

# Troubleshoot Ground Fault on Huawei SUN2000 Inverters



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Version	Created by	Date	Remarks
03	Huawei e84081311	30.11.2018	Initial version created

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If the inverter stops production and the Alarm ID **313-1 (Low Insulation Resistance)** or **318-1 (Abnormal Residual Current)** is displayed in the Smartlogger1000&2000 or SUN2000 app, it means a short circuit occurs between the PV string and the ground (ground fault, Fig. 1), damage AC cable or the ambient moisture level is too high to pass the inverter insulation resistance check. For the latter situation, the inverter will usually start up after the moisture evaporates later in the day.

If this fault is encountered, you need to check the insulation on DC/AC side.



Fig.1 some ground fault conditions (PV connector disconnected and fallen to the ground; PV wires strangled by tracker metal)

**Possible cause:**

- Damaged AC cables, or installation mistake low resistance 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 for the strings

**How to measure the insulation resistance of a string:**

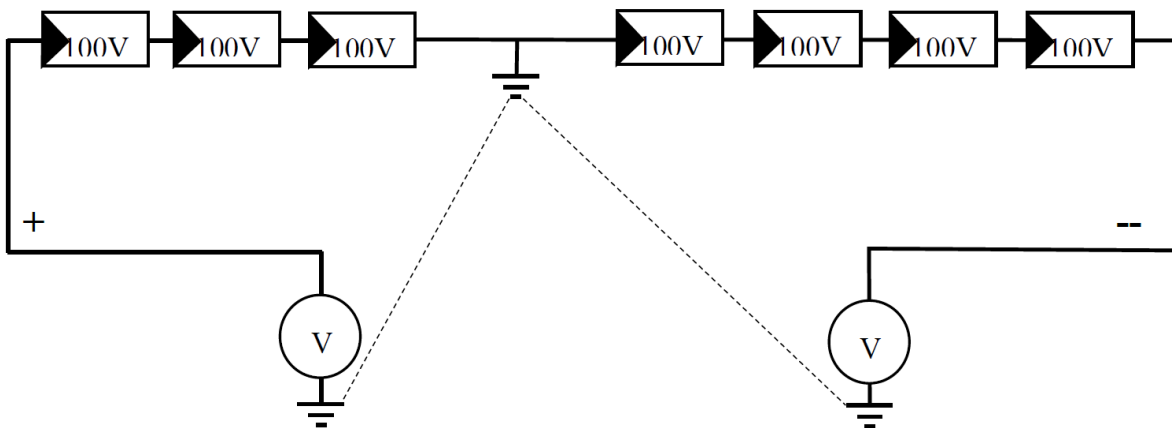
Disconnect the AC breaker to the inverter first, open the DC switches, and unplug all the strings from the inverter

- Measure the voltage between the positive terminal and the ground potential (PE).
- Measure the voltage between the negative terminal and the ground potential (PE).
- Measure the open circuit string voltage between the positive and negative terminals.

On a healthy PV string, the measured voltage between a string terminals to ground should show an initial value and quickly bleed down to zero. However, if the following results are present at the same time, there is a ground fault in the PV string:

- Terminal to ground voltage reading is stable.
- Sum of the two voltages to ground is approximately equal to the open circuit string voltage.

• If a ground fault is present, determine the location of the ground fault via the ratio of the two measured voltages and eliminate the ground fault. For example, on a 700V open circuit string, if the ground fault location is between the 3rd and 4th modules, the voltage between positive terminals to ground would be 300V and the voltage between negative terminals to ground would be -400V.



If the alarm still presents, please download the log file using SUN2000 App and contact Huawei service team.