

Altenergy Power System Energy Communication Unit (ECU)

Installation and User Manual

Version 3.0



ALTENERGY POWER SYSTEM INC.

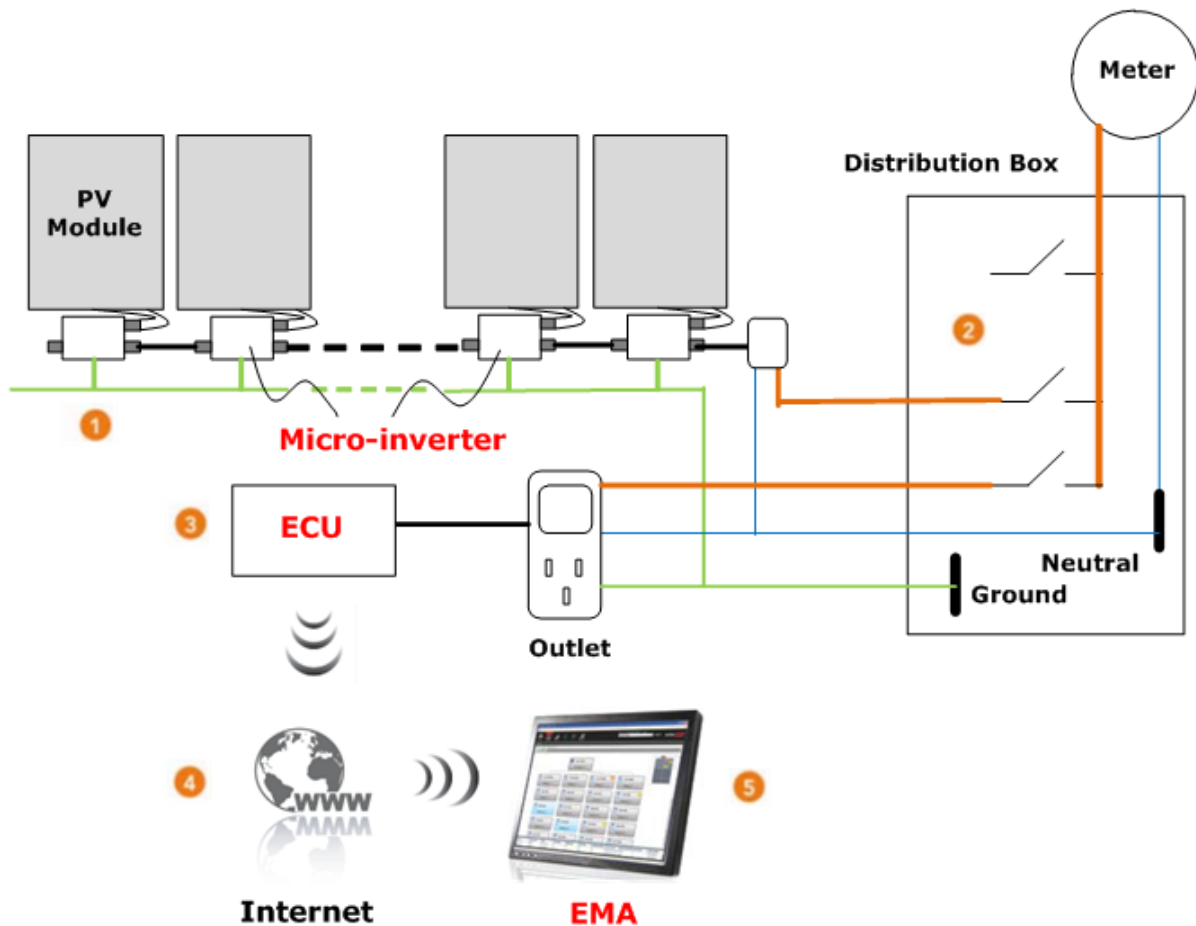
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1.0 Introduction

The APS-ECU is the information gateway for APS inverters. This internet ready data logger can communicate with every kind of APS interactive inverter available and provides the latest in system monitoring for your PV plant. The APS-ECU contains an integrated HTTP web server to allow the simplest and most flexible network integration of any data logger currently on the market. The user-friendly browser based interface provides the user with access to the solar array in seconds. Several configuration options ensure that any APS inverter system – regardless of the number of inverters, remoteness of the plant, or internet connection type – can be used with the APS ECU.



- | | |
|---------------------|-------------------|
| ① APS Microinverter | ② AC power line |
| ③ APS ECU | ④ Ethernet Router |
| ⑤ APS EMA | |

Other Elements in the APS Micro inverter System:

- The APS Micro inverter is a fully integrated device that converts the DC output of a single solar module into grid-compliant AC electricity.
- The APS web-based Energy Monitoring and Analysis system (EMA) constantly monitors every module on every installation. The EMA analyzes the data collected by the ECU from each micro-inverter.

2.0 Installation

Preparation

Before installing the ECU, ensure the site meets the following requirements:

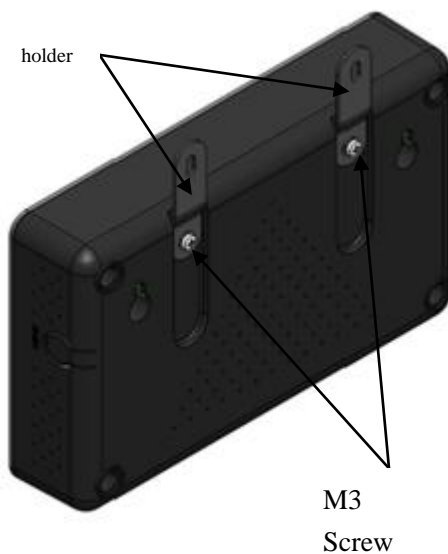
- Standard AC electrical outlet
- Broadband Internet connection
- Broadband router with Ethernet port
- Web browser to view EMA. Support web browsers are Internet Explore and Firefox

