

SolarPower Pro

User's Manual

Management Software for Solar Inverter

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1. SolarPower Pro Overview

1.1. Introduction

SolarPower Pro is a solar inverter monitoring software. It can monitor up to 247 devices via modbus interface and monitor up to 300 devices via Modbus and SNMP interface. It also provides web browser capability in a networked environment. The major functions of SolarPower Pro monitoring software include data log for device, power generation statistics, alarm messages, fault messages and parameter setting for devices. Refer to diagram 1-1 for system architecture:

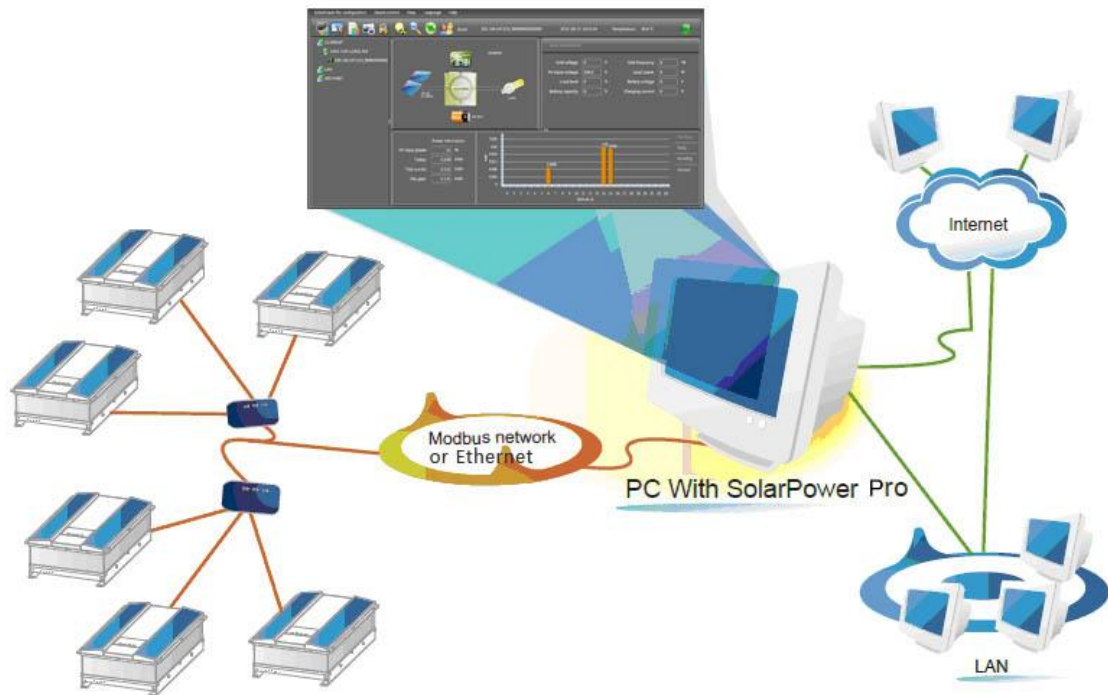


Diagram 1-1

1.2. Structure

SolarPower Pro includes SolarPower Pro service tray and SolarPower Pro monitoring application. SolarPower Pro service is the administrator for SolarPower Pro Monitoring application. It's a system program running in the back end. It will provide service including registration, startup, stop, SNMP Manager, configuration and software upgrade. SolarPower Pro monitoring application is the major subject to provide monitoring and web service for SolarPower Pro software.

1.3. Features

- Allows control and monitoring of multiple devices via Modbus or SNMP interface
- Automatic and real-time data acquisition of devices and secured data log saving
- Graphic display of device data for quick and easy reading
- Warning notifications or fault alarms via audible alarm, pop-up screen, broadcast, mobile messenger, tray message and e-mail
- Easy diagnosis from event statistics and amount calculation for energy saving
- Maximum data log up to 10 billion records
- Supports online upgrade and manually upgrade

2. SolarPower Pro Install and Uninstall

2.1. System Requirement

- 1 GB physical memory at least (2 GB is recommended)
- 2GB hard disk space at least
- Administrator authority is required
- More than 32-bit colors and 1280 x 800 or above resolution display is recommended
- TCP/IP protocol must be installed for network management
- An available communication port is needed
- Platforms supported by software are listed below:
 - Windows 2000
 - Windows 2003/2008/XP/Vista (32-bit & x64-bit)
 - Windows 7/8(32-bit & x64-bit)
 - Linux RedHat 8,9
 - Linux RedHat Enterprise AS3,AS5,AS6 (32-bit)
 - Linux SUSE 10 (32-bit)
 - Linux Cent OS 5.4 (32-bit)
 - Linux Ubuntu 8.X,9.X,10.X (32-bit)
 - Linux Fedora 5
 - Linux OpenSUSE 11.2 (32-bit)

- Linux Debian 5.x, 6x(32-bit)
- Mac OS 10.6, 10.7, 10.8, 10.9, 10.10 (x64-bit)

2.2. Software Install

Step 1 After clicking install, it will display the installation in process. Refer to the diagram 2-1.



Diagram 2-1

Step 2 Choose wanted language and click "OK" as diagram 2-2.



Diagram 2-2

Step 3 Click "Next" to proceed to the next screen as Diagram 2-3.

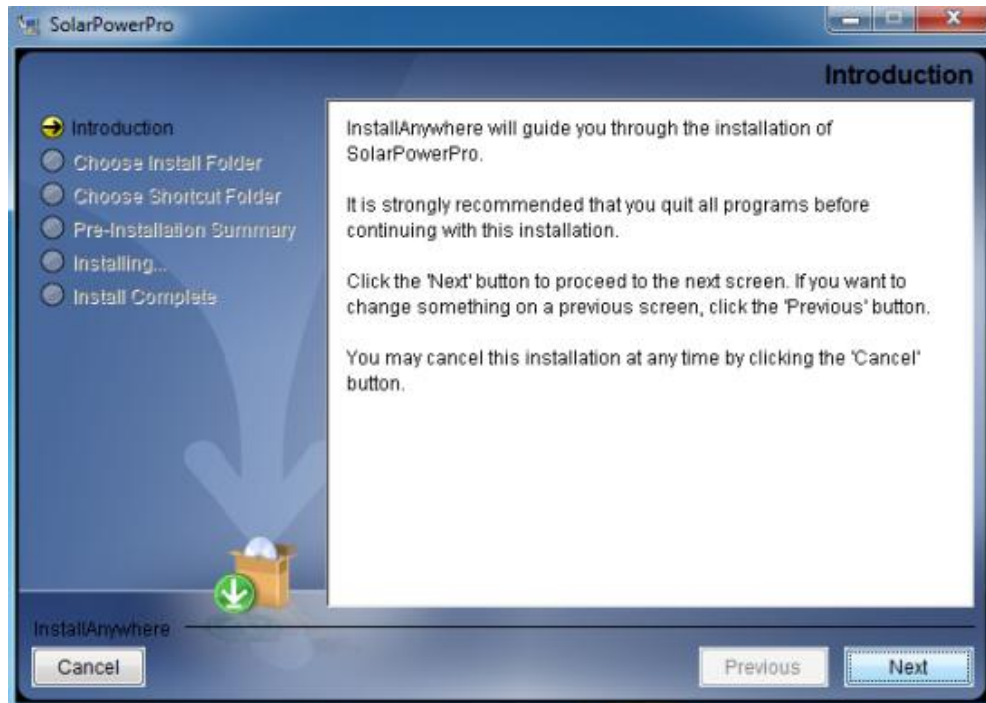


Diagram 2-3

Step 4 Click "Choose" button to change the default folder. After choosing the installed folder, click "Next" button. Refer to the following diagram 2-4.

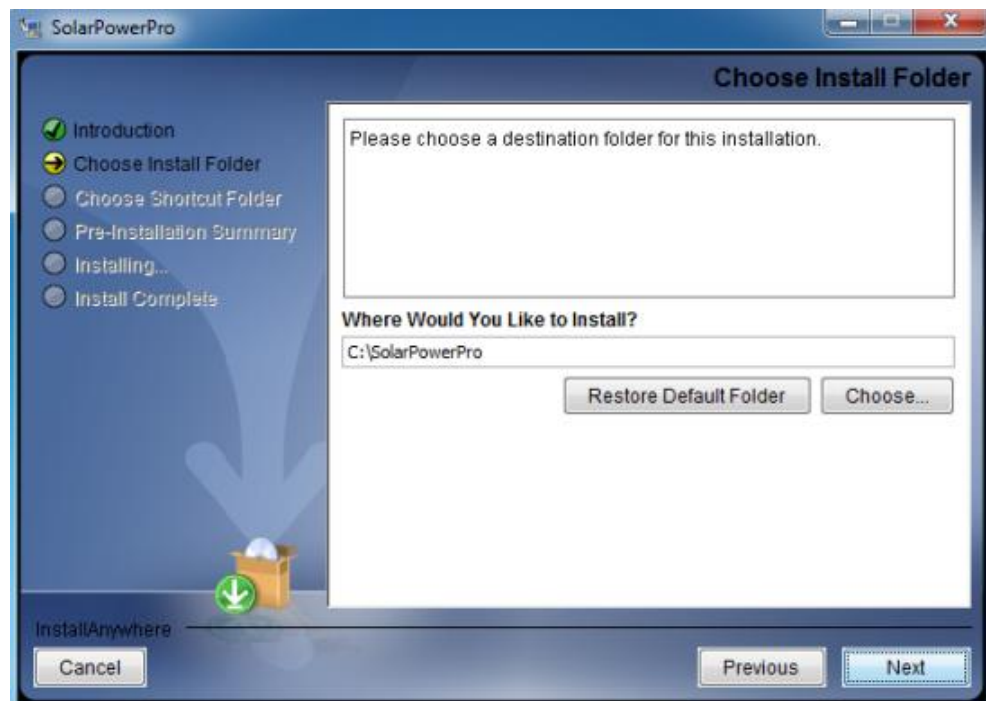


Diagram 2-4

Step 5 Choose the shortcut folder and click “Next” button. Refer to the following diagram 2-5.

