APS
Troubleshooting Guide

SOP-ED-09 A/0

ALTENERGY POWER SYSTEM INC.

Contact Information

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ECU issue

1. **LCD is completely blank**
   ECU might be failed, please contact APS technical support.
2. **LED shows no "IP" or keep "loading"**
   Please reset ECU. If the issue continues, please contact APS technical support.

Internet Problems

1. **LCD shows "-Web" and "60.190.131.228" IP**
   This means that the ECU has no connection to the router and APS EMA website.
   Troubleshoot as follows:
   1) Switch off the ECU
   2) Replug the Ethernet cable to the ECU and a broadband router.
   3) Switch on the ECU.
   If the issue continues, please contact APS technical support.

2. **LCD shows a good IP, but also shows "-Web"**
   This means that the ECU has no connection to the EMA website. The LCD shows a good IP (something other than 60.190.131.228), but also shows "-Web".

   Ensure the router can be connected to the internet and program all inverters UID number into the ECU local interface.
   1) The ECU is waiting for a response from EMA, and will likely show "+Web" soon. Wait a few minutes longer.
   2) Check that the ECU is connected to a broadband router and not a hub or switch.

3. **The ECU is using a static IP and cannot get a web connection**
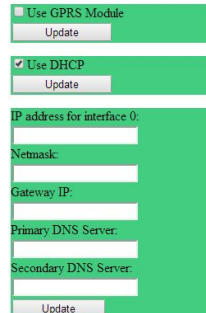   The ECU must be set up to use a static IP ad-dress.
   ✓ Use the ECU local interface to access to the ADMINISTRATION page.
   ✓ Click the "Network Connectivity" menu item.
   This allows you to see if the ECU is using DHCP or Static-IP, and allows you to change this setting if needed.

   NOTE: It is better contact IT staffs to work with you for the static IP setting.

☐ Use GPRS Module
Update

☑ Use DHCP
Update

IP address for interface 0:

Netmask:

Gateway IP:

Primary DNS Server:

Secondary DNS Server:

Update

4. Can I connect the ECU to a USB modem?

ECU cannot be connected to a USB modem and please connect the ECU to a broadband router with the Ethernet cable.

Communication Issues between ECU & Microinverters (Power Line Communication)

Power lines at the sites are used for inverters to communicate with ECU. Once ECU received the data from inverters, it can forward the data to the Server and EMA via the internet. Power line communication between the ECU and microinverters is completely separate from the ECU Internet communication. That is what makes the ECU a "gateway device". One side of the ECU communicates with microinverters via the power lines. The other side of the ECU communicates with the Internet using a standard Ethernet/network cable plugged into your broadband router.

1. Inverters are not detected by a brand new ECU

1) Is the system energized?
   ✓ Microinverters communicate only when powered by PV modules during daylight hours. Thus, a device scan or communication check is successful only during daylight hours.
   ✓ Check that Solar circuit breakers and Isolators in "ON" position

2) Is there an unbroken Neutral line from the load center to the solar array branch circuit? This is required for system communications.

3) Is the ECU on the same phase as microinverters?
   In some instances, Inverters are split into 2 phase to ensure phases balanced. Please plug ECU into an outlet of a circuit on the same phase as one string of inverters.

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4) Is another device causing interference?
- ✓ There may be interference on the line from a device at the site. In some instances, we've seen these devices interfere with power line communications:
    a) power strips and surge protectors on the same circuit
    b) UPS (Uninterruptible Power Supply) / battery backup units on the same circuit
    c) home automation/security devices that use power line communication
    d) battery chargers (cell phone and laptop chargers)
    e) AC adapters (laptop power cord)
    f) heavy rotating motors (e.g., fans, refrigerators, freezers, water pumps)
    g) workshop equipment (e.g., drill press, table saw, wood routers, planers)
- ✓ Try unplugging any other device that may be sharing the outlet with the ECU.
- ✓ Try relocating ECU to an outlet physically closer to the meter box (load center).

2. Inverters can be detected by ECU before but not now

1) Are inverters working properly?
- ✓ Check that Solar circuit breakers and Isolators in "ON" position.
- ✓ Check that all inverters are flashing green.

2) ECU might lose communication with the inverters.
- ✓ Reset ECU.
- ✓ Switch off ECU and then switch it on.
- ✓ Program all inverters' serial numbers into ECU manually.
- ✓ If issue continues, please contact APS technical support team.

3. How to identify an interfering load

You have to go through the load center, one circuit breaker at a time, to identify the source of interference. To do this:
- ✓ Turn off all circuit breakers except those for the PV array and for the ECU.
- ✓ Check the ECU to see that all microinverters are communicating.
- ✓ Turn on one additional circuit breaker and wait 10 minutes or so, to see if there is any interference.
- ✓ If not, turn on another circuit breaker and check again.

Using this method, you should be able to find out which circuit has the interfering load. You can then look at the individual loads on that circuit to see if you can see which device is causing the interference.