Find a Location for ECU

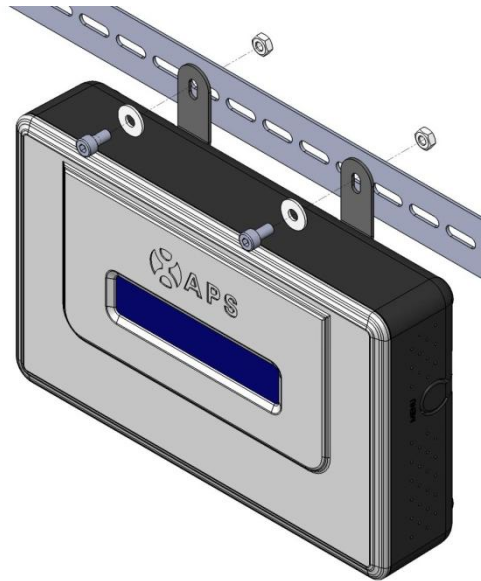
The ECU can be place on a table or be mounted on the distribution ark and wall. It is recommended that location for the ECU should be dry and cool. In addition, do not cover the ECU and keep it away from dust.

1) Distribution ark Mounting

- Loosen ECU at the back of the two M3 screws and rotate the holders.

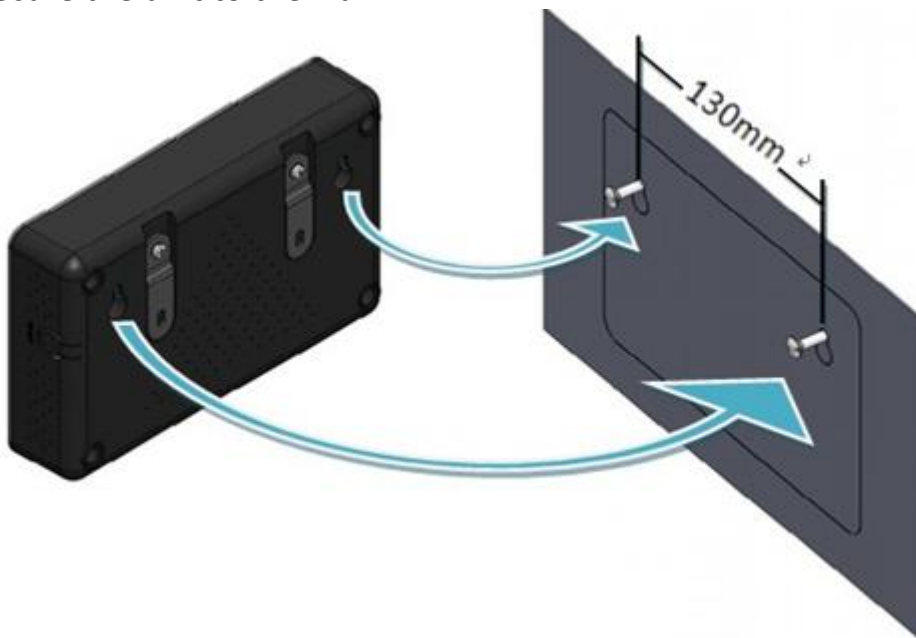


- Fix the ECU on the frame with screws and keep it away from other heat-generating devices.



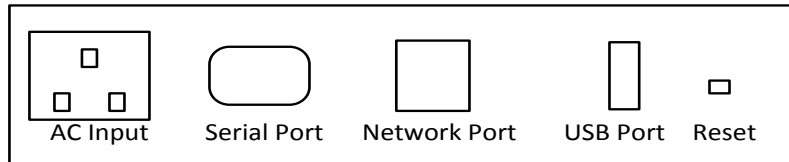
2) Wall Mounting

- Mount the ECU in a cool, dry, indoor location.
- Use two drywall screws or wall anchors to affix the ECU to the wall mounted at the dimensions shown. The maximum screw head diameter is 0.35". Use #8 screws (not included in kit).
- Slide the ECU onto the mounting screws, aligning the ECU screw holes with the screws installed in step 2. Lower the ECU onto the screw posts to secure the unit to the wall.



Install the ECU Cable Connections

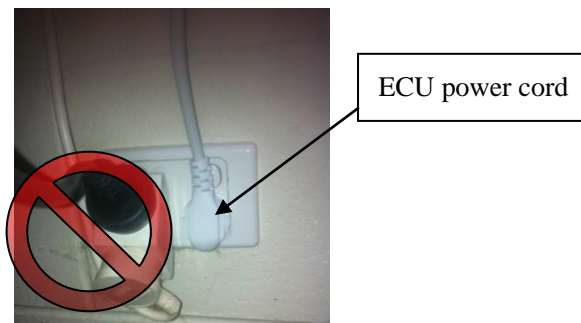
The following diagram is a guide to the connections on the back of the APS ECU.



- Plug the Ethernet cable into the network port on the ECU, and plug the other end into a spare port on the broadband router or LAN. The ECU needs to be able to obtain a Dynamic Host Control Protocol (DHCP) IP address and have a connection to the Internet. The ECU will only search for a DHCP IP address during its power up sequence.
- Plug the AC power cord into the AC input on the ECU, and then plug the other end into a standard AC electricity outlet.



Warning: Do not plug any electrical devices and power strip into the same that the ECU is connected to.