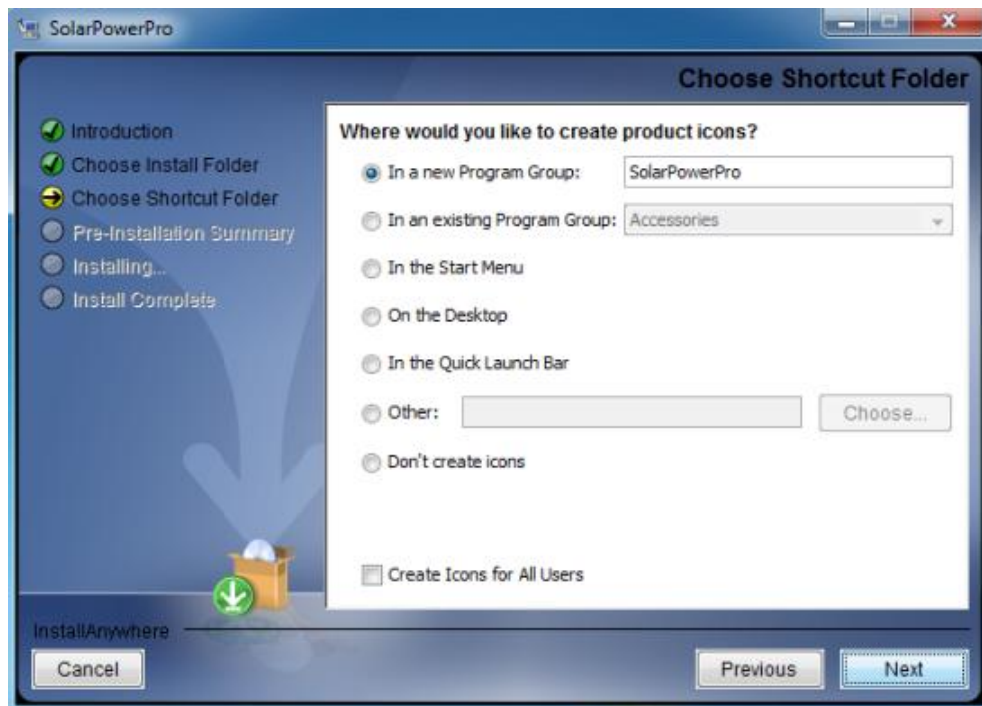


Diagram 2-5

Step 6 It will display the software summary before installation. Click “Install” button to start the installation and refer to Diagram 2-6.

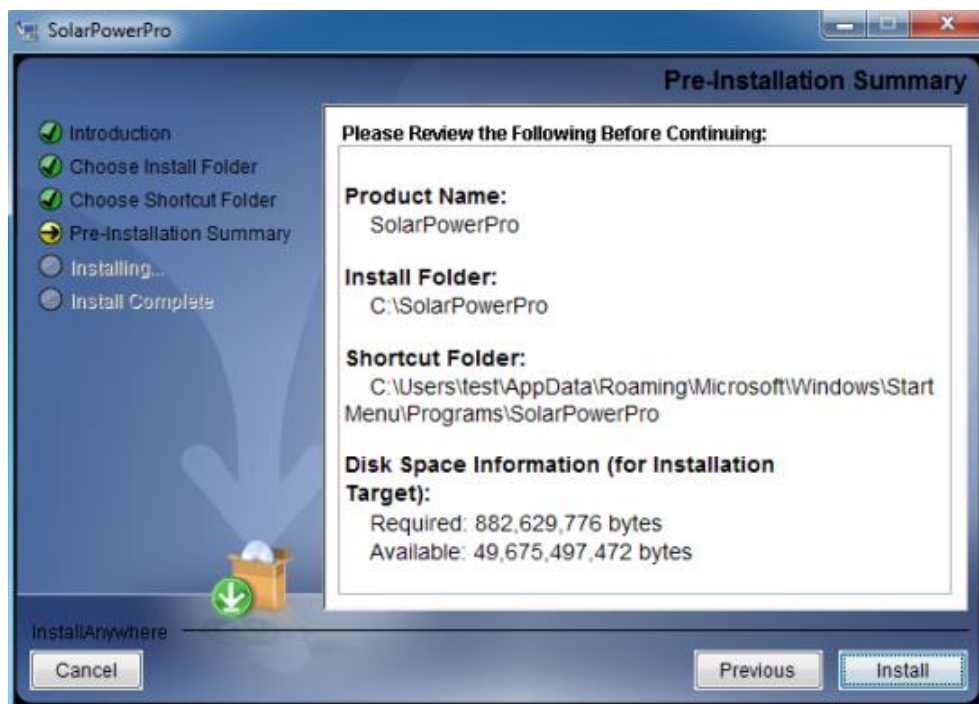


Diagram 2-6

Step 7 Installing, refer to Diagram 2-7.

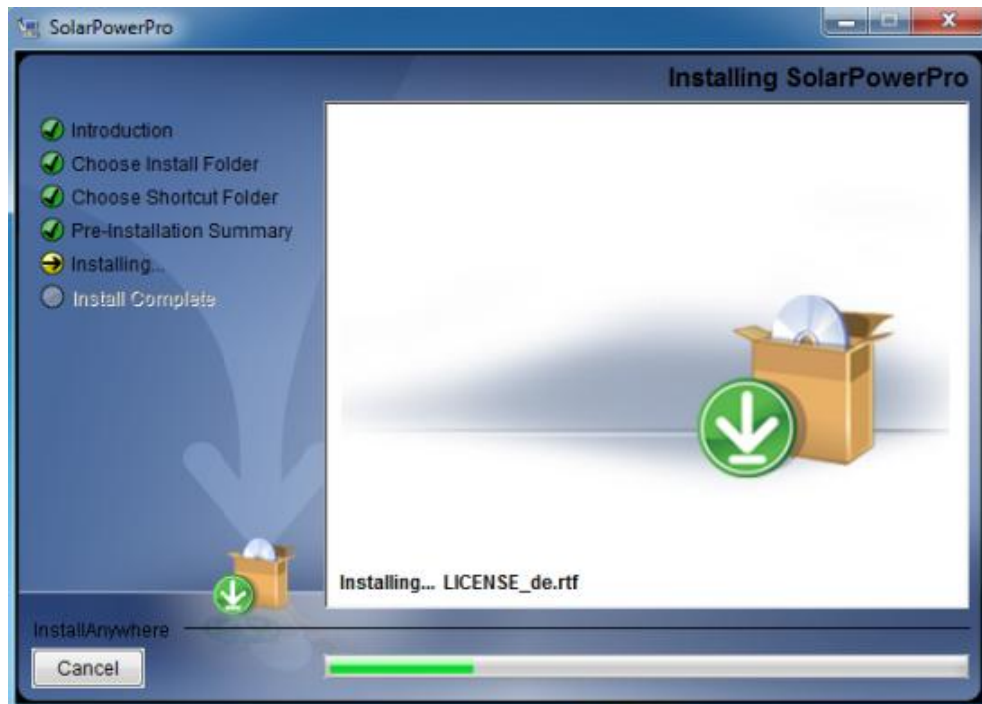


Diagram 2-7

Step 8 Click "Done" button to confirm the installation completely. Refer to Diagram 2-8.

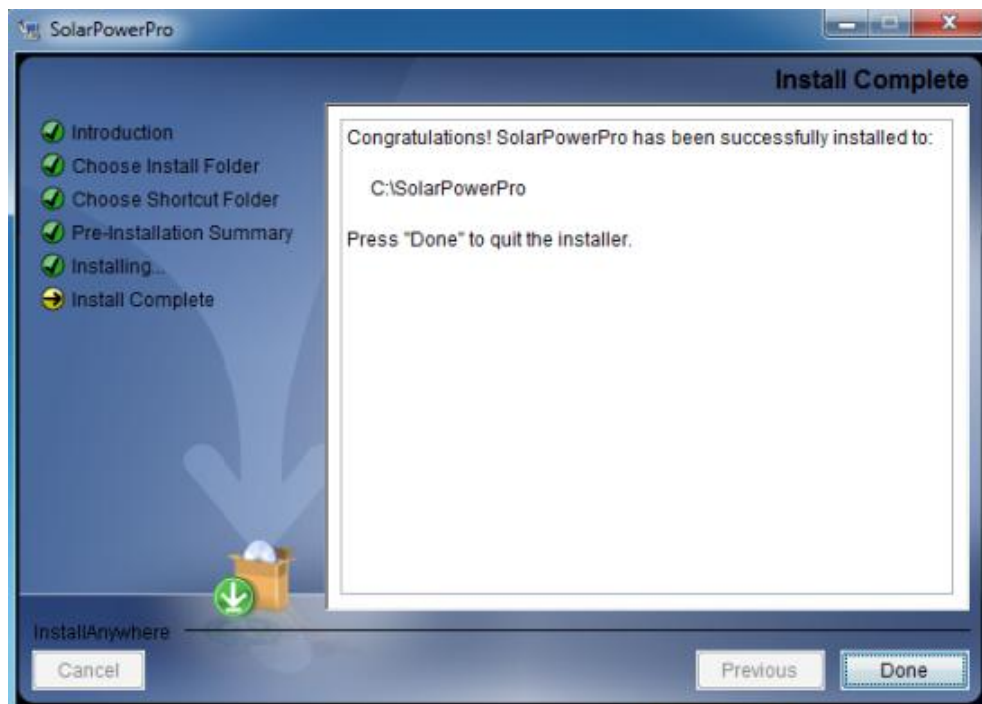


Diagram 2-8

Note: Please uninstall the previous version before install the new version software.

2.3. Software Uninstall

Please choose Start >> All Programs >> SolarPower Pro >> Uninstall. Then follow the on-screen instruction to uninstall the software.

Note: Before uninstall software, you must stop all software programs first and then log in as "Administrator"! Otherwise it can't be uninstalled completely.

3. Service Tray Application

3.1. Startup

The Installer will leave a shortcut icon called "SolarPower Pro Server" on your desktop. Refer to Diagram 3-1. Simply double click the shortcut. Then it will start the software and display a service icon located in tray. It will pop up function menu by clicking right button of the mouse. Refer to below diagram 3-2.



Diagram 3-1

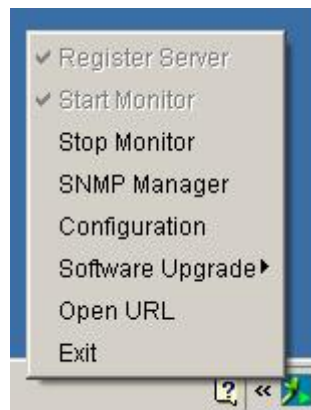


Diagram 3-2

3.2. Register Server




During installation, the installer will try to install the software as service application. If administrator ID is identified, register server will be automatically enabled and software will be activated as service application. Or you may register it manually, simply click "Register Server" as "Administrator" log in. There is no need to install the software again.

3.3. Start Monitor

This software will be automatically activated when installing it as service application. At this time, users can remote monitor the solar inverter through web browser even though users do not login in operation system.

If service application can not be registered successfully, when starting up service tray service, it will automatically activate monitoring application. If it's failed or stopped manually, simply click "Start Monitor" to activate it.

"Start Monitor" will check if monitoring application is registered as service application. If it's successfully, this software will be activated from service mode. If not, this software will be activated as monitoring mode. Users can identify the application mode from tray icon as below:

- Monitoring application is not activated successfully: 
- Monitoring application is activated as service mode: 
- Monitoring application is activated as application mode: 

3.4. Stop Monitor

Click "Stop Monitor" to stop monitoring application.