Microinverter / PV Module Issues

1. Microinverter LEDs and What they Mean

APS microinverters carry LED indicators, which are LEDs on the edge of APS microinverter YC200, YC250 and YC500.

2. The Microinverter LEDs are blinking green.

1) Slow green blinking lights (10s) indicates the microinverters are producing power as well as communicating with the ECU.

2) Fast green blinking lights (2s) indicates the microinverters are producing power, but not communicating with the ECU. If there is an ECU plugged in and operating at the site, this is likely a communications issue. see the "*Communication Issues between ECU & Microinverters (Power Line Communication)*".

3. The Microinverter LEDs are blinking red.

Red blinking lights indicate that the microinverter is not producing. To determine the problem, perform the following checks.

1) Is the system energized? Are the solar circuit breakers and isolators in the "ON" position?

For the microinverters to produce, the circuit breakers and isolators for the solar have to be in the "ON" position in the electrical load-center.

2) If the inverter blinking red is at the end of the string, please troubleshoot as follows:
   ✓ Turn off the string isolator
   ✓ Check end cap termination
   ✓ Disconnect AC connectors and reconnect it.
   ✓ Turn on the string isolator and see if the inverter LCD is blinking green.

If issue continues after completing the troubleshooting steps above, please replace this inverter.

3) If an inverter in the middle of the string is blinking red when adjacent inverters are blinking green, please replace the inverter blinking red.

4. The Microinverter LEDs are not lit

No lights indicate that the microinverter is not receiving power from the PV module.

1) Are the PV modules connected to the microinverters? PV modules power the microinverters, and microinverters cannot operate unless powered.

2) Check the PV module VOC (Open Circuit Voltage) and reconnect the DC lead of modules and inverters.

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✓ Use a volt meter to measure the PV modules VOC and ensure module faction well.

✓ Ensure the lead from the PV module is connected to DC lead on the microinverter properly.

If the issue continues after completing the troubleshooting steps above, please replace this inverter.

Power Production issue

1. The unit under review shows low production.

1) Has shading been ruled out as a possible cause?

✓ Please check 7-day system performance. If the periods of low production are fairly consistent and happen at the same time of day, shading is likely the cause. The following EMA screenshot shows an example of a system with shading impacts.
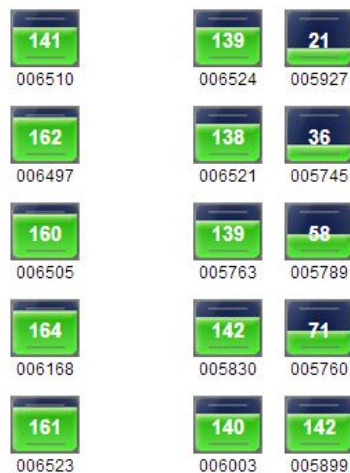

✓ Check DC Measurement in EMA.

You can use EMA to gain a more detailed analysis of the problem. The DC measurements taken by the microinverter and viewable in EMA are key to identifying root cause of the problem. To view the DC measurements, click "Performance graph" in EMA.

If the DC voltage is always lower than 30V, the module might be failed. Please let an electrician measure the VOC of the module to identify if module is faulty. The following EMA screenshot shows an example with a faulty module.
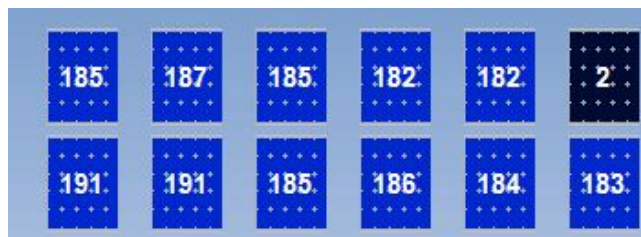

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DC Voltage Generated
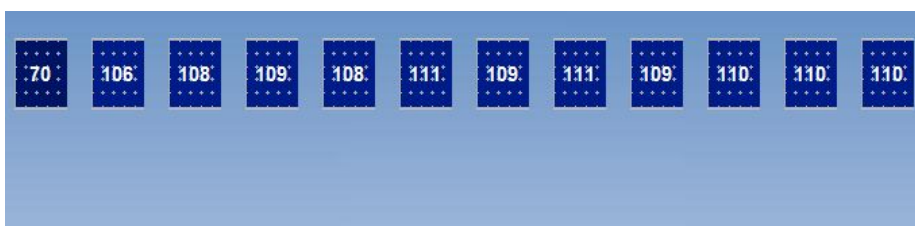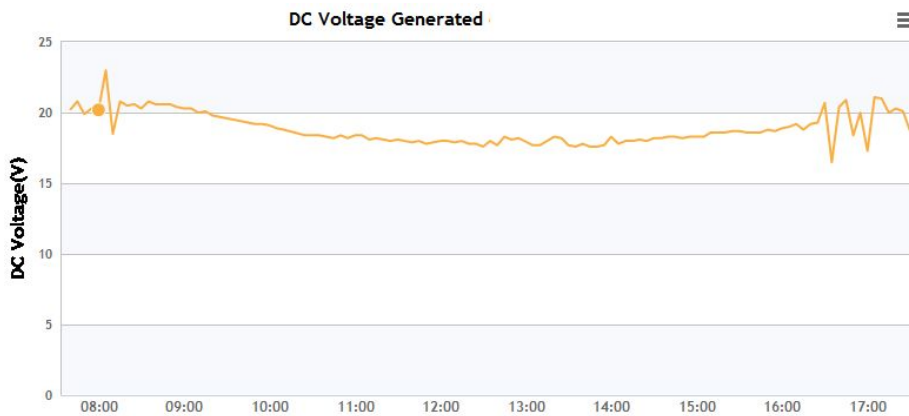
2. Why is one unit showing 0W production when adjacent units are productive?

