Optimizer offline

At the first point please do the following via fusiosnsolar web.

- Check the inverter and MBUS firmwares, upgrade if needed

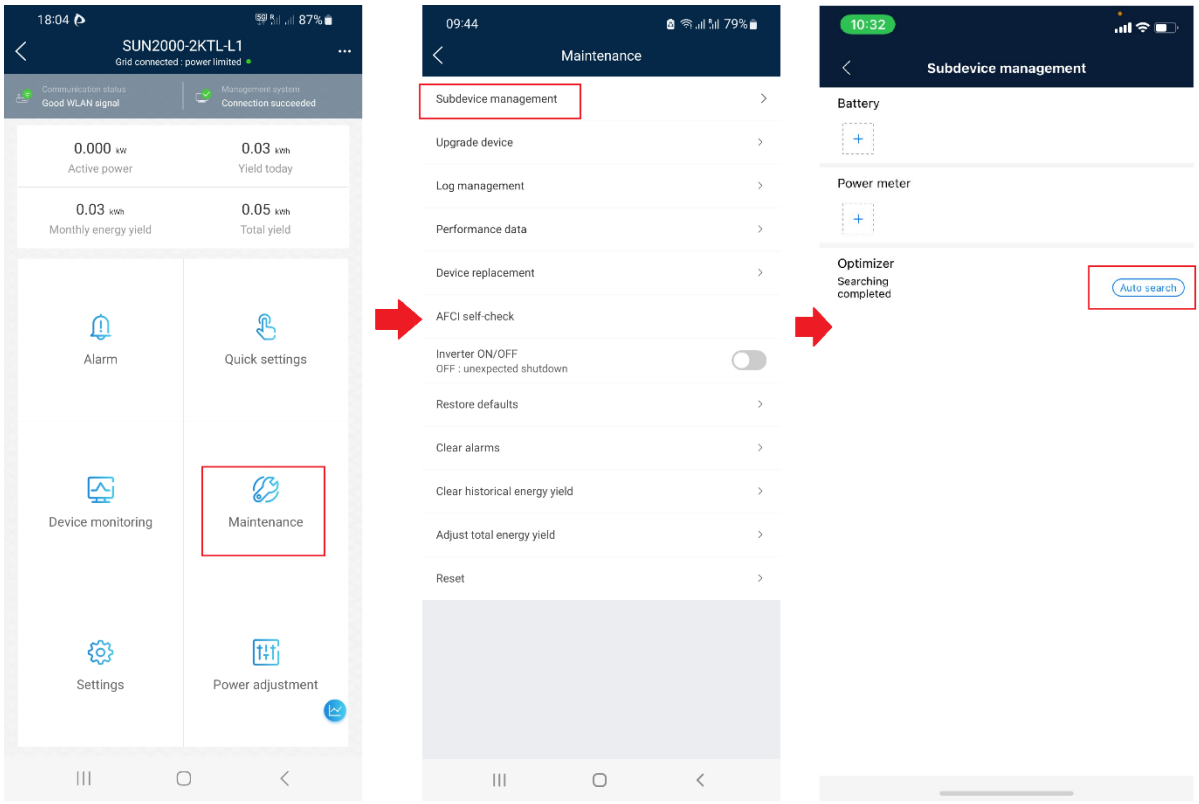
- Search optimizers during a good sunny weather.

