

Overvoltage protection for grid inverters

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1. Input overvoltage protection: When the input voltage of the DC side is higher than the maximum allowable DC array access voltage of the grid-tied inverter, the inverter cannot start or stop within 0.1s (running) and a warning signal is emitted. released at the same time. After the DC side voltage is restored to the allowable working range of the inverter, the inverter should power on and operate normally.

2. Input reverse connection protection: When the positive input terminal and negative input terminal of the solar inverter are reversely connected, the inverter should be able to protect itself automatically. When the polarities are correctly connected, the equipment should be able to work normally.

3. Input overcurrent protection: After connecting the PV modules in series and parallel, each string is connected to the DC side of the solar PV inverter. After MPPT interference, when the input current is higher than the maximum allowable DC input current set by the inverter, the inverter (in operation) stops the MPPT interference and sends a warning signal. After the DC side current returns to the operating range allowed by the solar inverter, the inverter should be able to start up and operate normally.

4. Output over-current protection: Over-current protection needs to be set on the AC output side of the grid-tied inverter. When a short circuit is detected on the grid side, the grid-tied inverter should stop supplying power to the grid within 0.1s and send out a warning signal. After removing the fault, the grid-tied inverter should work normally.

5. Output short circuit protection: In case of inverter output short circuit to the grid, short circuit protection measures must be taken. The short circuit protection action time of the inverter should not exceed 0.5s. After removing the short circuit fault, the equipment should work normally.

6. AC/DC surge protection: The on-grid solar inverter must have lightning protection function, and the technical index of the lightning protection device must ensure that it absorbs the expected impact energy.

8. Output overvoltage/undervoltage, overfrequency/underfrequency protection: On the AC output side of the grid-tied inverter, the grid-tie inverter must be able to accurately determine the overvoltage/undervoltage, overfrequency/ underfrequency and other abnormal conditions of the power supply network (wiring). The inverter connected to the grid must protect according to the required time. A warning signal should be issued when cutting. When the grid voltage and frequency return to the allowable voltage and frequency range, the inverter should be able to start normally.

10. Overheat protection: The grid connected inverter must have overheat protection functions, such as internal ambient temperature too high alarm (such as temperature too high in case of fire), too high temperature of key components in the machine (such as IGBT, Mosfet, etc.).



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11. Grid-tied protection automatic recovery: After the grid-tied inverter stops supplying power to the grid due to grid failure, the grid-tied inverter should be able to automatically send power to the grid 5 minutes after the mains voltage and frequency return to normal range for 20 s. In power supply, the output power should increase slowly, but without affecting the network.

12. Insulation resistance monitoring: The grid tied inverter has a complete insulation resistance monitoring function. When the electrical part of the equipment is grounded, the insulation monitoring system should be able to immediately monitor the status of inverter fault, shutdown and alarm. The inverter calculates the grounding resistance of PV+ and PV- by detecting the grounding voltage of PV+ and PV-. If the resistance of any side is less than the threshold, the inverter will stop working and the alarm will display "low PV insulation resistance".

13. Leakage current monitoring and protection: The solar grid tie inverter has perfect leakage current monitoring function. In the process of inverter operation, it monitors the leakage current in real time. When the monitored residual current exceeds the following limits, the inverter should be disconnected from the grid within 0.3s, and a fault signal should be sent: As for inverters with rated output less than or equal to 30KVA: 300mA; As for inverters with nominal power greater than 30KVA: 10mA/KVA.

This time last week I was at the 2019 All Energy Conference and Exhibition in Melbourne. Or — if I have been lazy getting this article out — it was this time last week plus or minus one day. Mostly plus.

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