1) Is an incorrect inverter serial number programmed into ECU manually?
If the unit showing 0W production since installation, this may be that a wrong serial number was programmed into ECU manually, so please check it on ECU local interface.

2) ECU might stop to search the inverter because of the interference. Please delete the inverter' serial number in ECU and reprogram it into ECU via ECU local interface page. To program a serial number into ECU, please see the steps below:

✓ Type the IP address such as 192.168.1.3 on ECU display into the browser of a computer and open the ECU local interface.
✓ Click "administration" and "ID management" and delete or input a serial number.

3) Alternatively the inverter might not produce because of an inverter failure, especially the inverter always reported to EMA but stopped reporting and showing 0W. Please contact APS technical support for further analysis and support.
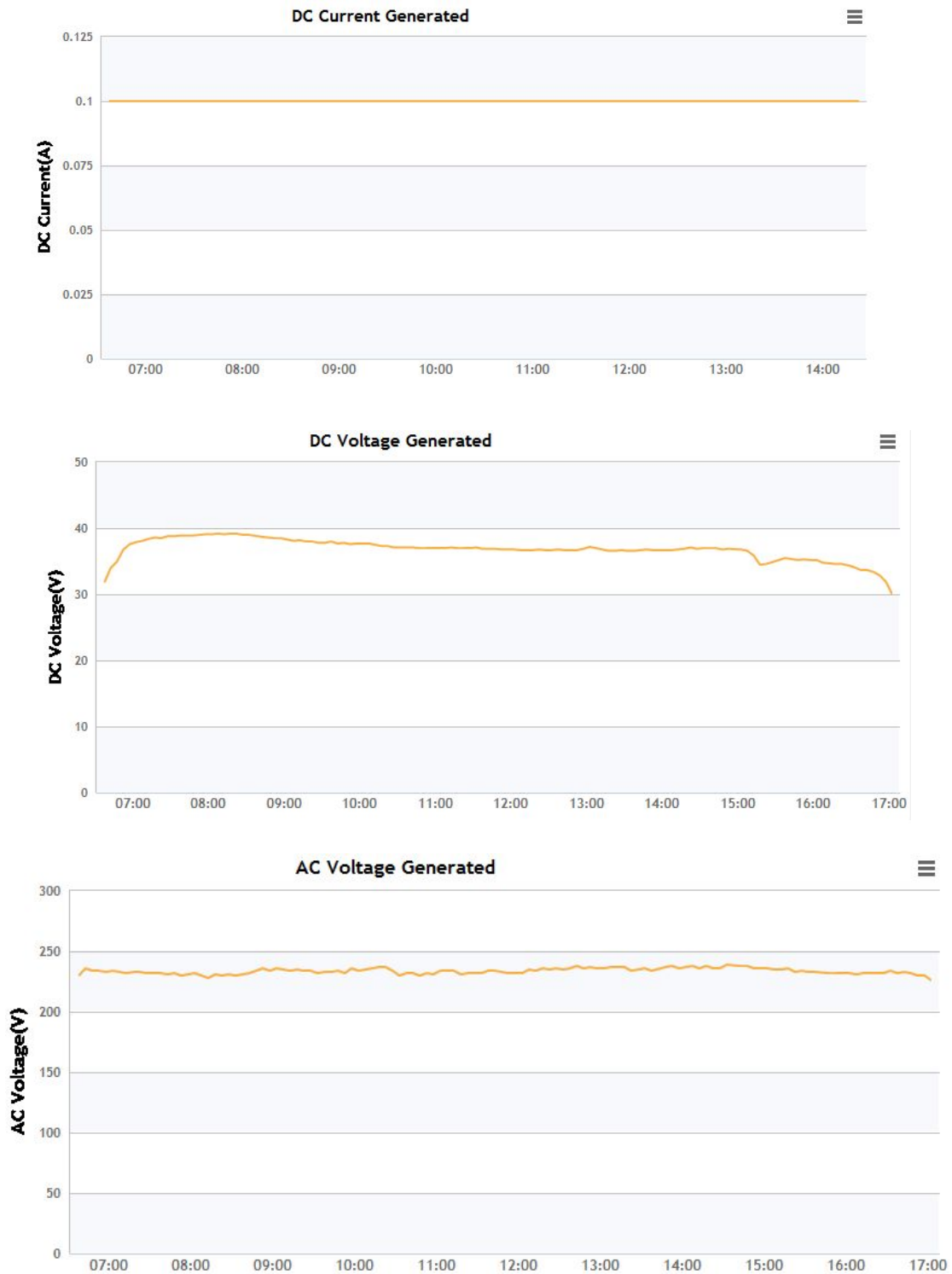
3. Why is one YC250 unit or one input of YC500 showing 2W, 3W or 4W production when adjacent units are productive?