If it doesn't solve the issue please proceed below at onsite

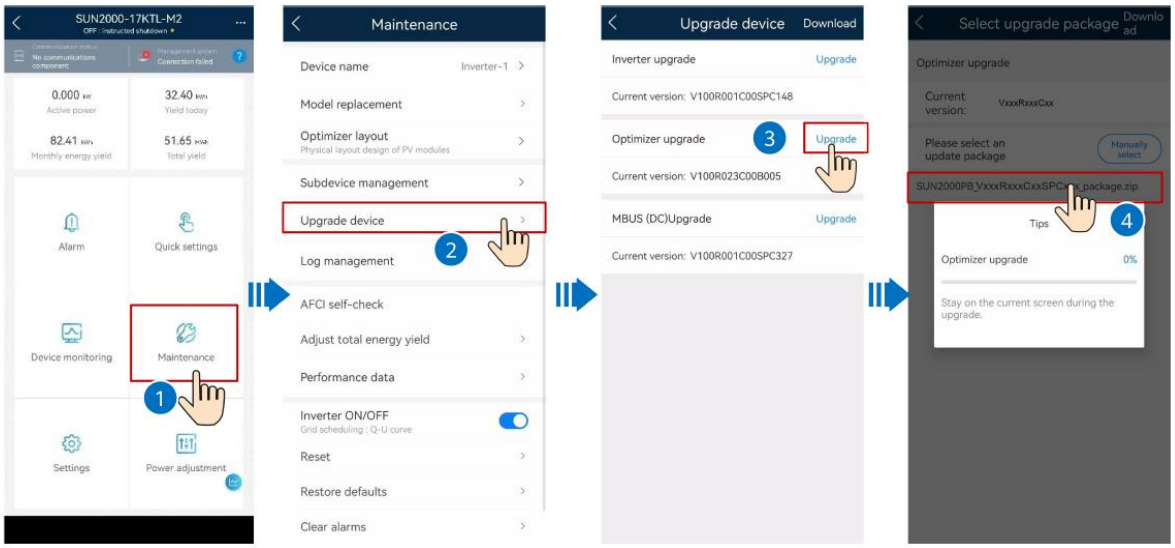
1) Login locally via fusionsolar app
2) Check the current version of MBUS, if it is other than V100R001C00SPC330 then do upgrade ***(Take screenshot/picture)***.

https://photomate.zendesk.com/hc/en-gb/articles/4707331277213-MBUS-DC-for-Inverters

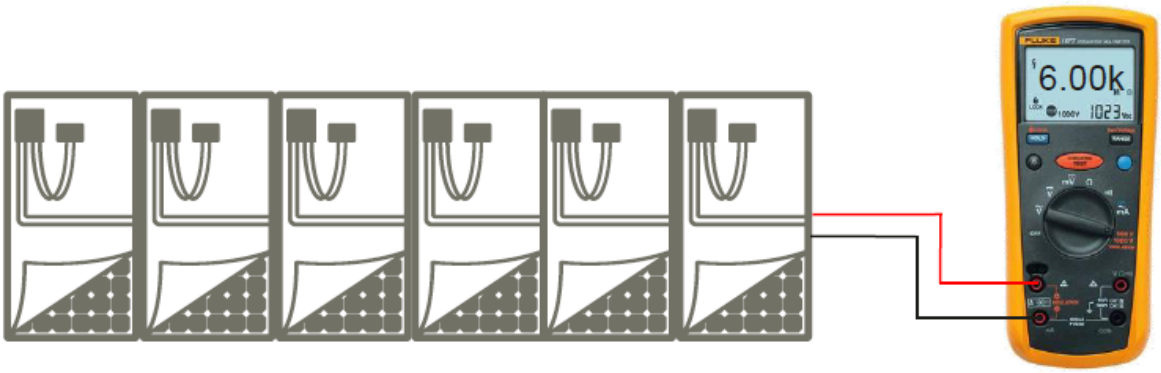
3) Check that the SN and location information of the optimizers are correct
4) Search for the optimizers again during the irradiance is good ***(Take screenshot/picture)***.
   Maintenance-> Subdevice Management -> Search optimizers



5) Check the current version of optimizer, if it is other than V100R002C10SPC019 then do upgrade, when the irradiance is good ***(Take screenshot/picture)***.

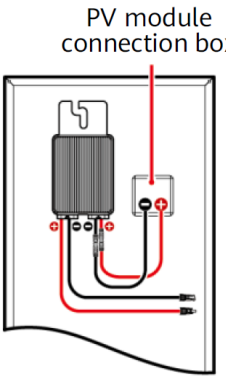


6) Measure the PV string resistance. Example: for 6 optimizers the resistance should be 6kOhm +/- 10%. ***(Take picture)***.

