

PV array polarity checking & voltage measuring before inserting PV strings to inverter

1. Check the PV string polarity

Use a multi-meter to check the PV string polarity, for EACH PV string.

Note: inverter would not present any clue on LCD display for a reversed polarity connection. Check the string polarity immediately if the inverter did not power up properly.

2. Check whether there is Ground Fault existing

Note: We need to **check it before inserting PV strings to inverter PV connector**. If the PV+ or PV- had contacted to Ground directly, for example, incorrect installation, negligence, broken seal, then there is possibility this may damage inverter.

Please following the below step to check it:

(1) Turn off Inverter DC switch, measure the voltage of PV positive to earth(V+), PV negative to earth(V-), and PV positive to negative(Voc) for each PV string.

In normal conditions, the V+ and V- should be 0 due to the fact that the PV strings are float and not grounded either on positive or negative pole. A voltage of $V_{oc}/2$ may be measured for the V+ or V- at first because of the parasitic capacitance of solar panels, but they will decay to zero rapidly and stabilize there.

(Either the earth terminal at inverter output or at AC isolator can be used as the reference earth for the voltage test. To do this measurement, you need to unplug each PV string from the inverter. Sometimes, the MC4 connectors are not so easy to be disconnected. For convenience, you can open the cover of the external DC isolator and measure the voltage at positive and negative terminals instead.)

(2) If a non-zero V+ or V- is measured and the absolute sum of V+ and V- equals to Voc, that means a ground fault probably exist on the DC side of the system. It could be due to broken PV panel, damaged PV cables, etc.

(3) To locate the position of ground fault, you can use the following calculation method

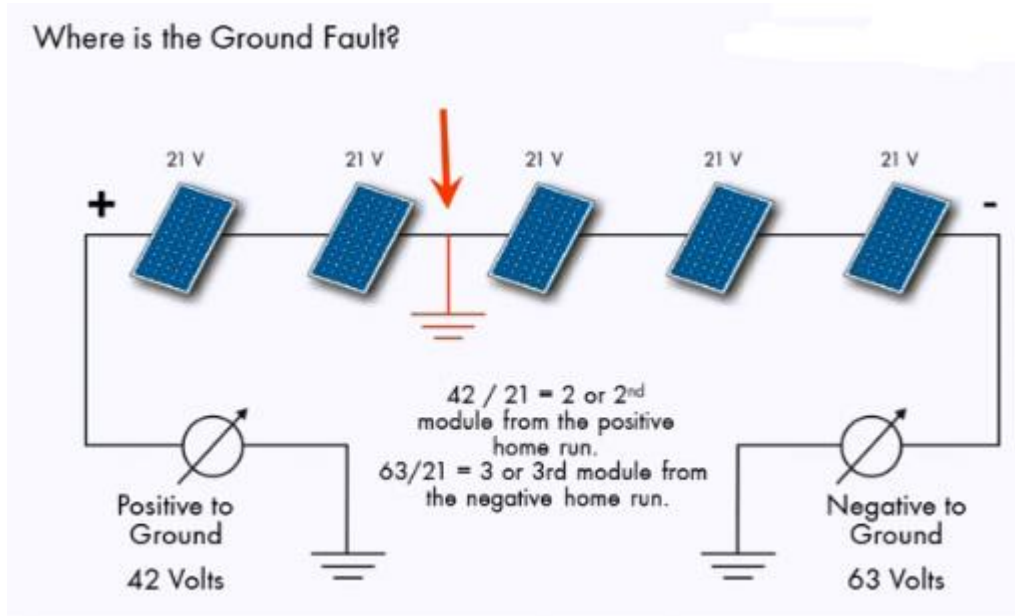
a. Calculate the open circuit voltage of PV panel (Vocp) by dividing Voc by the panel number in that string,

b. Divide Vocp into V+, you will get a number, i.e. the number is 3. That means the fault is located at a position between the 3rd and 4th panel from the positive pole of that string.

c. Do the above voltage measurement for each separate PV string to locate the faulty PV string and faulty position in that string.

Please check the below illustration for more information:

POS TO NEG = OPEN CIRCUIT VOLTAGE
 POS TO GND = 0V, NEG TO GND = 0V



P.s, when the inverter is reporting “PV Isolation Low”, the above troubleshooting measure is also can be used to identify where is the ground fault.

Growatt Service Center