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Check DC &AC Measurement in EMA

1) If Vdc is around 30V and Vac and frequency is normal while Idc is almost 0A, inverter might be failed. The following EMA screenshot shows an example of a faulty inverter.
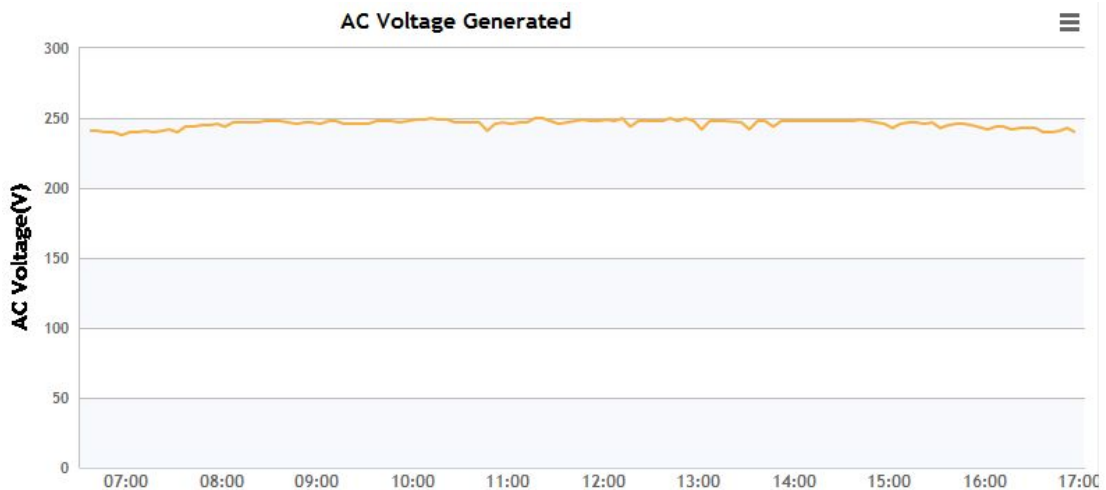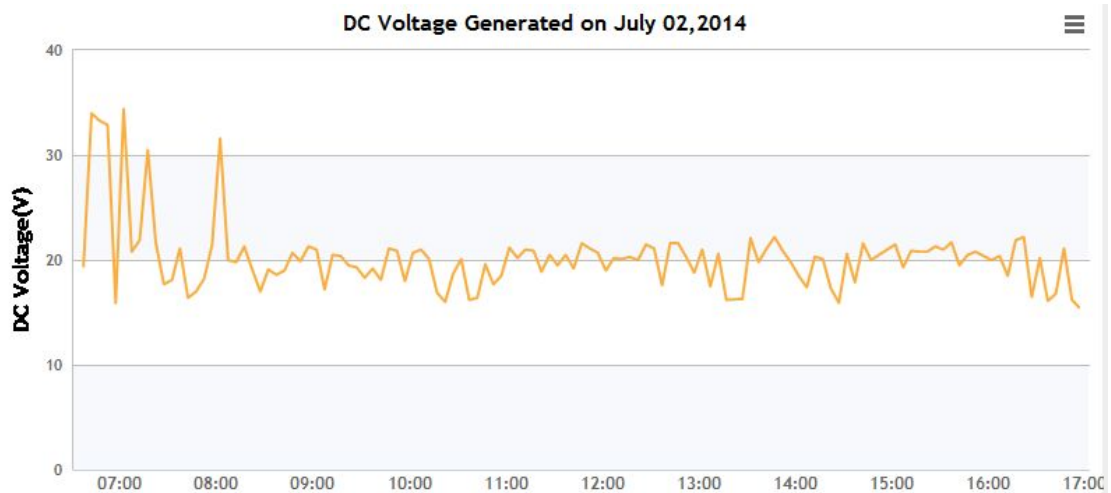
DC Current Generated

[Chart: DC Current(A) vs time from 07:00 to 14:00. Y-axis 0 to 0.125. Orange line flat at approximately 0.1.]