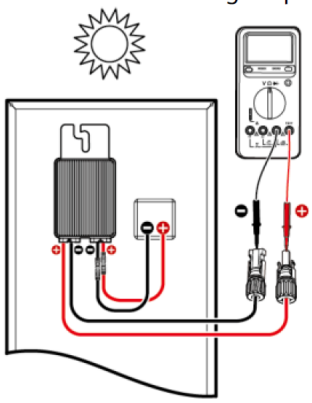


If it is different, then measure the resistance of individual disconnected optimizers (it should be 1 kOhm per optimizer).

1. Connect the optimizer input power cables.



2. Connect the positive probe of the multimeter to the positive output terminal of the optimizer and the negative probe to the negative output terminal. Check the output voltage and resistance of a single optimizer.

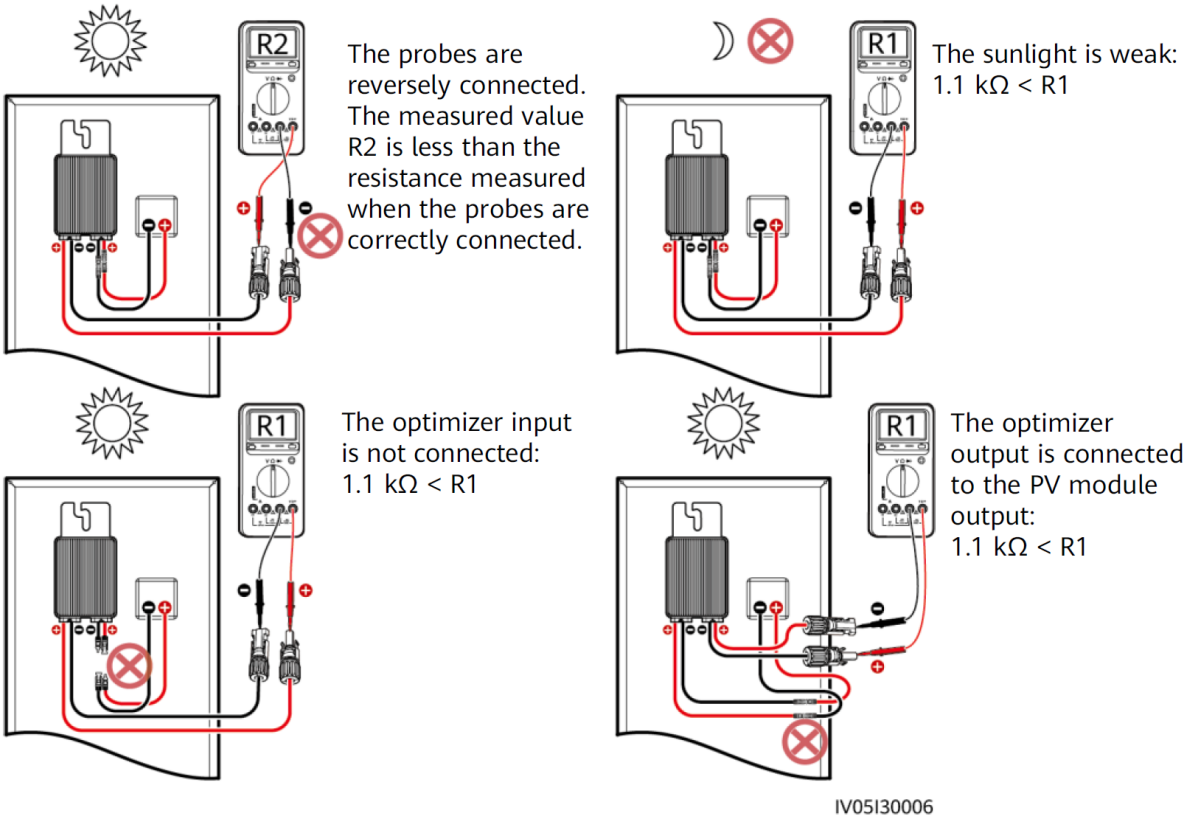


- The voltage V1 is 0 V.
- The resistance R1 is 1 kΩ (±10%).

