

Insulation Resistance



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Introduction:

Due to the bad weather the number of phone calls to Huawei Service Support increased regarding with ISO (Insulation Resistance) issues. So it is a good time to look at what these problems are, what causes them and how to overcome them.

Inverter will check if the ISO is less than 100K Ω each time before it enters into operation mode and feed in the Grid. If the isolation resistance is less than 100 K Ω the inverter will release **Alarm ID 313, Reason ID 1** that can be seen on the LCD display of 8 to 28 KTL SUN2000 and through mobile app of SUN2000 33 to 42 KTL. During operation if the inverter detects that the insulation resistance is less than 100 K Ω the inverter will stop working and will release **Alarm ID 313, Reason ID 1 or 2.**

This is not an Inverter hardware failure, the inverter only detects fault, this failure can occur during initial installation or commissioned solar plants in an existing PV system. An isolation fault may disappear and recur after a short period (especially if it is caused by morning moisture), therefore it is recommended to troubleshoot the fault as soon as it occurs, before it may temporarily disappear. If this fault is encountered, you need to check the insulation on DC/AC side.

Possible cause:

- Damaged AC cables, or installation mistake low distance between the phases and grounding.
- Damaged PV panels or DC wires, such as mounting screw through the back of a module or a conducting wire pinched against a mounting rail;
- Poor connection between PV panels caused by poor quality or aging of cable junction;
- Water ingress or damp condensation in junction box due to not properly sealed junction box or DC isolator enclosure, which will lower the insulation resistance and cause an Insulation fault.

To find the fault the following checks should be done:

1. Check the inverter's AC side connections and repeat the commissioning procedure.
2. Check if the inverter is well grounded
3. Make measurements of the insulation resistance between the positive and ground and negative and ground

How to measure the insulation resistance of a string:

- Turn OFF the inverter DC switch which situated at the left bottom side of the inverter.
- Disconnect all strings connected to the inverter
- Measure the insulation resistance (+, -) polarities of each cable and the ground for one string of module array to verify that there is no insulation failure.

Note: *The insulation resistance of the cable including the photovoltaic modules will be measured.*
Acceptable value if measurement is done by using 1000V Megger is 400K Ω or higher.

Test the string resistance using the insulation tester:

1. Connect the positive and negative connectors of the first or last module in the string to the branch cable.
2. Connect the positive probe of the insulation tester to the branch cable.
3. Connect the negative probe of the insulation tester to a ground point.
4. Select 500V testing on the insulation tester.
5. Test the insulation.