DC Voltage Generated

[Chart: DC Voltage(V) vs time from 07:00 to 17:00. Y-axis 0 to 50. Orange line rising from ~32 to ~38, peaking near 39, gradually declining to ~30 by 17:00.]

AC Voltage Generated

[Chart: AC Voltage(V) vs time from 07:00 to 17:00. Y-axis 0 to 300. Orange line fluctuating around 230-240.]
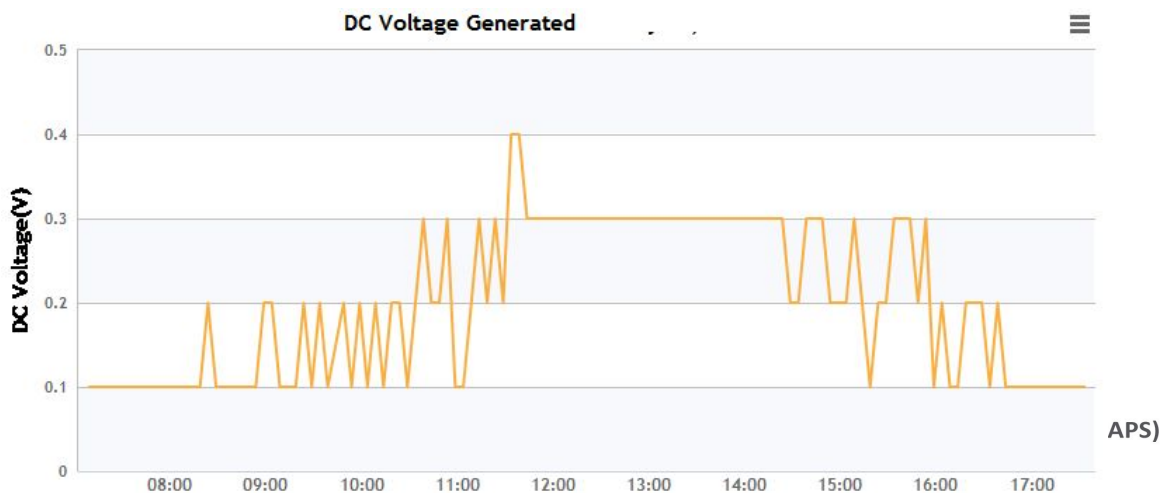
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2) If Vdc of the YC250 unit is around 30V while Vac is abnormal. This indicates the inverter is disconnected from the grid and loose AC plug connection or faulty AC connectors might be the cause.

**DC Voltage Generated**

AC Voltage Generated

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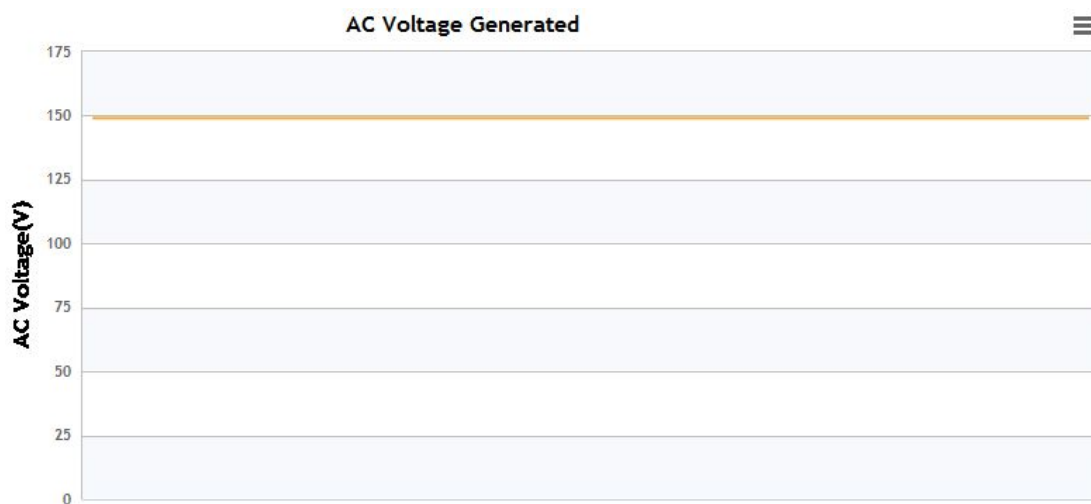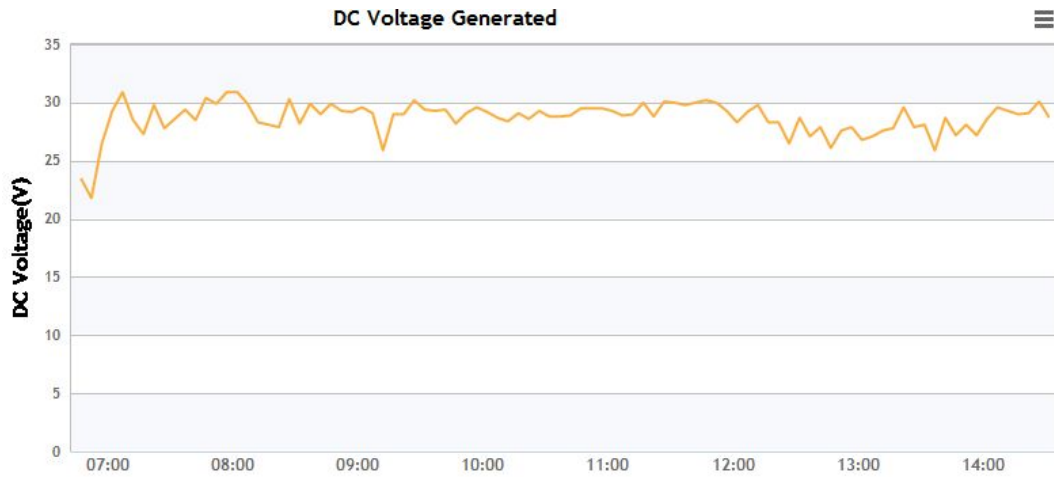
3) If Vdc is around 20V or lower than 20V while Vac is normal, the module might be faulty.