If the probes are reversely connected, the measured resistance is less than the resistance measured when the probes are correctly connected, which might be less than 0.9 kΩ.

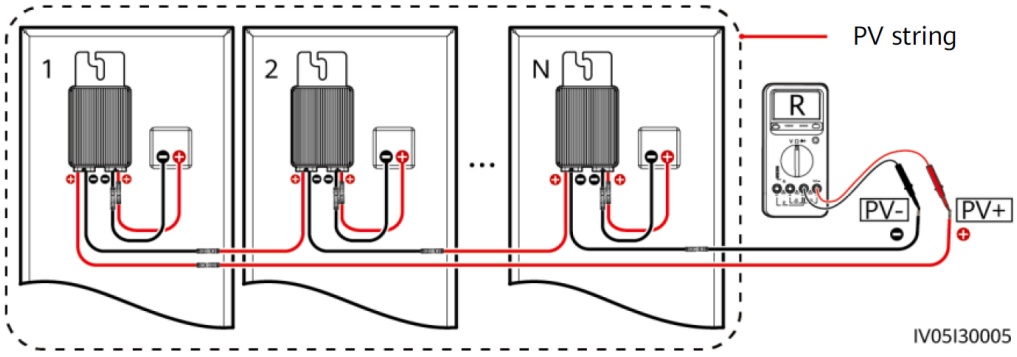
Resistance	Cause	Suggestions
0.9 kΩ ≤ R1 ≤ 1.1 kΩ	The optimizer is normal.	N/A
R1 < 0.9 kΩ	If the probes of the multimeter are correctly connected, the optimizer is faulty.	Replace the optimizer.
1.1 kΩ < R1	• The sunlight is weak. • The optimizer input is not connected. • The optimizer output is connected to the PV module output. • The optimizer is faulty.	1. Measure the resistance when the sunlight is sufficient. 2. Connect the optimizer input power cables. 3. Correct the optimizer cable connection. Connect the optimizer input power cables to the output cables of the PV module. 4. If the resistance is still abnormal, replace the optimizer.

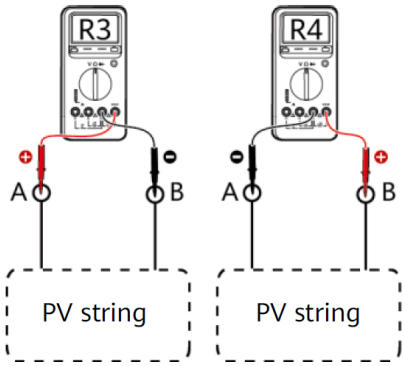
Common Exception Scenarios



3. Check that the optimizer input is properly connected, and connect the output power cables to the optimizer. Measure the PV string resistance when the sunlight is sufficient.

Full Configuration of Optimizers





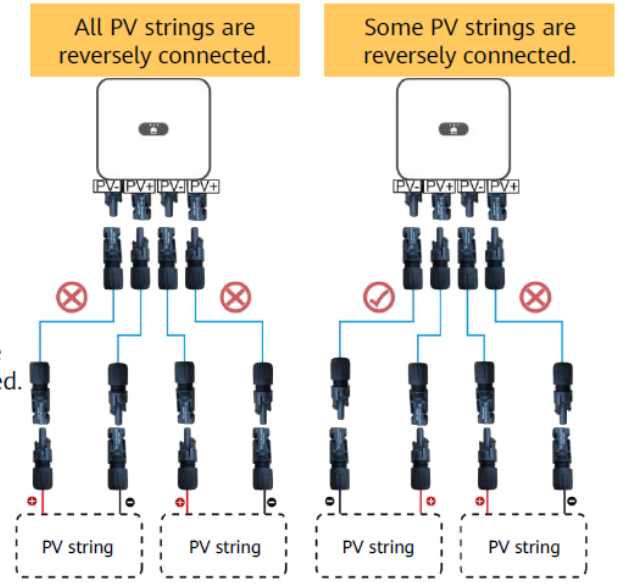
a. If R is infinite, an open circuit occurs in the PV string or the cables are connected to different PV strings. Rectify the PV string open-circuit fault and correctly group the PV string cables.
b. If R4 is less than R3, A is the positive cable of the PV string, and B is the negative cable of the PV string. If R3 is less than R4, B is the positive cable of the PV string, and A is the negative cable of the PV string. Attach correct cable labels.