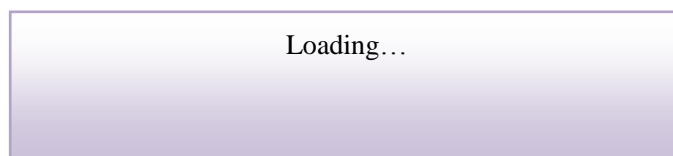
Warning: **Do not** plug the ECU into a power strip, surge protector, or uninterruptable power supply (UPS). The surge suppression or filtering from these devices can substantially diminish PLC communication performance.

ECU initial setting

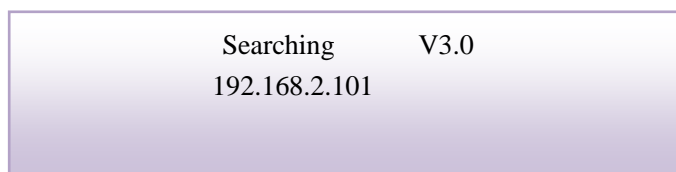
Step 1: Power on ECU

The following information will be displayed in LED screen after ten seconds.

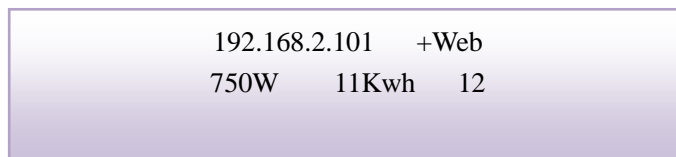
Initialization Interface:



Starting up Interface:



Operation interface:



When the communication between the ECU and inverters builds up successfully, the LED screen will show the value of your system. The data in operation interface includes:

- Local IP address, for example: 192.168.2.101 (your actual local IP address will be different)
- Web connection information: "+Web". This means the ECU is connected to the internet. If it is "-Web", Internet itself has problem. Need to setup the security authority to offer Auto IP configuration.
- Data of the present power-production in watts, for example: 750W
- Data of the life time output of the system in kWh, for example: 11kWh
- The number of online micro inverters producing power and reporting in to the ECU, for example: 12

Step 2: ECU time zone setting

- Enter the IP address shown on the ECU LED into the internet browser, and then open the web page.
- Click “Administration”, then “Date, Time, Time zone”. In the corresponding box, enter local date/time/time zone, click Update after finished. For details, refer to 4.4.2 time management.

Step 3: EMA Monitoring

After ECU display “+web”, contact APS technical staffs in your local area and they will setup an EMA account with User Name and Password.

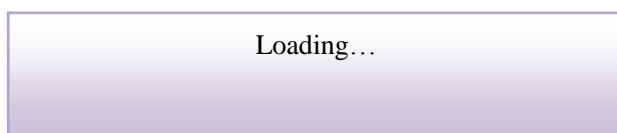
3.0 Basic Operation

The APS ECU has one two-line, 40-character LCD display with alphanumeric and graphic displays. Set the mode using a single button.

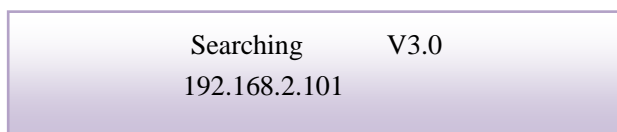
3.1 Power Up

As soon as the ECU is plugged into an AC outlet, it will power up and display several information screens. The ECU will be ready to work less than five minutes after powering up. The ECU has completed booting up and has started normal operation when it displays the following information:

Initialization Interface:

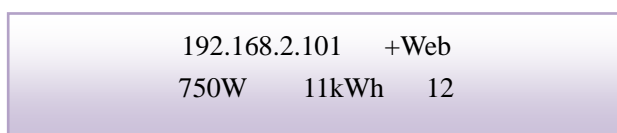


Work Started Interface:



The V3.0 indicates the firmware version from which the ECU's operation and features are dictated. After the ECU receives an IP address and establishes an Internet connection, the ECU will contact a Network Time Protocol (NTP) server so that it can set an accurate local time.

Normal Work Interface:

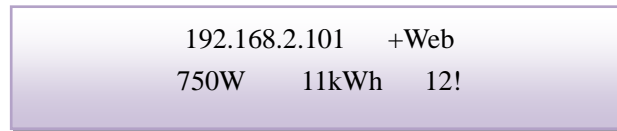


The number 12 indicates the number of panels to which the ECU is connected.

Use the Menu button on the ECU to set the number of microinverters you are going to install. Press and hold the Menu button. When it reaches the first digit of the number of microinverters you are going to connect to the ECU, release the button and move the cursor forward one space. Repeat this process until the complete number of microinverters connected to the ECU is displayed.

After inputting the number, move the cursor until it is under ‘OK.’ Hold the button for three seconds to finish setting the number of microinverters. Then enter the work started interface and begin to search for the microinverters.

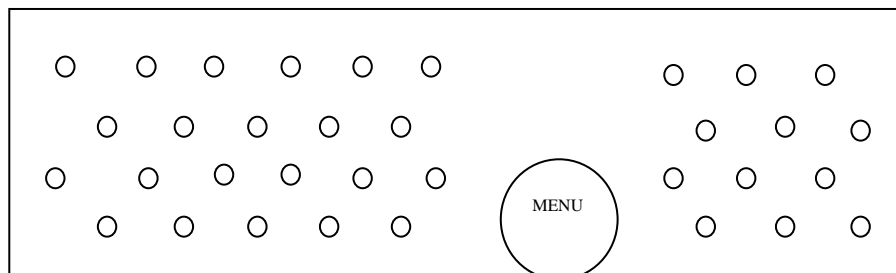
The symbol “!” following the number 12 indicates that the number of microinverters connected to the ECU doesn’t match the number programmed into the ECU.