DC Voltage Generated on July 02, 2014

AC Voltage Generated

4) If Voc is almost 0 V while there is Idc reading, the module may be the cause, so please measure the open-circuit voltage (VOC) of the module first. Alternatively, inverter is failed, so please contact APS technical support. See the screenshot below.


DC Voltage Generated

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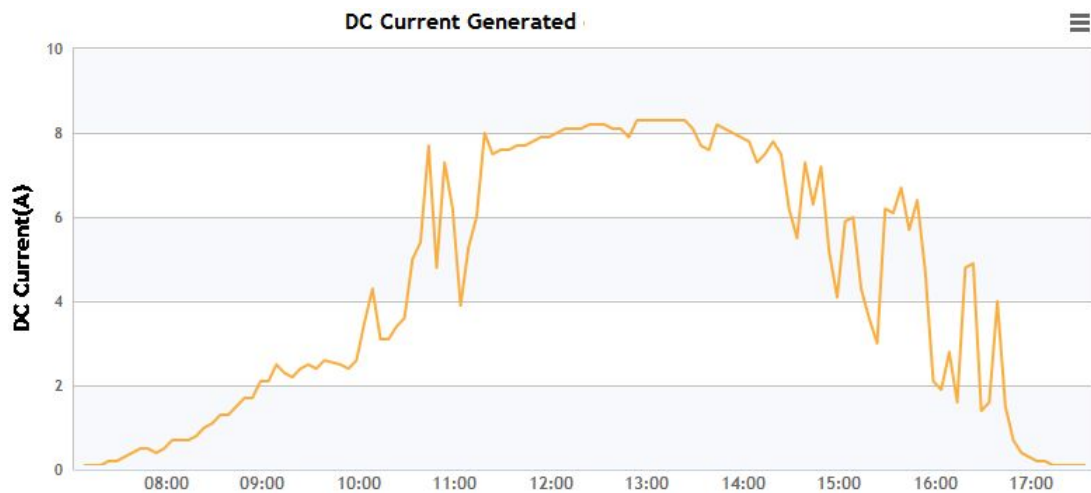
4. Why are A and B inputs of YC500 showing 2W, 3W or 4W production when adjacent units are productive?
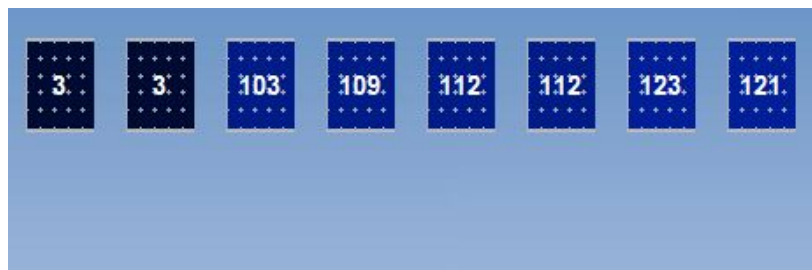
1) Vdc is around 30V while Vac is abnormal. This indicates the inverter is disconnected from the grid. Alternatively, loose AC plug connection between inverters might be the cause, see the troubleshooting below:
   ✓ Switch off the string isolator
   ✓ Disconnect the AC connector of the inverter and reconnect properly
   ✓ Switch on the string isolator and wait for 2 minutes.

If issue continues after completing the troubleshooting steps above, please replace this inverter.