3.5. SNMP Manager

Click the "SNMP Manager" to access the SNMP management tool. For details, please refer to "SNMP Manager User manual".

3.6. Configuration

3.6.1. Port Modification

If port conflict occurs, you may modify value of tray port. The default setting for tray port is listed as below (Refer to section A in Diagram 3-3):

- Tray port: 38692

- Database connection port: 53306
- Web Service port: 58080
- Web service shutdown port: 58005
- AJP port: 58009

You may modify the value of tray port to any number between 0 to 65536. If value entry is used, the system will remind users to enter another number again.

NOTE1: Please do NOT modify port value unless port conflict occurs. This modification will affect remote monitoring website. For example, if changing web service port to 58081, then the remote monitoring website will change to:

<http://xxx.xxx.xxx.xxx:58081/SolarPowerPro>

NOTE2: To avoid possible conflicts, please do NOT enter value with at least 4 digits.

3.6.2. Software Upgrade

Refer to section B in Diagram 3-3 for the detailed configuration for online upgrade:

- Specify the URL for update files: This is the directory to online update software. Please do not change it unless it's instructed by software vendor.
- Save files to: The directory to save files.
- Online auto-update: If selected, it will automatically check if there is any new version launched online every 1 hour.
- If applying online upgrade, please follow below for configuration:
 1. Select "Apply the proxy configuration";
 2. Enter IP address and port of server;
 3. If ID identification is requested, select "Enable authentication" and enter User Name and Password.
- Connection test: Click this button to test if all configurations are set up well.

Configuration

Tray port: 38692

Database connection port: 53306

Web service port: 58080

Web service shutdown port: 58005

AJP port: 58009

Specify the URL for update files: e-download.com/solarpowerpro/updatewindows.zip

Save files to: C:\Program Files\SolarPower Pro1.00\UpgradeFiles

☒ Online auto-update

☐ Apply the proxy configuration

IP:

Port:

☐ Enable authentication

Username:

Password:

Diagram 3-3

3.6.3. Configuration Saved

Click "Apply" button to save all changes in Configuration page. Click "Cancel" to stop the change.

3.7. Software Upgrade

Software upgrade includes online upgrade and manually upgrade.

- Online Upgrade:

Click "Online Upgrade" to search the latest software version. If new version is detected, it will automatically download and upgrade. Refer to Diagram 3-4.

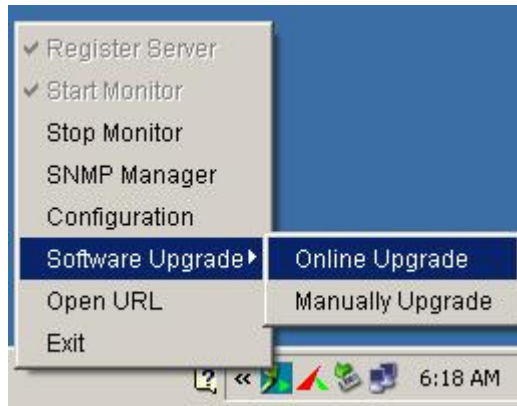


Diagram 3-4

- **Manually Upgrade:**

Users can manually upgrade the software. Follow below steps:

1. Click "Manually Upgrade" from function menu. Refer to Diagram 3-5.



Diagram 3-5

2. Click "Browse" to choose file directory. And then, click "Upgrade" to upgrade software. Refer to Diagram 3-6.

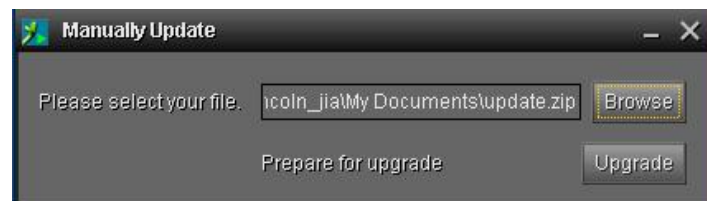










Diagram 3-6

3.8. Icon and Software Status

- Connecting devices with service mode:  and  will rotate as an animation.
- Connecting devices with application mode:  and  will rotate as an animation

- When receiving event message at application mode with devices connected,  will flash for reminder
- When receiving event message at application mode without devices connected,  will flash for reminder
- When receiving event message at service mode with devices connected,  will flash for reminder
- When receiving event message at service mode without devices connected,  will flash for reminder

3.9. Message Board

Users can check message board for event list. Refer to Diagram 3-7.

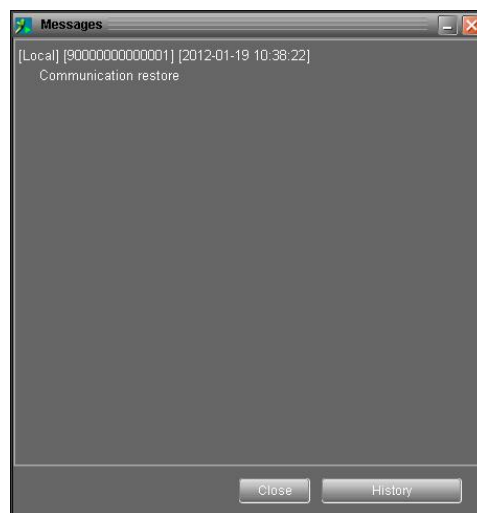


Diagram 3-7

3.10. Exit

Click "Exit" to exist service application.

4. SolarPower Pro GUI Interface

SolarPower Pro GUI Interface has five sections as marked in the illustration below:



Diagram 4-1

A. Function Menu offers complete tool-set for navigating and setting the GUI.

B. Shortcut Menu provides short cuts to more commonly used functions.

C. Solar Inverter Navigation indicates all devices locations in networked environment.

D. Current Monitoring Information displays User ID, monitored inverter ID, time, temperature, and warning indicator.

E. Main Client Area contains information and/or controls that change with each function menu or shortcut menu selected.

4.1. SolarPower Pro Configuration

4.1.1. Basic

Select SolarPower Pro Configuration>>Basic. This page is to set basic display. Refer to Diagram 4-2.



Diagram 4-2

1. Page refresh interval: This interval time will determine how long the web page is refreshed. Setting range is from 5 to 600 seconds. The default setting is 5 seconds.
2. Output information update interval: This interval time will determine how long the power generation data is updated. Setting range is from 10 to 600 seconds. The default setting is 20 seconds.
3. Devices scan interval: This interval time will determine how long the device scanning action will be executed. The setting range is from 5 to 600 seconds. The default setting is 5 seconds.
4. Record interval: This interval time will determine how long the monitoring data of solar inverters will be recorded into database. The setting range is from 30 to 600 seconds. The difference between each option is 30 seconds. The default setting is 60 seconds.
5. Max. device time difference: It will send alarm message when the maximum device time difference is longer than the setting time. The setting range is from 1 to 60 minutes. The default setting is 5 minutes.
6. Date format: This system supports 4 different formats, "YYYY-MM-DD", "YYYY/MM/DD", "MM-DD-YYYY" and "MM/DD/YYYY". The default setting is "YYYY-MM-DD".

7. Temperature format: This system supports Centigrade (°C) and Fahrenheit (°F).
The default setting is Centigrade (°C).

NOTE: The setting value in item 1, 2, 3, and 4 will affect the software performance. To achieve optimum performance, we recommend all settings as below:

For modbus interface:

Device numbers	Page refresh interval	Output information update interval	Devices scan interval	Record interval
1-10	5	60	5	60
11-60	20	60	10	90
61-120	30	120	30	120
121-200	40	150	40	180
201-247	60	180	60	240

For SNMP interface:

Device numbers	Page refresh interval	Output information update interval	Devices scan interval	Record interval
1-10	10	60	60	60
11-60	20	60	60	90
61-120	30	90	60	120
121-200	40	120	60	160
201-300	60	150	60	180

If any change is made, simply click "Apply" button in the end of each setting. Then, the setting will be saved.

4.1.2. Password

It's password configuration for administrator only. Before operating and configuring the software, please login first and modify the password. The default password is "**administrator**" at first log in. Users can only browse inverter status and information as Guest status without login as an Administrator. Guests can not control or executive any setting.

Step 1 Select SolarPower Pro Configuration>>Password. Refer to Diagram 4-3.

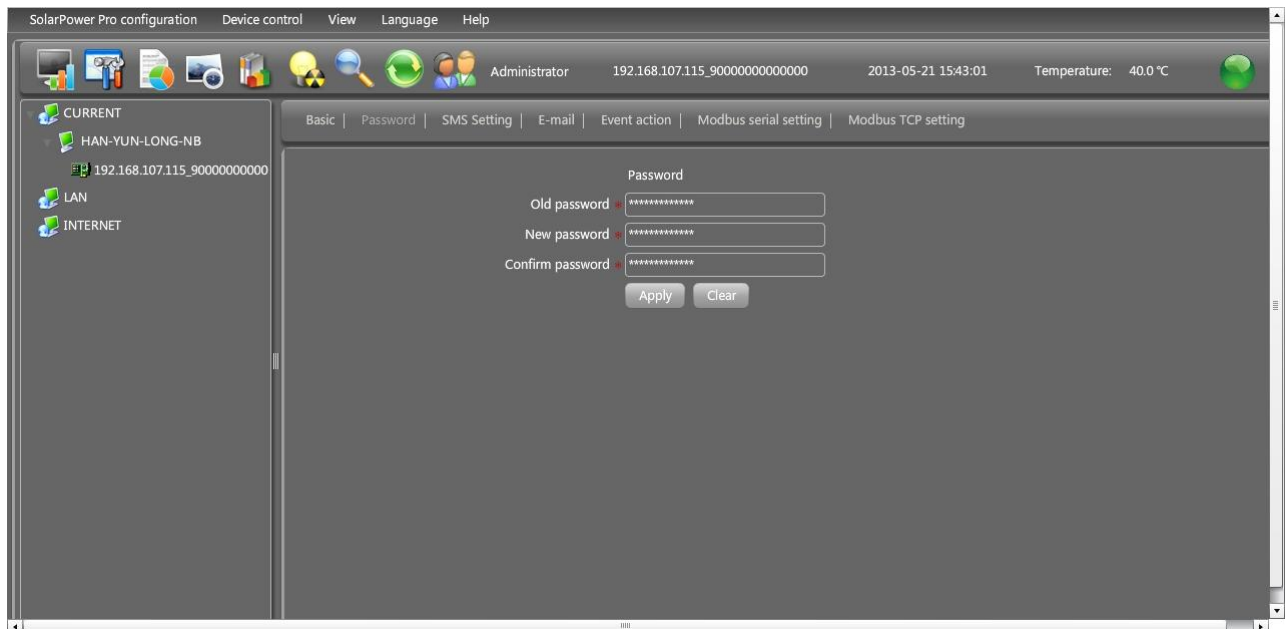


Diagram 4-3

Step 2 Enter old password, new password, and retype new password in confirm password column to modify password for administrator. (The password should be at least 6 digits) Then click “Apply” button to successfully modify password for administrator.