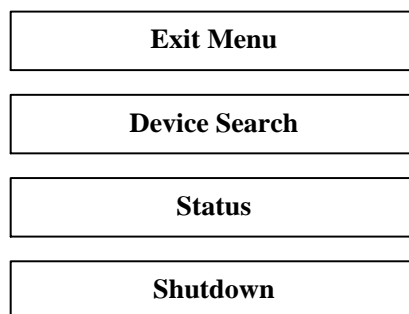
This scan continues to search for new microinverters until all of the microinverters are connected to the ECU, which can take anywhere from a few minutes to several hours, depending on the strength of the network. Once the ECU is connected to all the microinverters, it begins collecting data from each.

3.2 Menu Structure

The following figure shows the ECU side of the button:

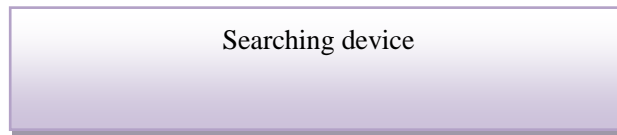


You can access the ECU LCD panel menu by pressing and holding the Menu button; after two seconds you will enter the ECU menu. Continue holding the button, and menu items will appear in the following order:

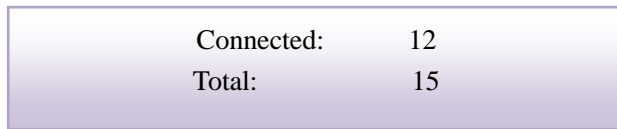


Continue holding the Menu button. When the LCD window displays “Device

Search,” release the Menu button. The following display will appear:



Enter the ECU menu. Hold the Menu button until the LCD window displays “Status.” Release the Menu button, and the following items will appear:



The numbers above mean that there are 15 microinverters that need to be connected to the ECU, but that the ECU is only connected to 12 microinverters.

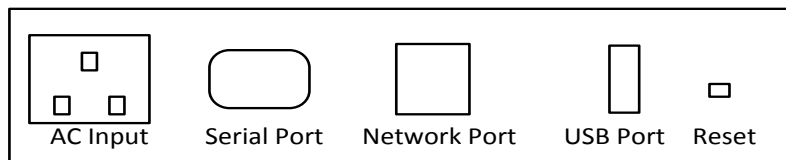
Enter the ECU menu. Hold the Menu button until the LCD window displays: “Shutdown.” Release the Menu button, and the following items will appear:



Choose “Ok”, and the system of inverter will shut down. If within one minute without pressing the button again, then automatically exit the menu button.

3.3 Restore the factory set operation

The following diagram guides to the connectors back of APS-ECU.



For the ECU restore the factory set, simply press the “Reset” button for three seconds or more long, ECU will automatic return to the factory default settings.

3.4 Troubleshooting

Potential Problems and Solutions

IP Address Problem: If the IP address displayed on the ECU’s LCD window

does not match the subnet on your internal network and shows something beginning with “60.190.x.x,” it means that it was unsuccessful in obtaining a DHCP IP address from your router.

- Check network connectivity to the router or other DHCP server. You may need to contact your Internet Service Provider or refer to your router documentation for troubleshooting assistance.

LCD Window Displays “-Web”: The ECU could not connect to the Internet to find an NTP server and could not connect to the APS website.

- Check network connectivity to the router. You may need to contact your Internet Service Provider or refer to your router documentation for troubleshooting assistance.

LCD Window Display “!”: The number of installed units doesn’t match the microinverter-count. This may indicate that the ECU is having difficulty communicating over the power lines. It could also be caused by low light levels, resulting in module voltage that is too low for the microinverter to power up.

192.168.2.118 +Web
2776W 1kWh 12!

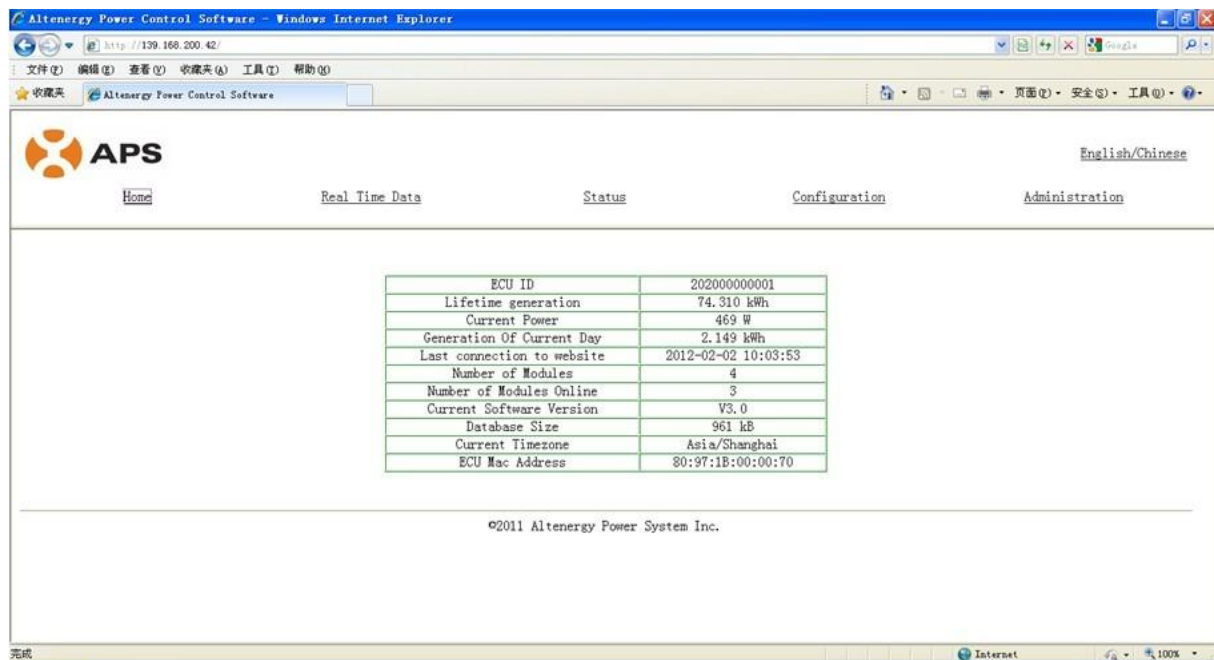
- Plug the ECU into an electrical socket in a different location. Keep it away from your router.