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DC Voltage Generated

AC Voltage Generated
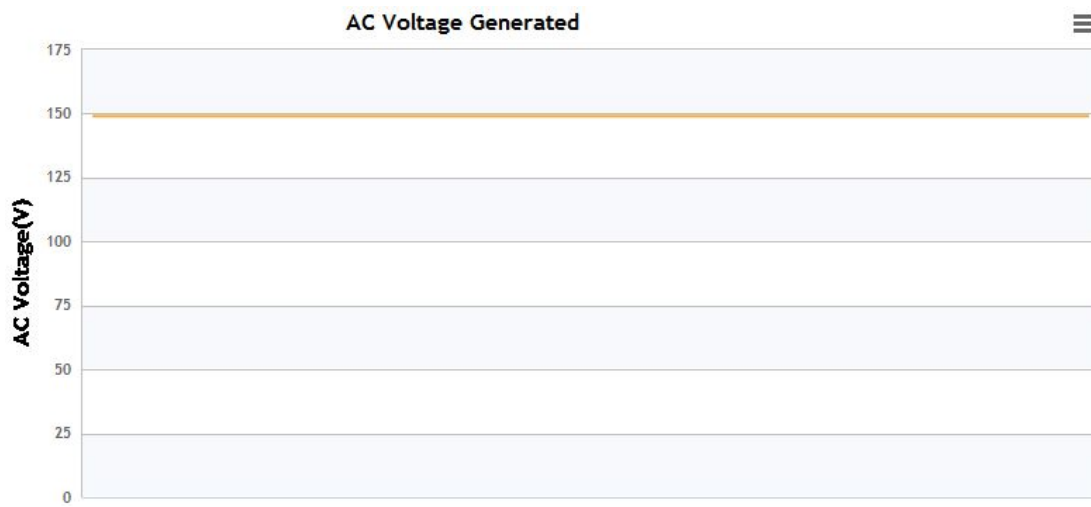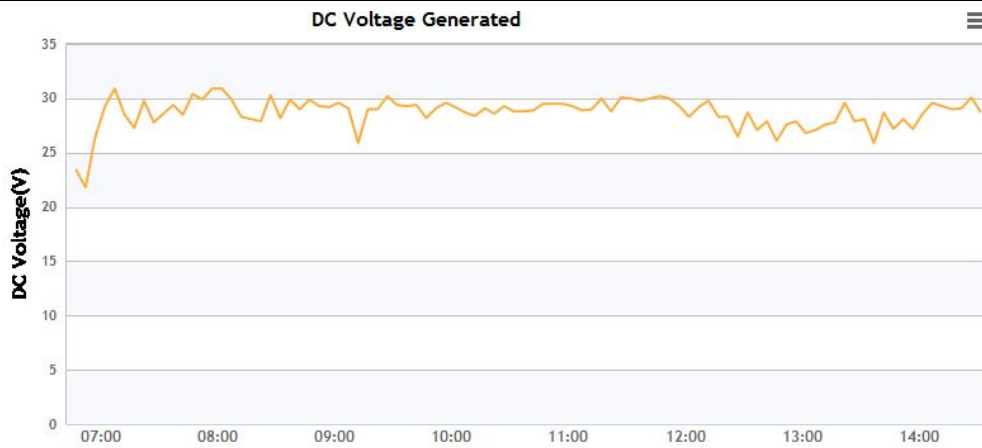
2) Vdc is around 30V and Vac is normal while Idc is almost Zero.This indicates the inverter is fault, so please replace it.

DC Current Generated

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DC Voltage Generated
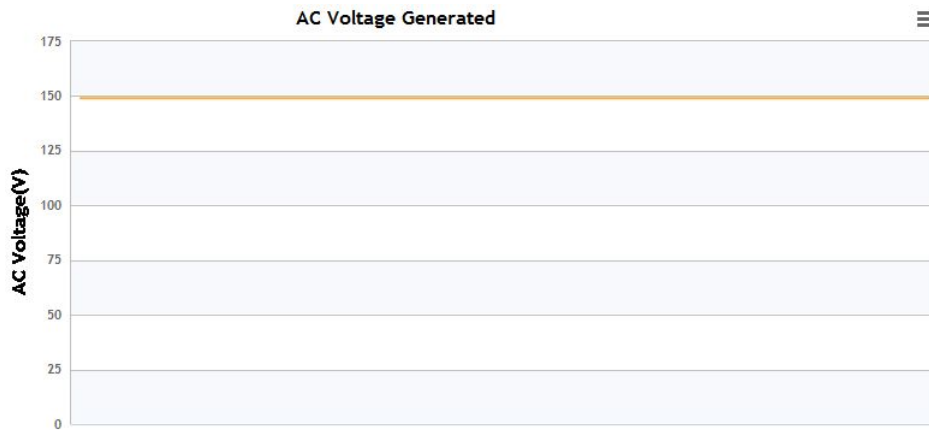