NOTE1: Simply click “Login” button on the top right corner to log in the software.

NOTE2: If password is forgotten, it’s necessary to re-install the software.

4.1.3. SMS Setting

It’s for entering SMS receiver list. In the event of an alarm condition occurring, a message about solar inverter status will be sent to the specified users via mobile phone. For the event receiving list, please configure in “Event Action” column (refer to section 4.1.5).

Step 1 Choose SolarPower Pro Configuration >> SMS Setting. Refer to Diagram 4-4.

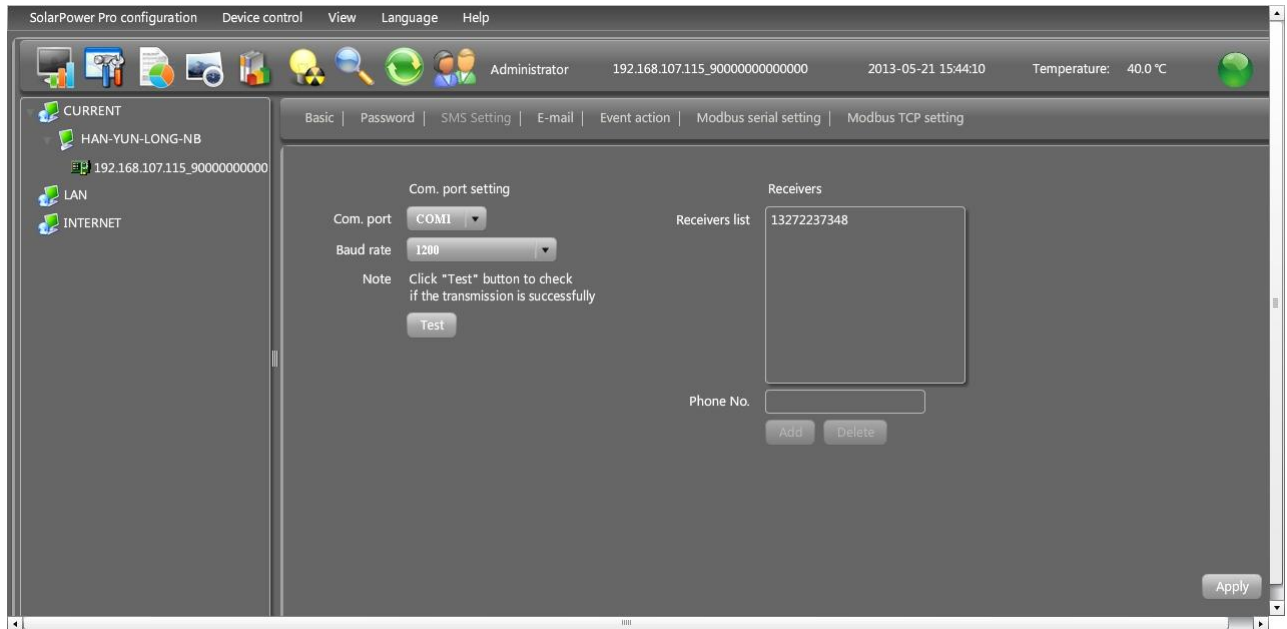


Diagram 4-4

- Step 2** Select communication port and baud rate.
- Step 3** Enter mobile phone numbers in "Phone no." column and click "Add" button to add phone no. in Receivers List. To delete numbers, simply select phone no. from "Receivers list" and click "Delete".
- Step 4** Click "Apply" button to save all changes. The "Test" button can be used to send a test SMS to confirm the correct operation. If all parameters are set up correctly, system will send a test message to all receivers and pop up a successful message. (Refer to Diagram 4-5) Otherwise, it will pop up a failure dialog to indicate there is an error for parameter setting. (Refer to Diagram 4-6)

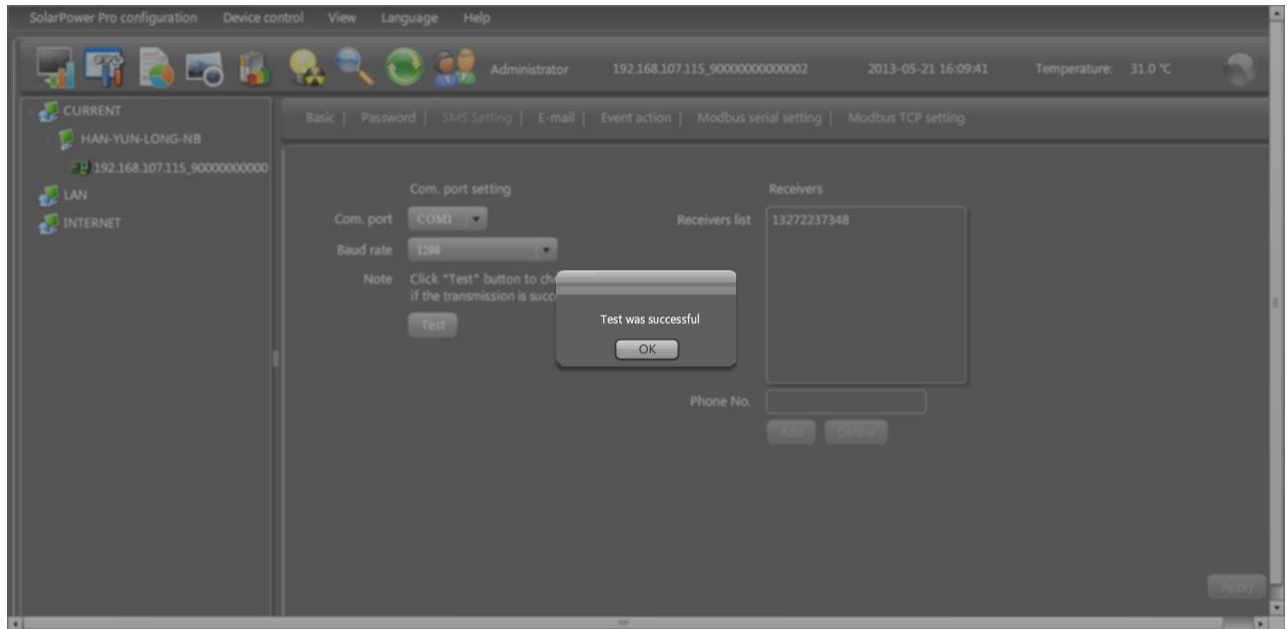


Diagram 4-5

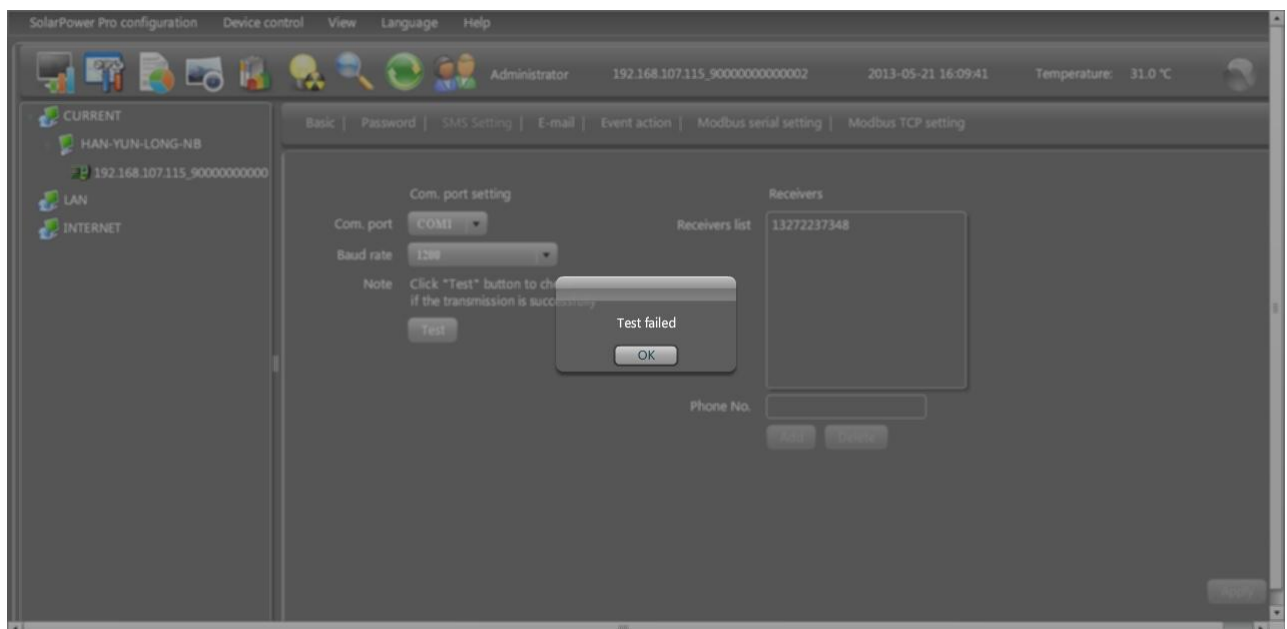


Diagram 4-6

NOTE: It's required to plug-in GSM Modem if sending SMSs to mobile phones.

4.1.4. E-mail

This feature enables the configuration to send alarm mail by SMTP server. For the event receiving list, please configure in "Event Action" column (refer to section 4.1.5).

To use this function, the e-mail service must be correctly configured in the computer. All values in this function page are default empty. This action can't be executed without the

SMTP information, e-mail account and password. Besides, the sender account should be allowed for SMTP/POP3 forwarding.

Step 1 Select SolarPower Pro Configuration >> E-mail. Refer to Diagram 4-7.