4.0 ECU Local Interface

Connection to APS's web-based monitoring and analysis website (EMA) requires an Internet connection. However, if there is no Internet access at the installation site, it is still possible to communicate directly with the ECU local interface using the Ethernet port and a personal computer with a web browser.

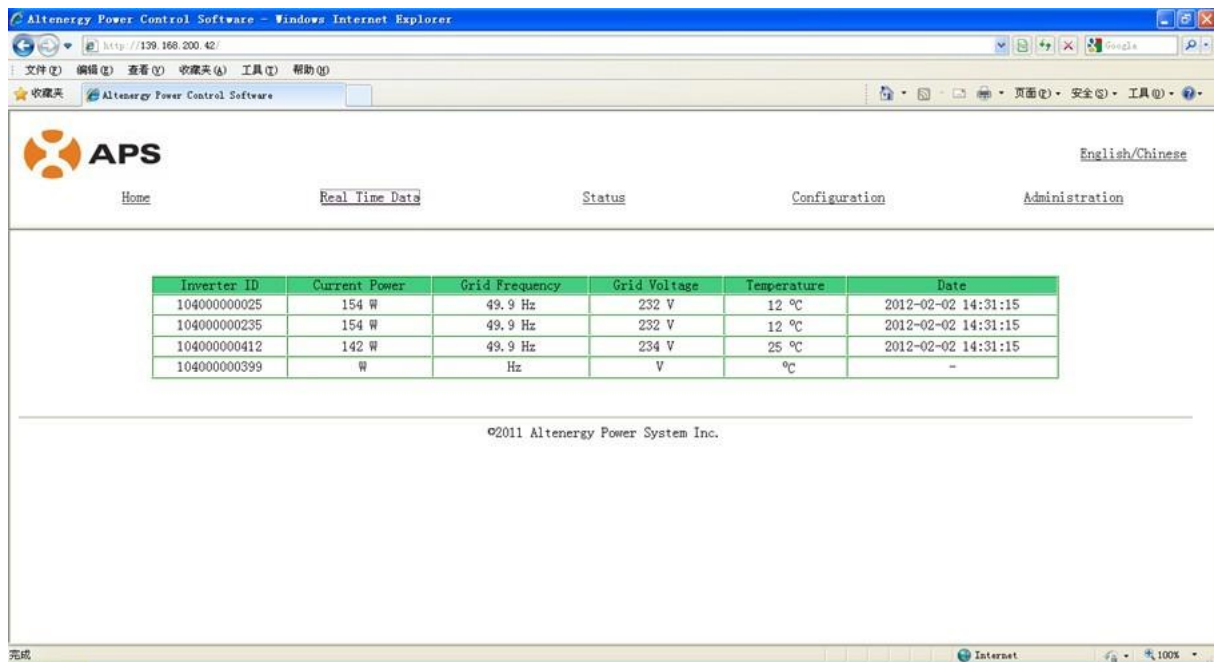
4.1 Home Screen

Once the browser has successfully connected with the ECU, the following screen is displayed in the browser. This home screen provides a system overview and shows the current status of the microinverters that have been identified by the ECU. From this screen, you can access other screens in the interface.



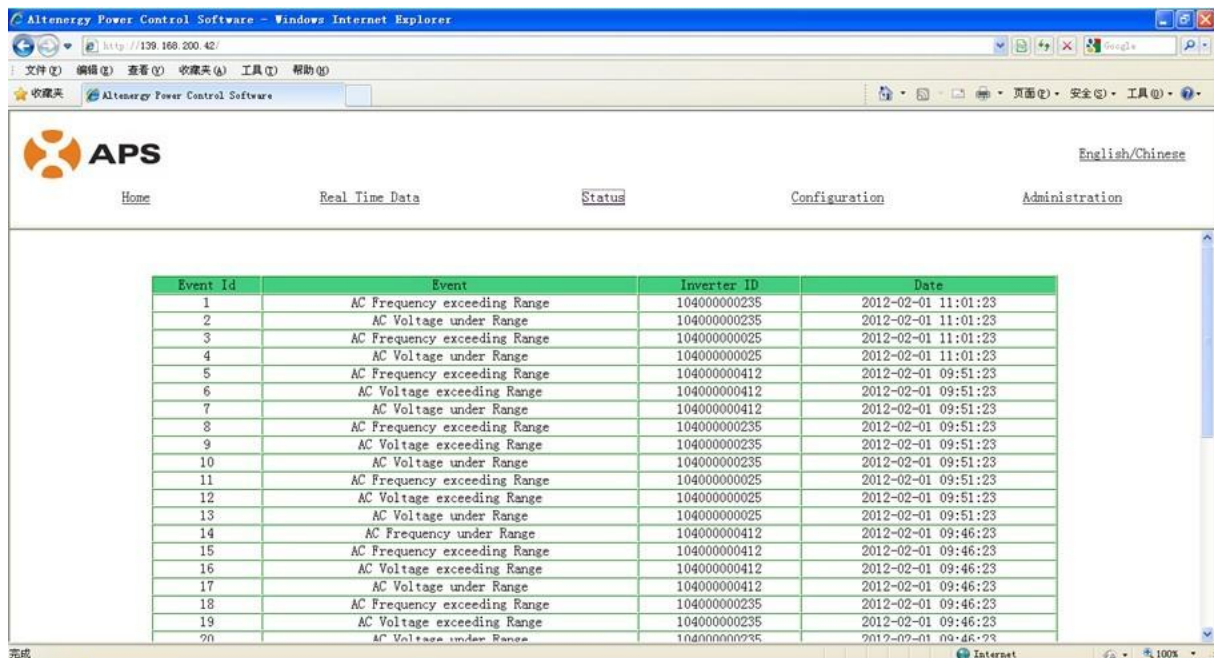
4.2 Real-time Data Screen

To view the real-time system operation data statistics for your solar array, click “Real Time Data” from the ECU home screen to navigate to the real-time data screen.