AC Voltage Generated
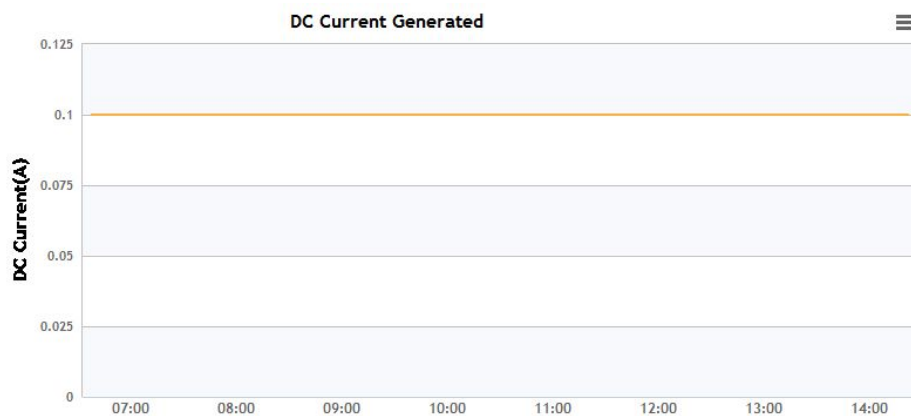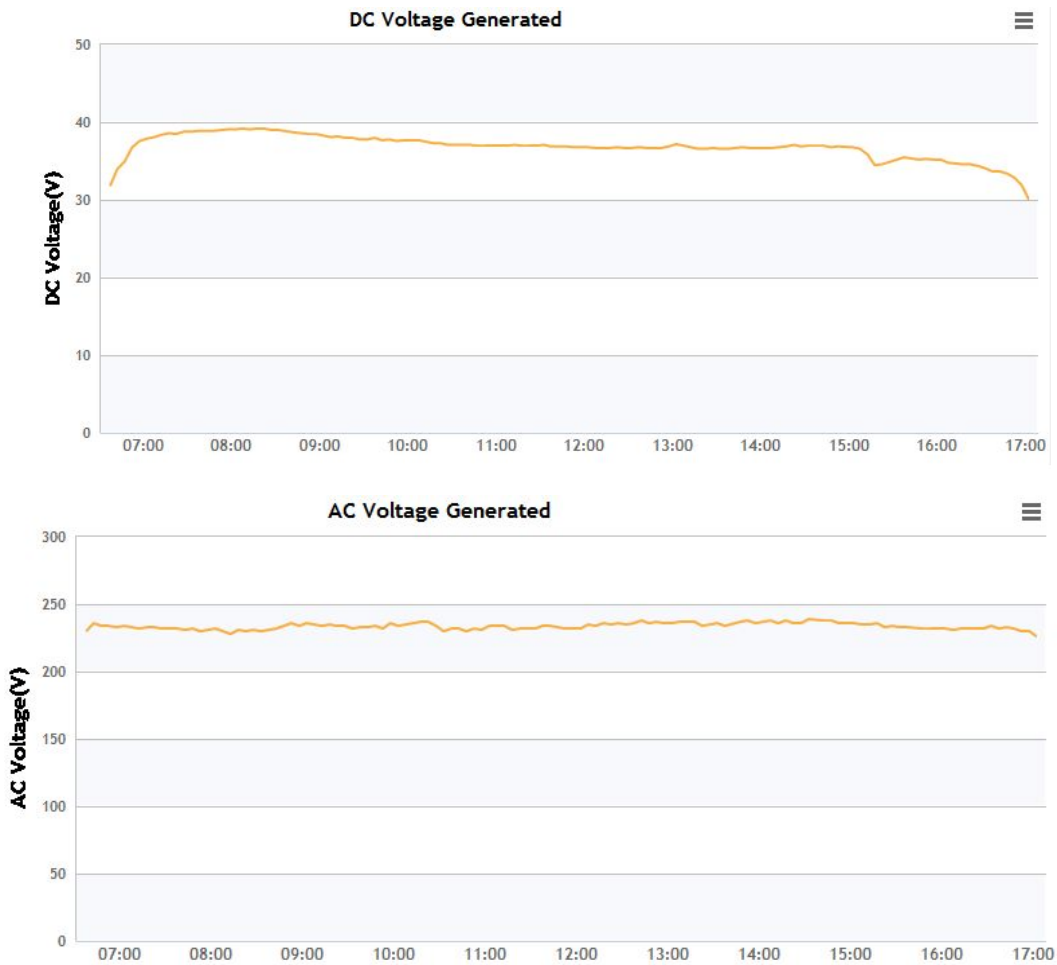
5. Why are couples of microinverters showing 2W, 3W or 4W production when adjacent units are productive?

    Check AC Measurement in EMA of these units and Vac should be always abnormal like the screenshot below. This indicates that these 3 inverters is disconnect from the grid. Loose AC plug connection or faulty AC connectors might be the cause. Please check the AC plug connection on the roof.

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AC Voltage Generated

6. Why are all microinverters in one string showing 2W, 3W or 4W production when adjacent units are productive?

Check AC Measurement in EMA of these units and Vac should be always abnormal like the screenshot below. This indicates that the string is disconnected from the grid. Check that Solar circuit breakers and Isolators in "ON" position.

AC Voltage Generated

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