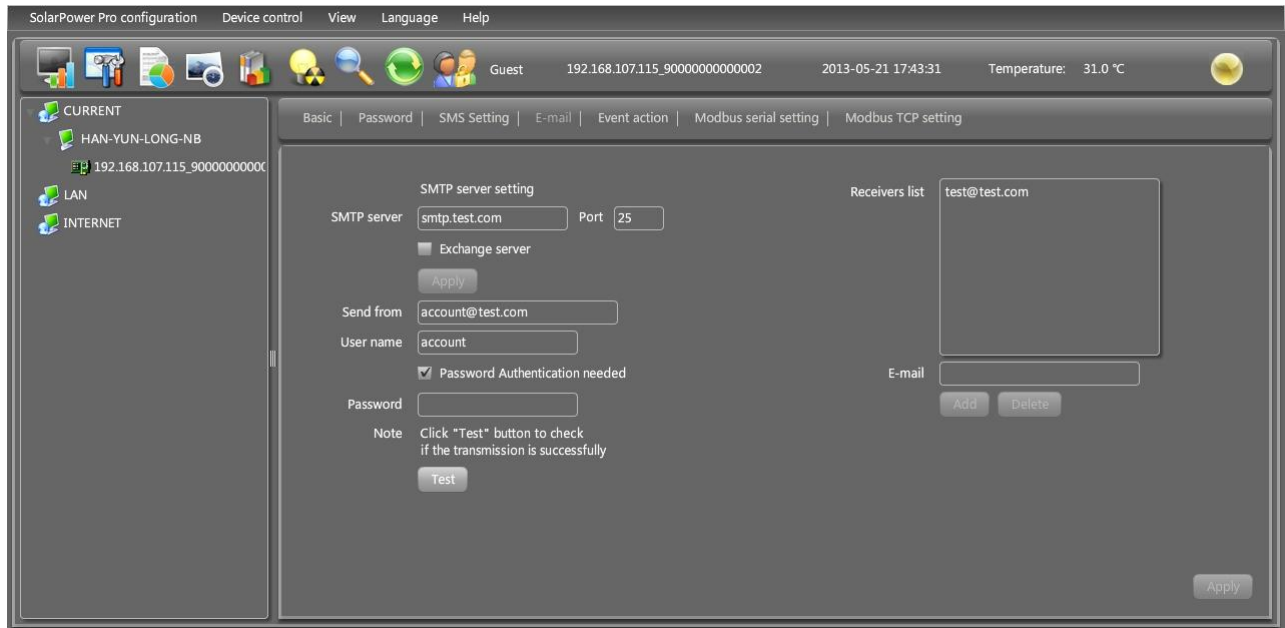


Diagram 4-7

Step 2 Enter data in SMTP server, Port, Send from E-mail address, User name and password columns. Click checkbox of password authentication needed for password verify.

NOTE: If using Exchange Server for mailbox system, it's required to configure Exchange server domain name in SMTP sever and select "Exchange server". Then, click "Apply" button to apply all changes.

Step 3 Enter correct e-mail accounts in E-mail column. Then, click "Add" to add accounts into receivers list. To delete e-mail account, simply select accounts from Receivers list and click "Delete" button.

Step 4 Click "Apply" button to save all changes. The "Test" button can be used to send a test e-mail to all receivers to confirm correct operation. When the test e-mails are successfully sent to specific recipients, it will pop up a successful message on operated PC. Otherwise, it will pop up a failure dialog to indicate there is an error for parameter setting.

4.1.5. Event action

It's to configure response actions for events. Software provides five response actions after events occur.

- 1. Event record:** It will record event to data log in software after events occur. This function is default selected.
- 2. Computer alarm:** Computer will beep to remind users after events occur. This function is only available for Windows OS.
- 3. Broadcast:** It will send event message to all client PCs (Refer to user manual for client side) with software registered in service tray in the LAN.
- 4. SMS:** It will send event messages to specific mobile phone numbers after events occur.
- 5. E-mail:** It will send event e-mail to assigned e-mail accounts after events occur.

Step 1 Select SolarPower Pro Configuration >> Event actions. Refer to Diagram 4-8.

Step 2 Select desired action methods by clicking checkbox.

Step 3 Click "Apply" button to save all configurations.

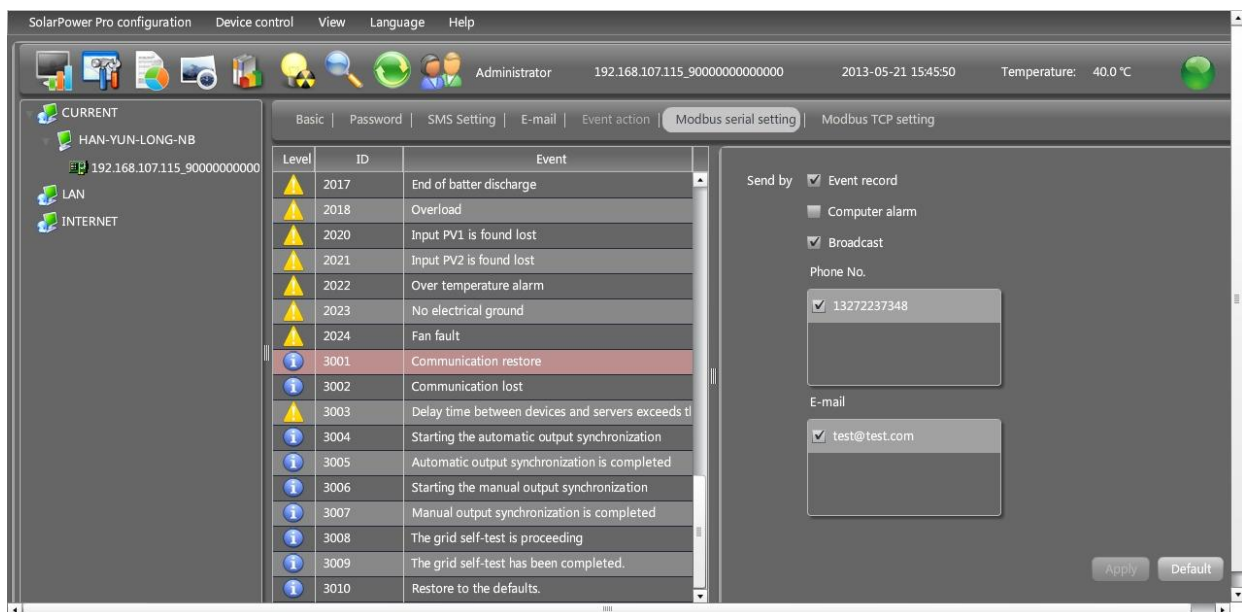


Diagram 4-8

NOTE1: When editing receiver list in SMS or e-mail columns, it's necessary to refresh event action page to reload the updated receiver list.

NOTE2: The PCs which can receive event message via broadcast must be installed

client software with web service.

NOTE3: Event list may be different based on different types of solar inverters.

4.1.6. ModBus serial setting

This function is to set Modbus communication port with PCs that connected to Modbus card via RS232/RS485 converter. The settings include Modbus port, Baud rate, data bit, stop bit, parity and each Device ID in Modbus network.

- Step 1** Select SolarPower Pro configuration>> Modbus serial setting. Refer to Diagram 4-9.
- Step 2** Select Modbus port to connect PC.
- Step 3** Select "Device ID" of connected solar inverter in Modbus network.
- Step 4** Select "Baud rate" of com. port. The default setting is 19200.
- Step 5** Modify "Data bit" of com. port. The default setting is 8.
- Step 6** Modify "Stop bit" of com. port. The default setting is 2.
- Step 7** Modify "Parity". The default setting is NONE.
- Step 8** Click "Apply" button to save all changes.

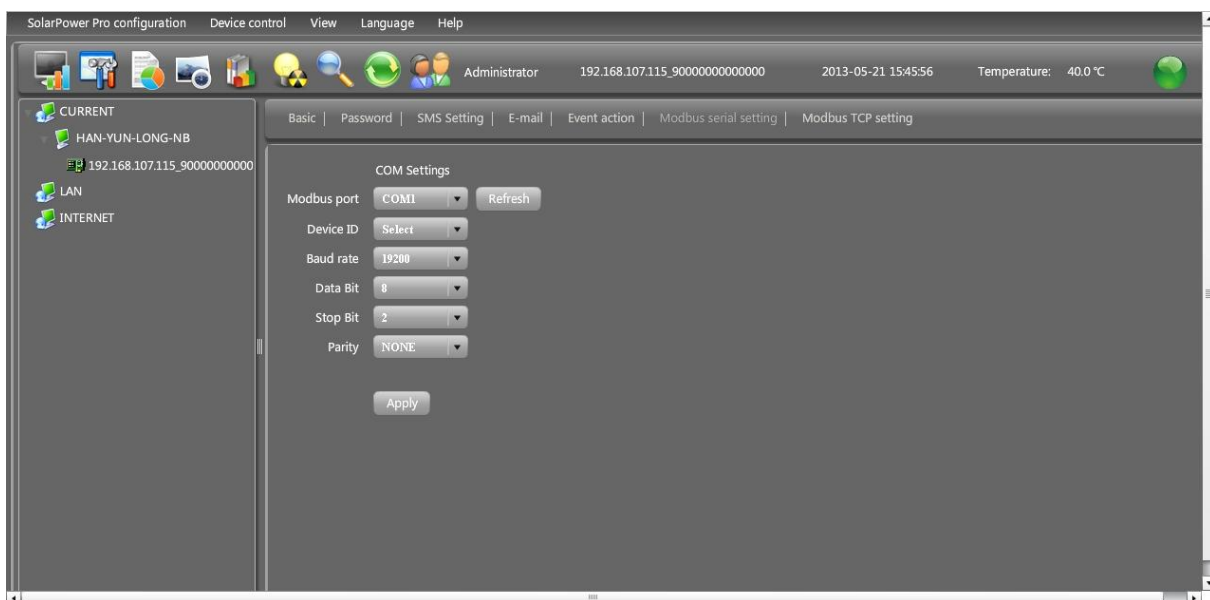


Diagram 4-9

NOTE1: Click "Refresh" button to refresh the port list.

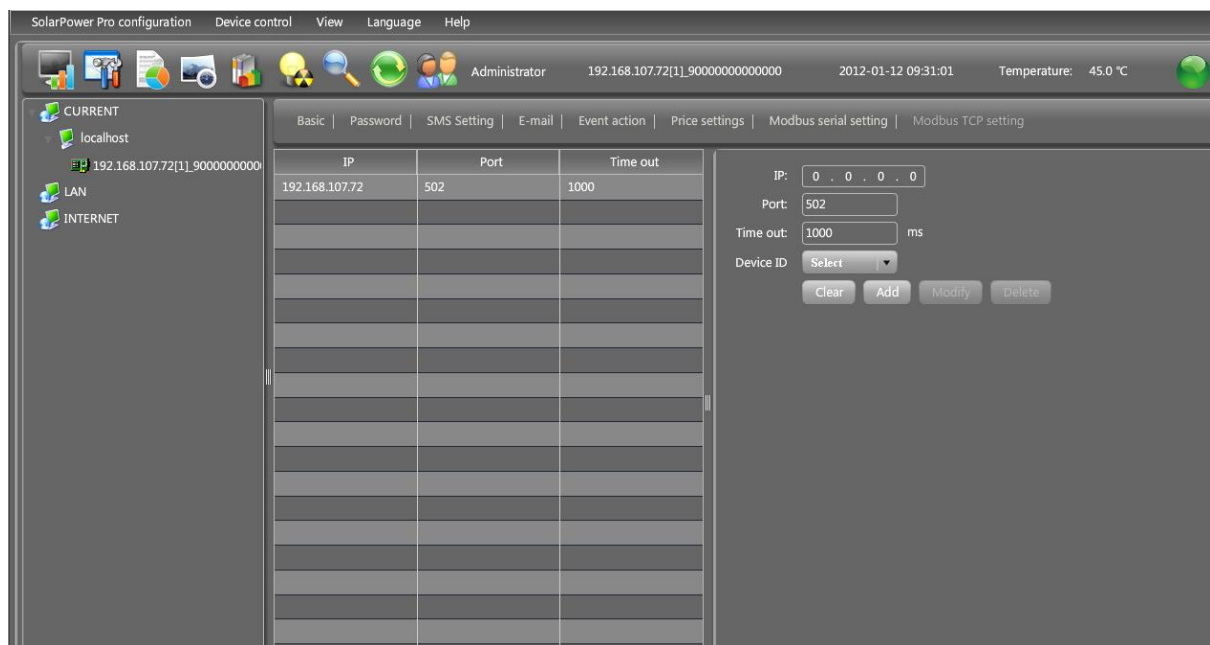
NOTE2: SolarPower Pro supports multiple com. ports in multiple Modbus networks.