4.3 Status

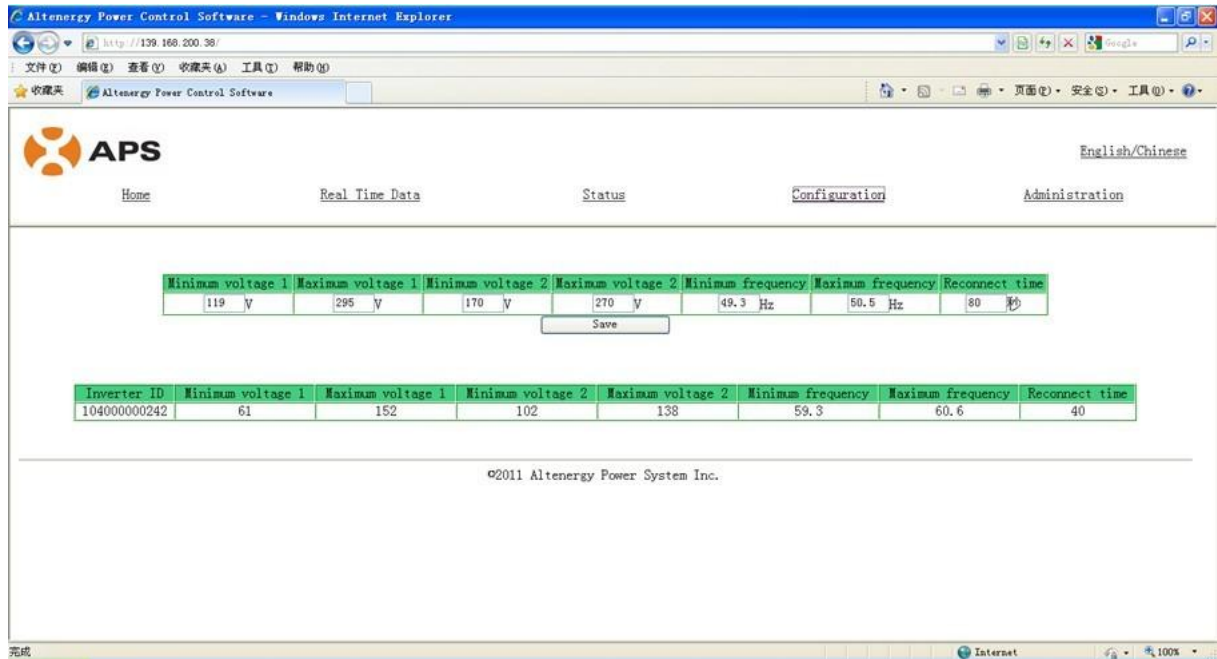
To view system status, click “Status” from the ECU home screen.



4.4 Configuration

Configure the inverter parameters. Input the parameters in each box, click “Save”. Then click “Configuration” to view the result in a few minutes. As shown

below (the "Configuration" web is only 3.0 version and later contains) :

