POWER OF TRUST

Write-up about

Grid Sharing Solar UPS **10KW-150KW.**

Configuration

The Grid sharing solar UPS as the name suggests is a dual input UPS (Utility and the solar; where solar is the preferred source) which feeds the common load without any change-over (for sensitive and critical loads); however as the solar energy declines and becomes insignificant by evening; a fast change-over can be configured if the connected loads are not very sensitive. The total load is shared by the solar MPPT and the utility during mains availability and between battery and solar power during power failure.

The intelligent module utilises the entire power available from solar and in the event of a short-fall in power availability from solar, the mains power is drawn only to extent to compensate the deficit of power.

Maximum power point tracking (MPPT) technology (unlike the conventional PWM) ensures maximum utilisation of the available solar power.

Advantages

Unlike the conventional hybrid invertors the solar power is utilised to the maximum and the batteries need not be oversized for large backup.
The solar panel capacity can be gradually upgraded from 10% of the total power to 100% over a period of time reducing the initial burden of investment.
The output of MPPT is fed to the power sharing module which ensures that the maximum power from solar is utilized for the inverter to function. If the solar panel power availability is adequate to cater to the load demand, no power is drawn from the grid and the solar shall take care of the battery charging.

Arvi solar USP **- Conventional available solar power solution needs either battery (in PCU) or grid reference (in Grid-export models) to function; Arvi GSS solar power solutions can work** without **both of them.**

Solar Power Inverter

Double conversion, IGBT, MPWM based inverter converts the DC to regulated pure sinewave AC. For safety reasons, isolation is provided between the input and the inverter output.

Let us explain how our concept works.
Assuming full capacity solar panel is chosen (for example 10kw panel for a 10KVA UPS) if sufficient sun light is present the panel will be sufficient to take care of the entire load. Supposing there is a surge load that demands more than 10KW, and then we have two choices.
a) Discharge the difference of power from battery /b) To compensate for the difference of power from the grid without battery being discharged.

Let us explain another case to give clarity in our concept.

Assuming a poor sunlight condition, the 10KW solar panel is able to deliver about say 4KW power, we need not change-over to utility (like a conventional hybrid inverter), the grid power will be utilised only to the extent to cater to the difference in power.
Assuming load demand of about 9KW, the solar will contribute 4KW and the grids will simultaneously/ parallel supply the remaining 5KW.
The concept of Grid **sharing** solar UPS focuses on

a) Harnessing maximum energy from solar depending on the feasibility of investment.
b) Reduces the burden of initial investment.
c) Reduce the huge investment on batteries for long back up in Online UPS applications.

Grid sharing UPS necessarily has a solar PV panel (for energy harnessing from virtually inexhaustible source with no adverse environmental effects), an efficient MPPT charge controller cum convertor and an invertor to convert the DC to a pure regulated sinewave output.

The PV maximum output power is dependent on the operating conditions and varies due to variations in solar energy because of cloud and sunset. Solar cells have a complex relationship between solar irradiation, temperature, and total resistance that produces a non-linear output efficiency known as the I-V curve. This necessarily means that load shall not draw current beyond a point wherein the solar power delivery falls to almost zero, at the same time drawing a lesser power allowing the extra power unutilized. This necessitates the need of a smart power monitoring and converting technique rather than a simple PWM charge controller.

The critical component in the solar UPS is the Maximum power point tracking (MPPT) charge controller. MPPT is a technique that solar inverters use to get the maximum possible power from the PV array. It is the purpose of the MPPT system to sample the output of the cells and apply a resistance (load) to obtain maximum power for any given environmental conditions. Essentially, this defines the current that the inverter should draw from the PV in order to get the maximum possible power (since power equals voltage times current).

The output of MPPT is fed to the power sharing module which ensures that the maximum power from solar is utilized for the inverter to function. In the event of a short-fall in power availability and demand of the load, the mains power is drawn to compensate the deficit to the difference of power required.

If the solar panel power availability is adequate to cater to the load demand no power is drawn from the grid and the solar shall take care of the battery charging.

Solar Power Inverter

For safety reasons, isolation is provided between the input and the inverter output. The DC to AC conversion is done using IGBTs with MPWM to generate network grade clean, pure sine wave output.