NOTE3: All configurations will be changed based on different port selection in Step 2.

NOTE6: If monitoring multiple Modbus networks, please repeat from step 2 to step 7 to set all ports.

This function is to set Modbus TCP gateway with PCs that connected to Modbus card via Modbus TCP gateway. The settings include Modbus TCP gateway IP address, Modbus TCP gateway port, time out duration and each Device ID in Modbus network.

Step 5: Click "Add" button to add Modbus TCP gateway setting.

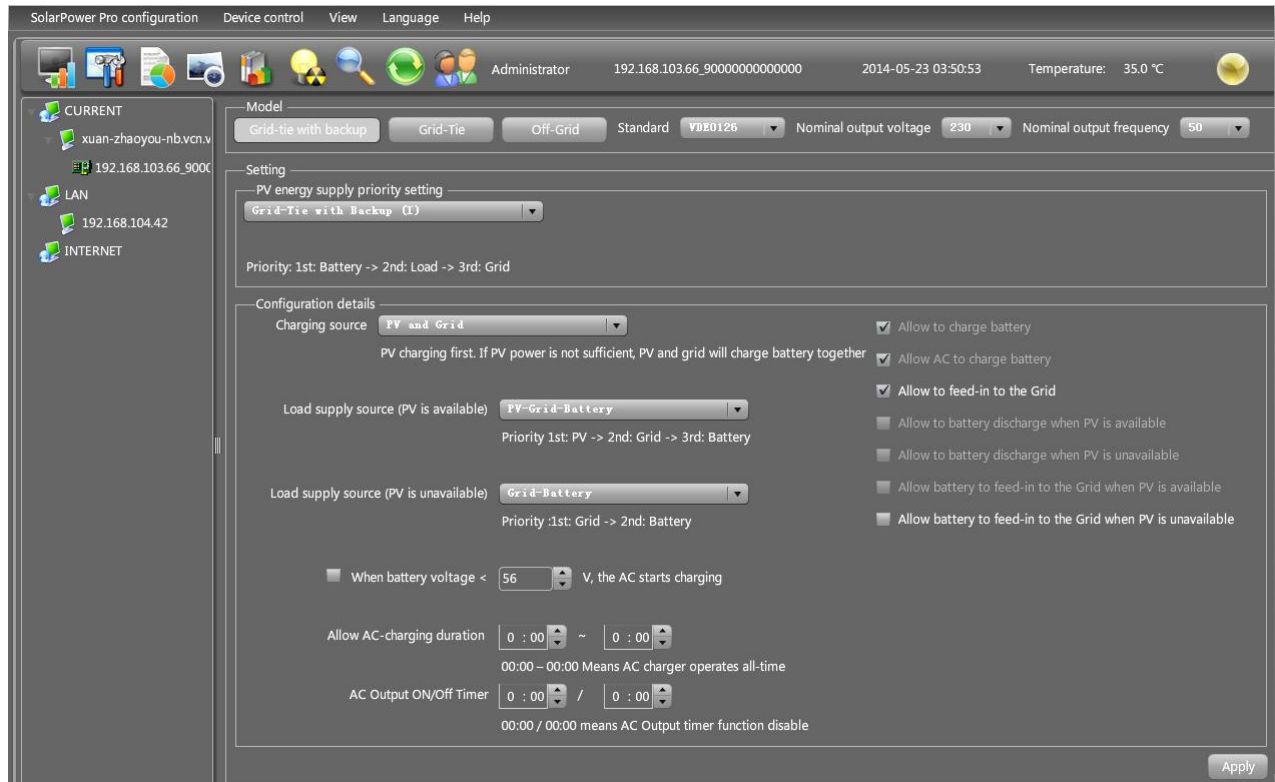


NOTE1: If Modbus TCP gateway only supports one gateway and several users access Modbus TCP gateway at the same time, the communication quality of Modbus TCP gateway would be poor.

4.2. Device control

4.2.1. MyPower Management

It is to set up inverter operation mode and personalized interface. Select Device Control>>MyPower Management. Refer to diagram below.

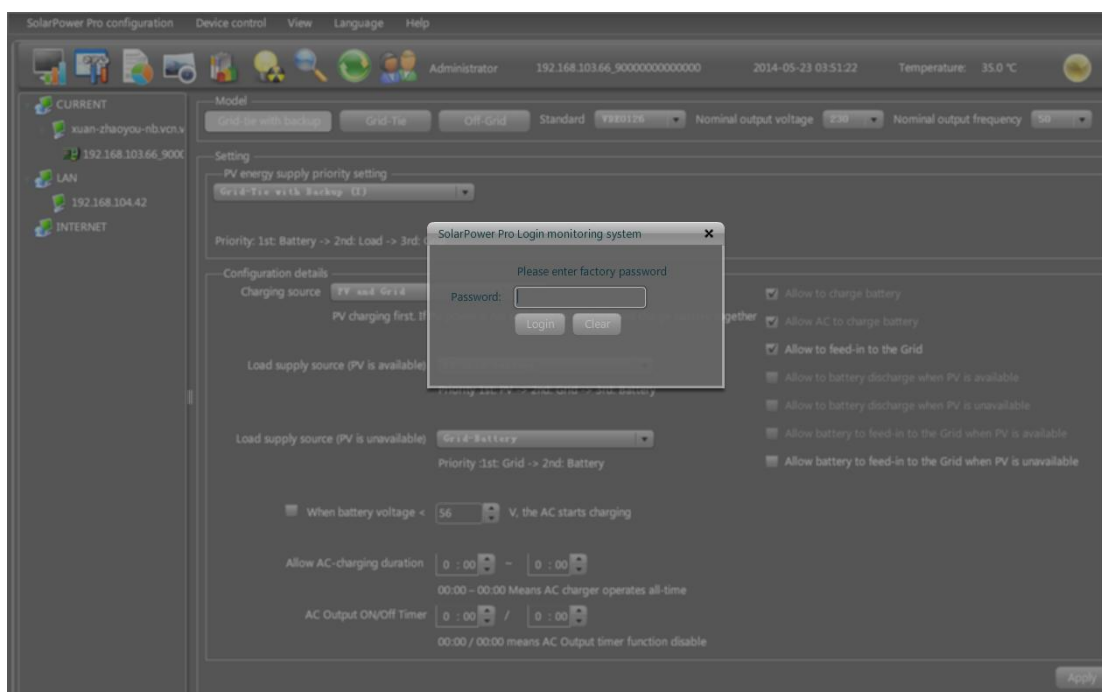


4.2.1.1 Mode

There are three operation modes: Grid-tie with backup, Grid-Tie and Off-Grid.

- Grid-tie with backup: PV power can feed-in back to grid, provide power to the load and charge battery. There are four options available to select in this mode: Grid-tie with backup I, II, III, IV and V. In this mode, users can configure PV power supply priority, charging source priority and load supply source priority. However, when Grid-tie with backup IV option is selected in PV energy supply priority, the inverter is only operated between two working logics based on defined peak time and off-peak time of electricity. Only peak time and off-peak time of electricity are able to set up for optimized electricity usage.
- Grid-Tie: PV power only can feed-in back to grid.
- Off-Grid: PV power only provides power to the load and charge battery.

Standard: It will list local grid standard. It's requested to have factory password to make any modifications. Please check local dealer only when this standard change is requested.



CAUTION: Wrong setting could cause the unit damage or not working.

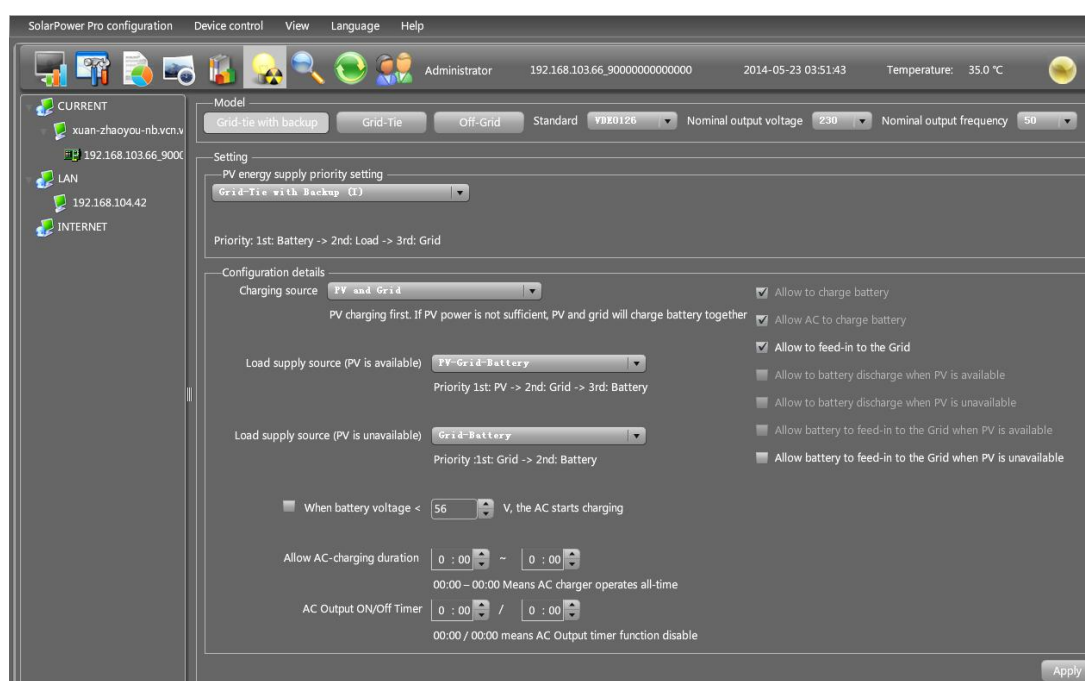
Nominal Output Voltage: There are 5 options for high voltage system to select, 240V, 230V, 220V, 208V and 202V. For low voltage system, there are four options: 127, 120, 110 and 101.

