

Low PV Insulation Resistance Issues

(Error 039 / 302)

Disclaimer

The material in this document has been prepared by Sungrow Power Supply Co., Ltd. and is intended as a guideline to assist solar installers for troubleshooting. It is not a statement or advice on any of the Electrical or Solar Industry standards or guidelines. Please observe all OH&S regulations when working on SUNGROW equipment.

A Low Insulation Resistance Error (039 for Grid-Connected and 302 for Hybrid Inverters) indicates that there could be an Earth Fault in the PV array. There can be a few things causing this issue; hence, they all need to be checked. Most low system insulation resistance problems are caused by wet weather and will recover when weather conditions improve. If it does not recover in sunny weather or for a long time, follow the steps below.

1. Firstly, the insulation resistance for each PV string needs to be measured safely in accordance with local and national standards. The Australian AS/NZS: 5033: 2014 inc amdt 1&2 Appendix D4 will be used as an example. This needs to be checked between the Positive and Earth as well as the Negative and Earth terminals with the array(s) disconnected from the inverter.
2. If the insulation resistance is less than minimum insulation resistance (see below table - less than 1 MΩ) for each string by using Insulation Resistance Tester ('megger' or similar), check electrical devices on the DC cable (such as rooftop isolator) to make sure it has not been affected by moisture, and the DC cable and PV terminals for damage etc.

System voltage ($V_{oc\text{ste}} \times 1.25$)	Test voltage	Minimum insulation resistance, MΩ
<120	250	0.5
120–500	500	1
>500	1000	1

3. If the PV array and wiring are clear, please shut the inverter down and turn it back on after 10 minutes.

4. Test each set of strings on each MPPT input to identify which string / MPPT is causing the fault (e.g. only connect string 1 to the inverter and disconnect string 1 and only connect string 2 to the inverter).

If the issue still persists, contact SUNGROW.