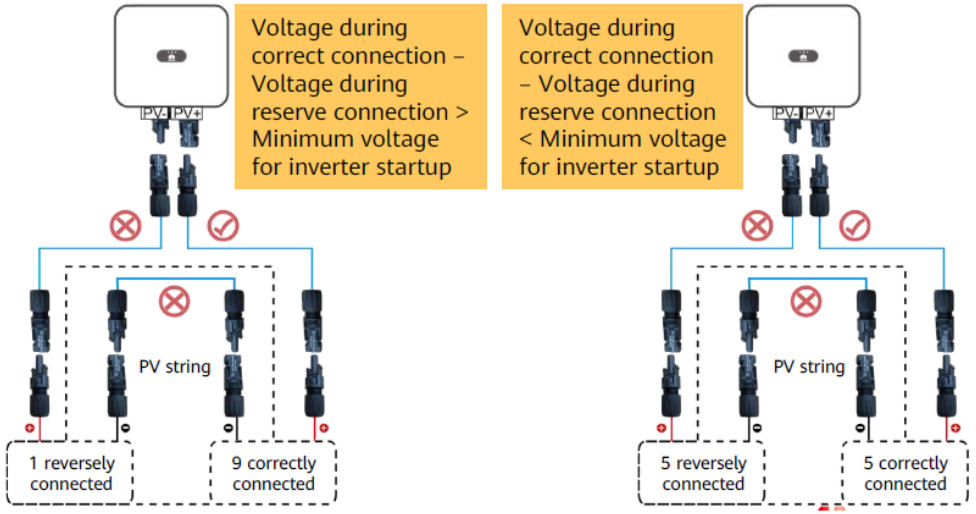
7) Check whether the input and output terminals of the optimizers are reversely connected and also optimizer extension cable made correctly. ***(Take picture)***

(Full configuration of optimizers) PV string reverse connection

Fault Mode	Symptom	Alarm
All PV strings are reversely connected.	The networking is normal. Voltages of all PV strings are low and cannot be adjusted. The inverter is in the irradiation detection state.	Inverter alarm: Abnormal PV Module Configuration (ID = 3)
Some PV strings are reversely connected.	The networking is normal, with a backfeed current from the faulty PV string to the inverter.	Inverter alarm: PV string reversed (ID = PV string number)
Some optimizers of PV strings are reversely connected: Voltage during correct connection – Voltage during reserve connection > Minimum voltage for inverter startup	The networking is normal. After the inverter is connected to the power grid, the abnormal PV strings can output power.	Optimizer alarm: Abnormal output voltage
Some optimizers of PV strings are reversely connected: Voltage during correct connection – Voltage during reserve connection < Minimum voltage for inverter startup	The networking is normal. After the inverter is connected to the power grid, the abnormal PV strings can not work.	Optimizer alarm: Abnormal output voltage

The extension cables with the same connectors at both ends are connected.





8) Measure the RISO on fully optimized strings ***(Take picture)***.

- Verify safe string voltage and current: max. 50V and 500mA.
- Connect the positive and negative connectors of the first or last optimizer in the string to the branch cable.
- Connect the positive probe of the insulation tester to the branch cable.
- Connect the negative probe of the insulation tester to a ground point.
- Select 500V testing on the insulation tester.
- Test the insulation.

If the resistance is less than 600kΩ in a single phase inverter or less than 1MΩ in a three phase inverter, continue checking this string's components to isolate the source of leakage. Always make sure to connect both negative and positive output connectors to the tester using a branch cable.