Nominal Output Frequency: There are two options to select, 50HZ or 60HZ.

4.2.1.2 Setting

Grid-tie with backup

- Grid-tie with backup (I) :



PV energy supply priority setting: 1st Battery, 2nd Load and 3rd Grid.

PV power will charge battery first, then provide power to the load. If there is any remaining power left, it will feed-in to the grid.

Battery charging source:

1. PV and Grid: It's allowed to charge battery from PV power first. If it's not sufficient, grid will charge battery.
2. PV only: It is only allow PV power to charge battery.
3. None: It is not allowed to charge battery no matter it's from PV power or grid.

Load supply source:

When PV power is available: 1st PV, 2nd Grid, 3rd Battery

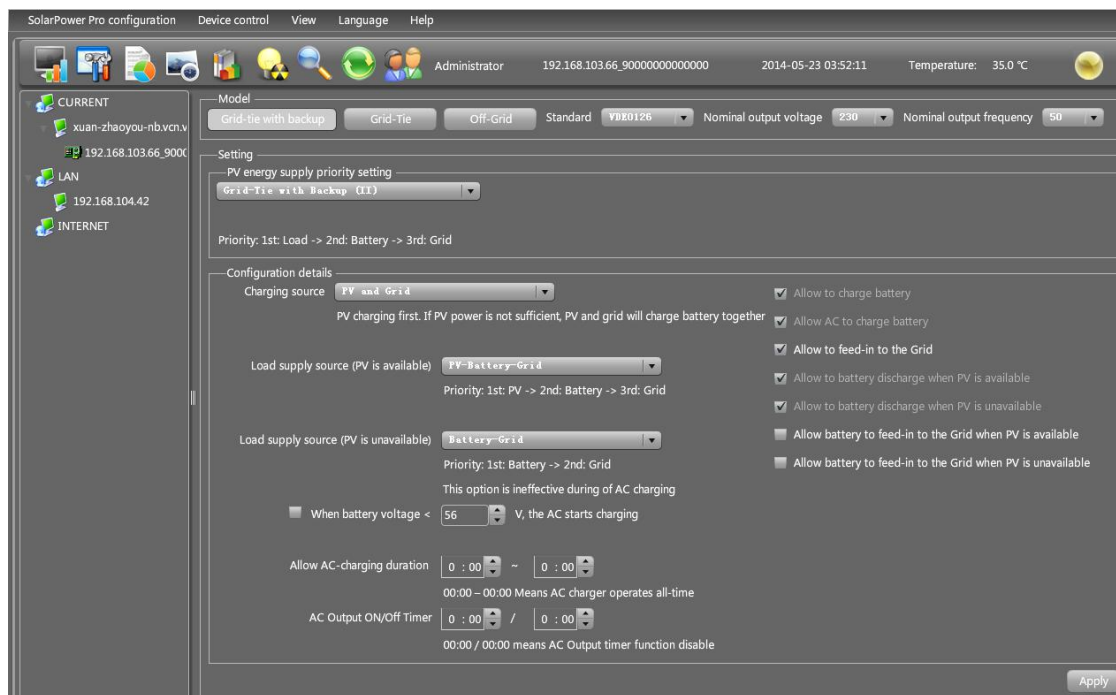
If battery is not fully charged, PV power will charge battery first. And remaining PV power will provide power to the load. If it's not sufficient, grid will provide power to the load. If grid is not available at the same time, battery power will back up.

When PV power is not available:

1. 1st Grid, 2nd Battery: Grid will provide power to the load at first. If grid is not available, battery power will provide power backup.
2. 1st Battery, 2nd Grid: Battery power will provide power to the load at first. If battery power is running out, grid will back up the load.

NOTE: This option will become ineffective during AC charging time and the priority will automatically become 1st Grid and 2nd Battery order. Otherwise, it will cause battery damage.

- Grid with backup (II) :



PV energy supply priority setting: 1st Load, 2nd Battery and 3rd Grid.

PV power will provide power to the load first. Then, it will charge battery. If there is any remaining power left, it will feed-in to the grid.

Battery charging source:

1. PV and Grid: It's allowed to charge battery from PV power first. If it's not sufficient, grid will charge battery.
2. PV only: It is only allow PV power to charge battery.
3. None: It is not allowed to charge battery no matter it's PV power or grid.

Load supply source:

When PV power is available:

1. 1st PV, 2nd Battery, 3rd Grid

PV power will provide power to the load first. If it's not sufficient, battery power will provide power to the load. When battery power is running out or not available, grid will back up the load.

2. 1st PV, 2nd Grid, 3rd Battery

PV power will provide power to the load first. If it's not sufficient, grid will provide power to the load. If grid is not available at the same time, battery power will back up.

When PV power is not available:

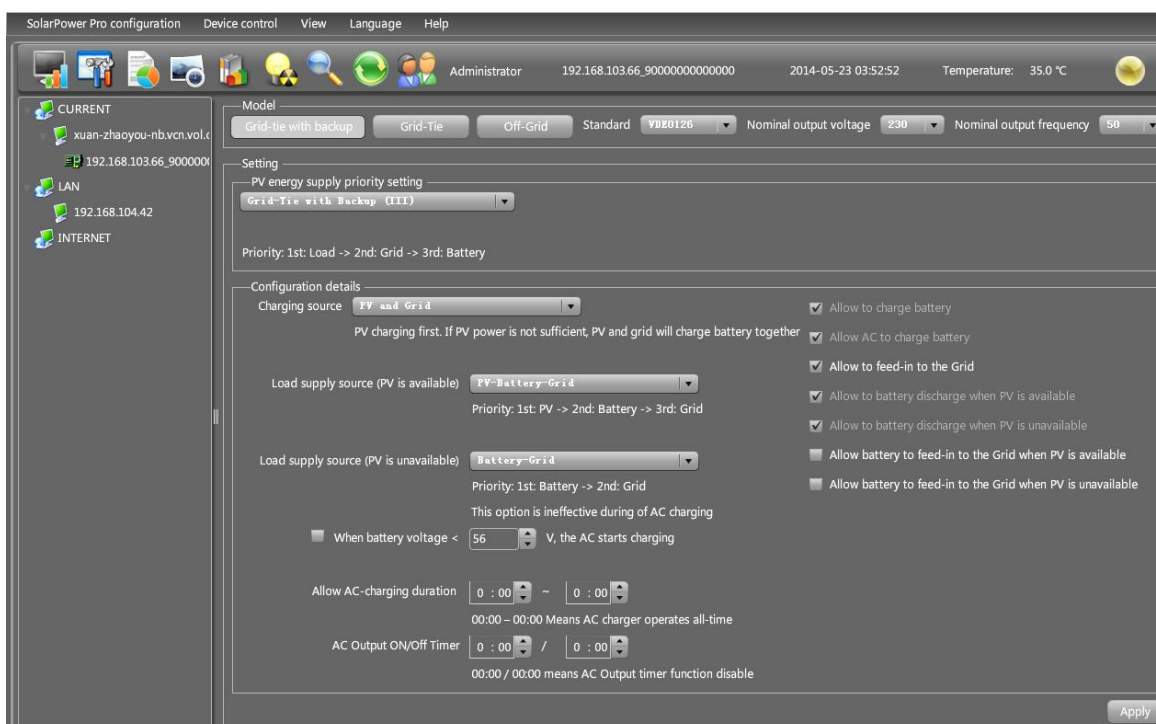
1. 1st Grid, 2nd Battery: Grid will provide power to the load at first. If grid is not

available, battery power will provide power backup.

2. 1st Battery, 2nd Grid: Battery power will provide power to the load at first. If battery power is running out, grid will back up the load

NOTE: This option will become ineffective during AC charging time and the priority will automatically become 1st Grid and 2nd Battery order. Otherwise, it will cause battery damage.

- Grid-tie with backup (III):



PV energy supply priority setting: 1st Load, 2nd Grid and 3rd Battery

PV power will provide power to the load first. If there is more PV power available, it will feed-in to the grid. If feed-in power reaches max. feed-in power setting, the remaining power will charge battery.

NOTE: The max. feed-in grid power setting is available in parameter setting. Please refer to section 4-2-2.

Battery charging source:

1. PV and Grid: It's allowed to charge battery from PV power first. If it's not sufficient, grid will charge battery.
2. PV only: It is only allow PV power to charge battery.
3. None: It is not allowed to charge battery no matter it's PV power or grid.

Load supply source:

When PV power is available:

1. 1st PV, 2nd Battery, 3rd Grid

PV power will provide power to the load first. If it's not sufficient, battery power will provide power to the load. When battery power is running out or not available, grid will back up the load.

2. 1st PV, 2nd Grid, 3rd Battery

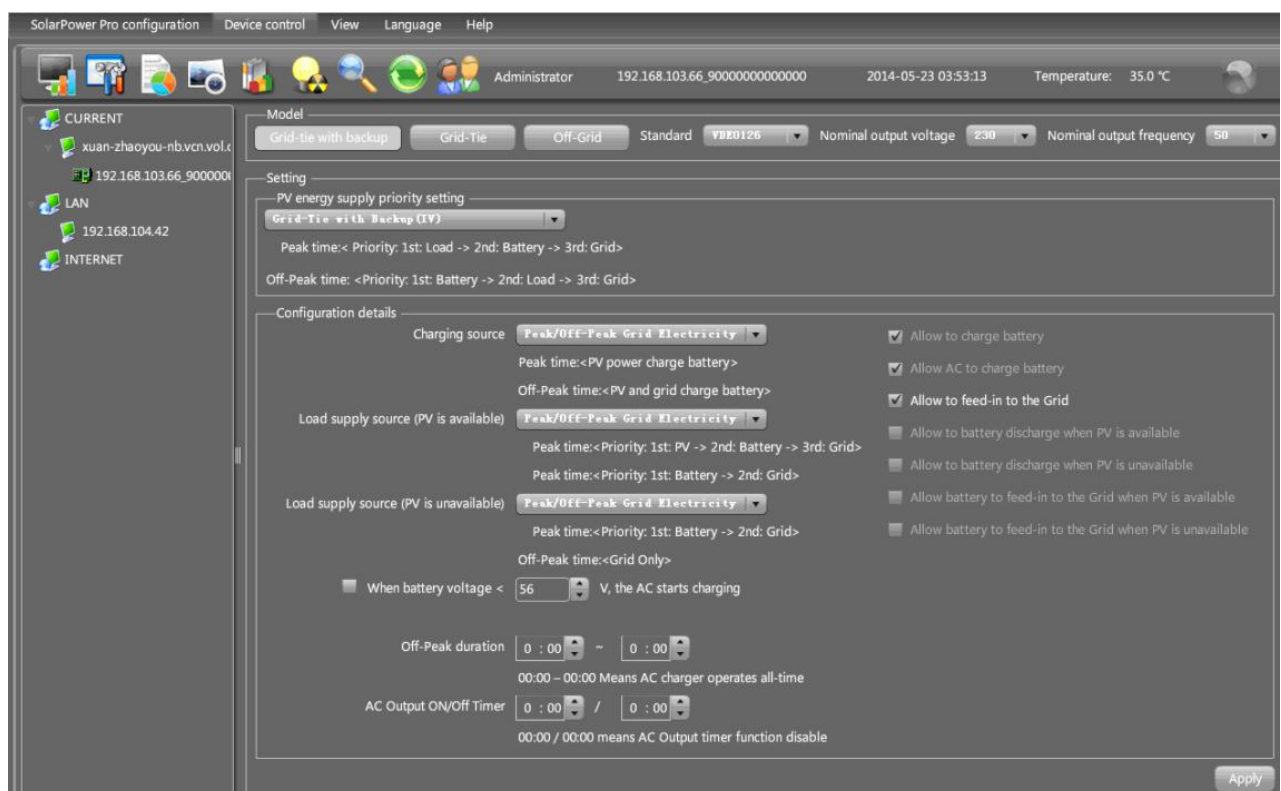
PV power will provide power to the load first. If it's not sufficient, grid will provide power to the load. If grid is not available at the same time, battery power will back up.