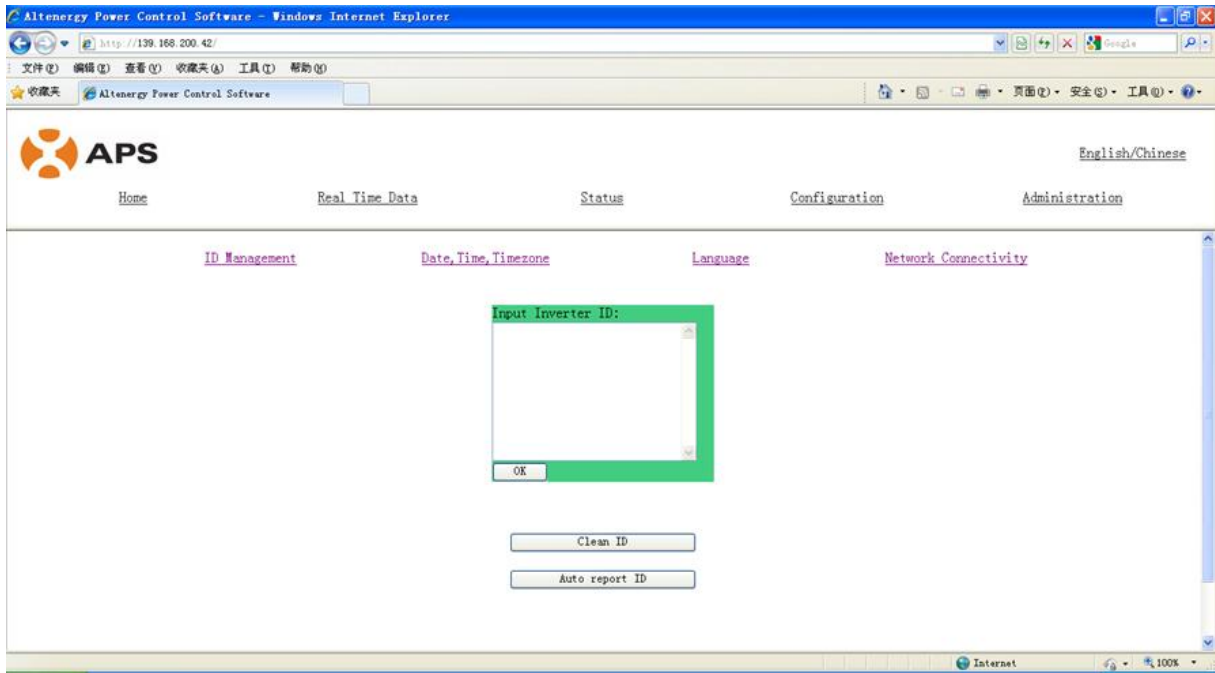


4.5 Administration Screen

For the user to set up the ECU parameters

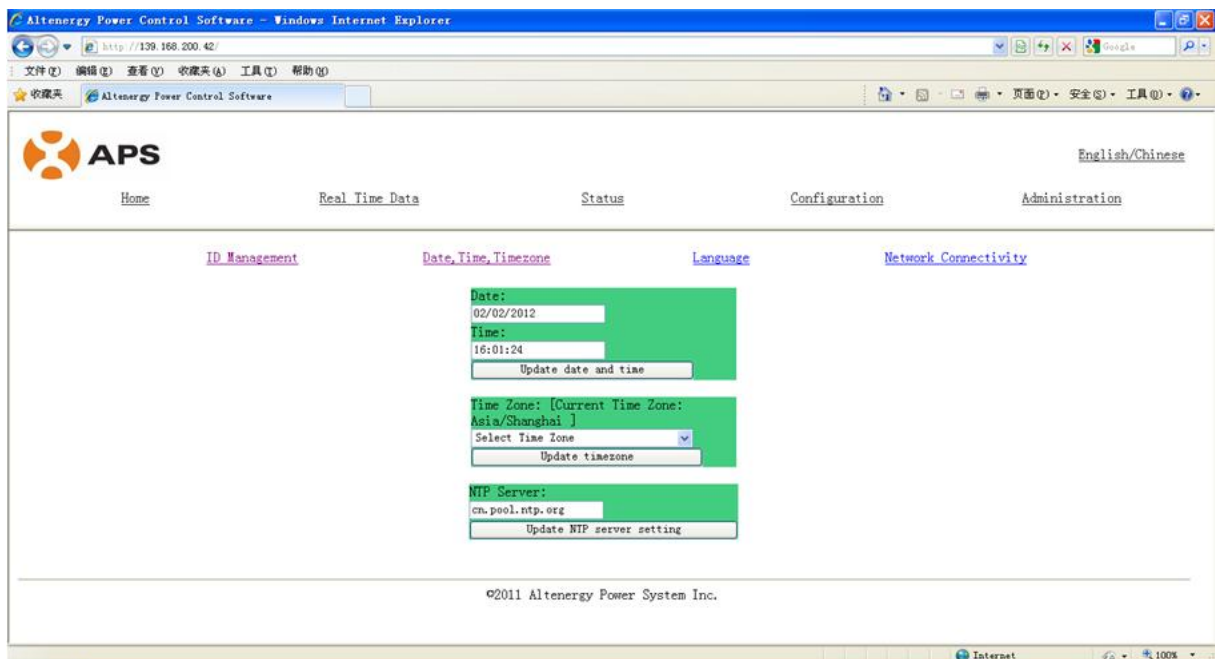
1) ID Management

For the user to input 12 digits inverter ID, each input the ID number and press "Enter" a line break, then enter the next inverter ID, all inverter ID into finish, press the "ok" button, the input completed. If you need to remove the inputted inverter ID, you can check the "empty ID" this button. The default option is reporting ID automatically, the customer need not manual input inverter ID. As shown below:

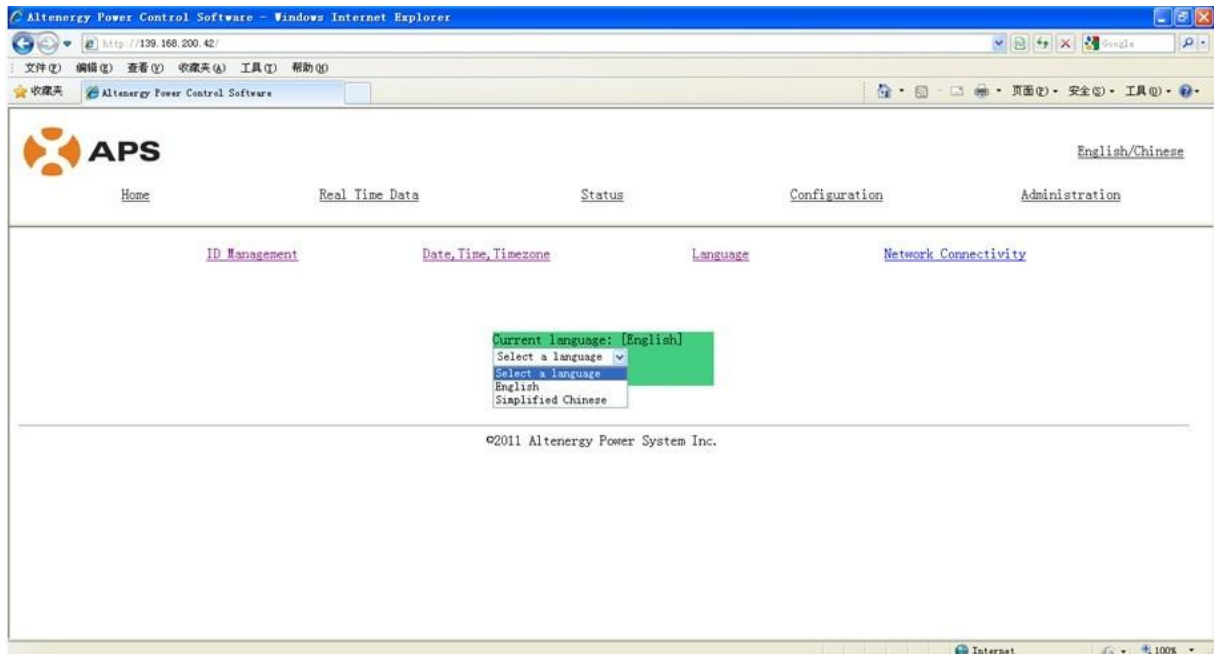


2) Time management

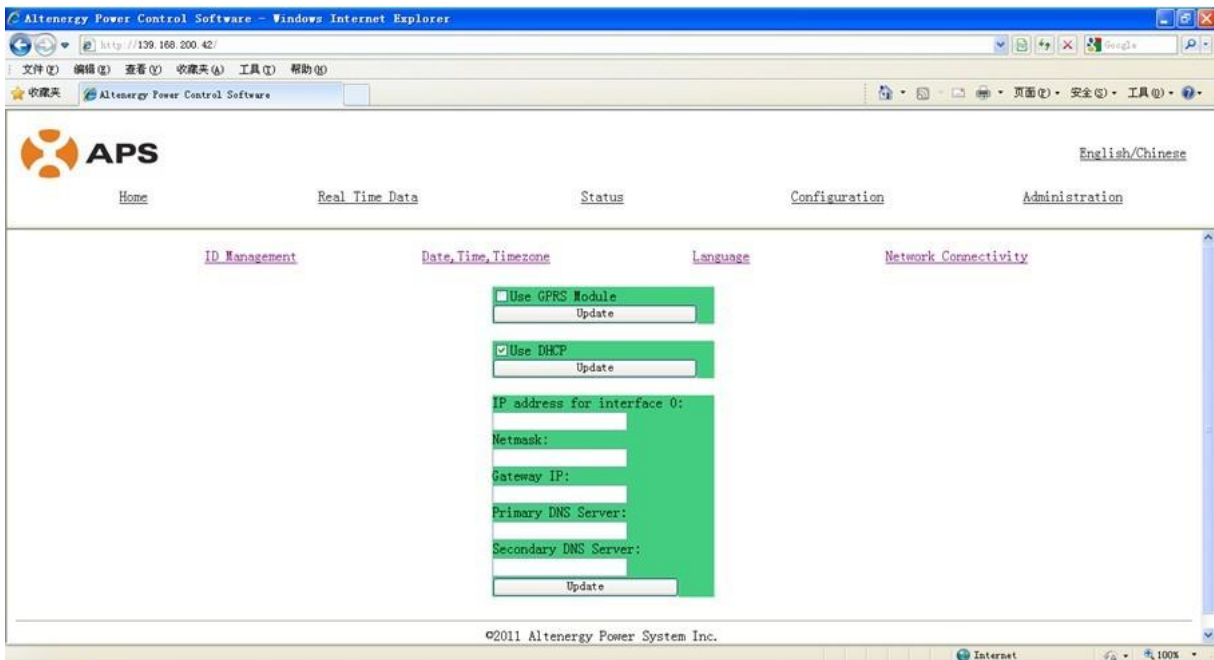
In date column, input date, format for day/month/year, in time column, input time, format for hour/minute/second, after the completion of the input, click on the "ok" button. The ECU also can connect to the NTP server for obtaining accurate date and time automatically. In "NTP server" Spaces place, users can set NTP server address. As shown below:



- 3) Language management. Users can switch between in both Chinese and English. As shown below:



- 4) Network management. For the customer to choose GPRS function (need matching GPRS module) , set up automatic assign IP address, manual input IP address and DNS server. As shown below:



Event Messages

The table below lists messages that the ECU provides to indicate certain conditions. These messages appear on your computer screen when your

computer is connected to the ECU local interface. These messages provide APS Customer Support with useful information when you call for assistance.

Home Screen	Description
AC Frequency exceeding Range	The frequency of the AC grid has exceeded the upper limit.
AC Frequency under Range	The frequency of the AC grid has exceeded the lower limits.
AC Voltage exceeding Range	The voltage of the AC phase has exceeded the upper limit.
AC Voltage under Range	The voltage of the AC phase has exceeded the lower limit.
Over Critical Temperature	The inverter is producing less power in an attempt to not overheat.
Grid Gone	The AC utility grid is no longer present.
Grid Instability	The inverter is not producing power due to one or more of these conditions: AC Frequency Out Of Range, AC Voltage Out Of Range, or Grid Gone. Note that Grid Instability will remain for about 5 minutes after the underlying conditions clear.



Notes: If you don't have a LAN, you must use a crossover Ethernet cable to connect the ECU directly to your computer to access the local ECU interface. This assumes that your computer has a network interface card. If you fail to make a connection at this point, you can try to manually configure your subnet to 60.190.131.1, subnet mask 255.0.0.0.

5.0 Technical Data

Model: ECU-3	
Communication Interface	
Power Line	APS Proprietary
Ethernet	10/100M Auto-sensing, Auto-negotiation
USB interface	Standard
RS232 (GPRS)	Optional
Power Requirements	
AC Outlet	110~240 VAC, 50~60 Hz
Power Consumption	2.5 W
Mechanical Data	
Dimensions(WxHxD)	182 mm x 113 mm x 42 mm
Weight	380 g
Ambient Temperature Range	-40° C to +65° C
Cooling	Nature Convection; No Fans
Enclosure Environmental Rating	Indoor - NEMA 1(IP30)
Features	
Standard Warranty Term	3 Years
Compliance	IEC60950,GB/T17799