When PV power is not available:

1. 1st Grid, 2nd Battery: Grid will provide power to the load at first. If grid is not available, battery power will provide power backup.
2. 1st Battery, 2nd Grid: Battery power will provide power to the load at first. If battery power is running out, grid will back up the load.

NOTE: This option will become ineffective during AC charging time and the priority will automatically become 1st Grid and 2nd Battery order. Otherwise, it will cause battery damage.

- Grid-tie with backup (IV): Users are only allowed to set up peak time and off-peak electricity demand.



Working logic under peak time:

PV energy supply priority: 1st Load, 2nd Battery and 3rd Grid

PV power will provide power to the load first. If PV power is sufficient, it will charge battery next. If there is remaining PV power left, it will feed-in to the grid. Feed-in to the grid is default disabled.

Battery charging source: PV only

Only after PV power fully supports the load, the remaining PV power is allowed to charge battery during peak time.

Load supply source: 1st PV, 2nd Battery, 3rd Grid

PV power will provide power to the load first. If PV power is not sufficient, battery power will back up the load. If battery power is not available, grid will provide the load. When PV power is not available, battery power will supply the load first. If battery power is running out, grid will back up the load.

Working logic under off-peak time:

PV energy supply priority: 1st Battery, 2nd Load and 3rd Grid

PV power will charge battery first. If PV power is sufficient, it will provide power to the loads. The remaining PV power will feed to the grid.

NOTE: The max. feed-in grid power setting is available in parameter setting. Please refer to section 4-2-2.

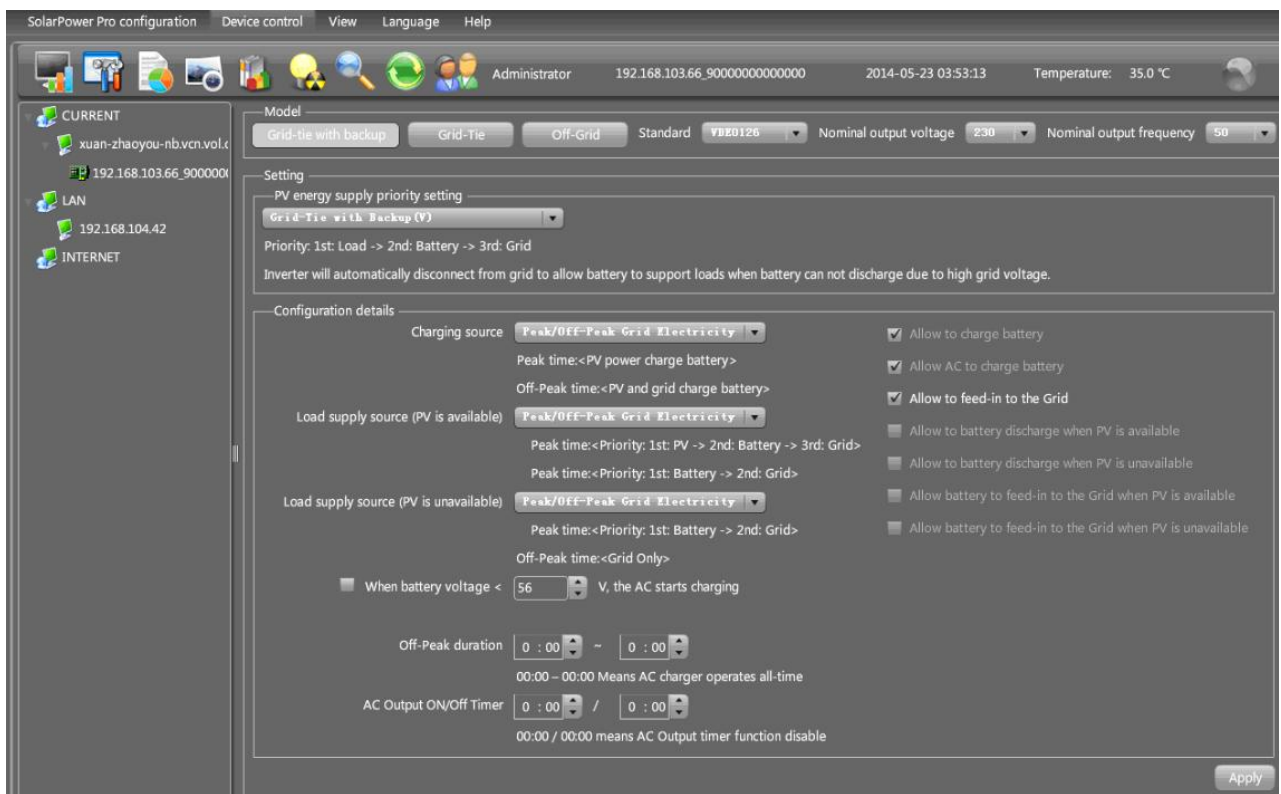
Battery charging source: PV and grid charge battery

PV power will charge battery first during off-peak time. If it's not sufficient, grid will charge battery.

Load supply source: 1st PV, 2nd Grid, 3rd Battery

When battery is fully charged, remaining PV power will provide power to the load first. If PV power is not sufficient, grid will back up the load. If grid power is not available, battery power will provide power to the load.

- Grid-tie with backup (V): Under this mode, inverter will automatically disconnect from grid to allow battery to support loads when battery can not discharge due to high grid voltage.



PV energy supply priority setting: 1st Load, 2nd Battery and 3rd Grid.

PV power will provide power to the load first. Then, it will charge battery. If there is any remaining power left, it will feed-in to the grid.

Battery charging source:

1. PV and Grid: It's allowed to charge battery from PV power first. If it's not sufficient, grid will charge battery.
2. PV only: It is only allow PV power to charge battery.
3. None: It is not allowed to charge battery no matter it's PV power or grid.

Load supply source:

When PV power is available:

1. 1st PV, 2nd Battery, 3rd Grid

PV power will provide power to the load first. If it's not sufficient, battery power will provide power to the load. When battery power is running out or not available, grid will back up the load.

2. 1st PV, 2nd Grid, 3rd Battery

PV power will provide power to the load first. If it's not sufficient, grid will provide power to the load. If grid is not available at the same time, battery

power will back up.

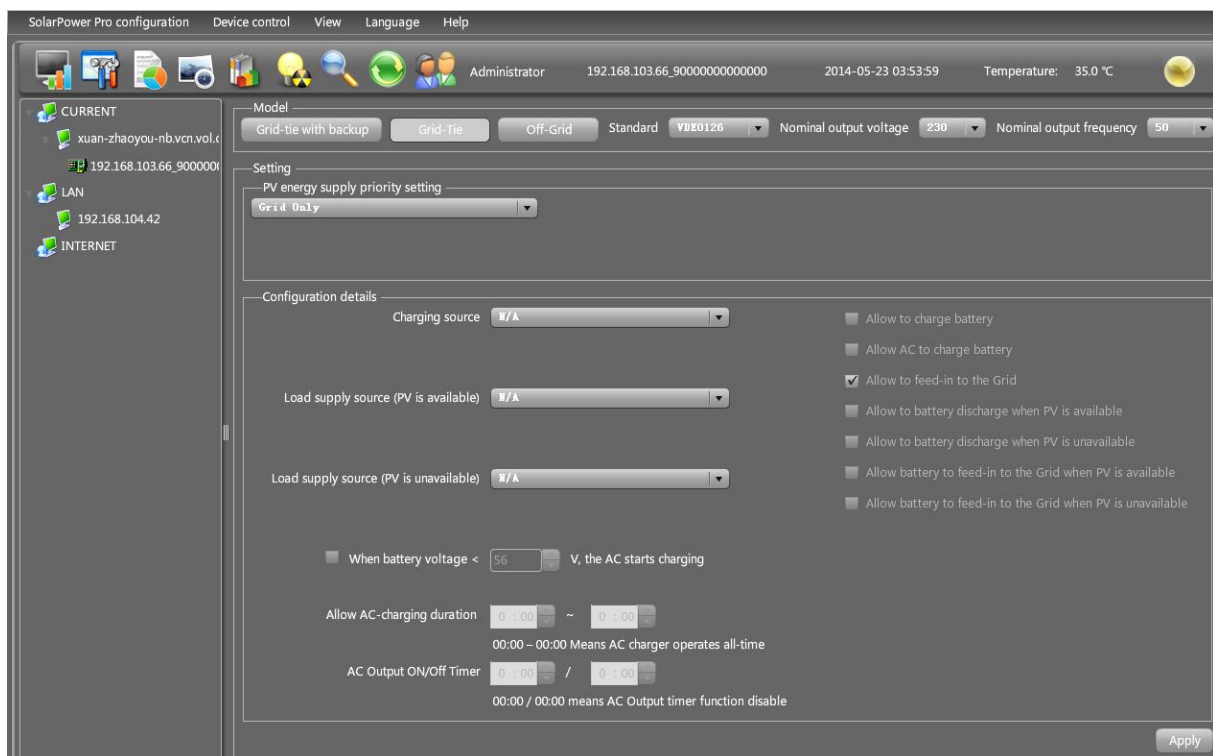
When PV power is not available:

1. 1st Grid, 2nd Battery: Grid will provide power to the load at first. If grid is not available, battery power will provide power backup.
2. 1st Battery, 2nd Grid: Battery power will provide power to the load at first. If battery power is running out, grid will back up the load

NOTE: This option will become ineffective during AC charging time and the priority will automatically become 1st Grid and 2nd Battery order. Otherwise, it will cause battery damage.

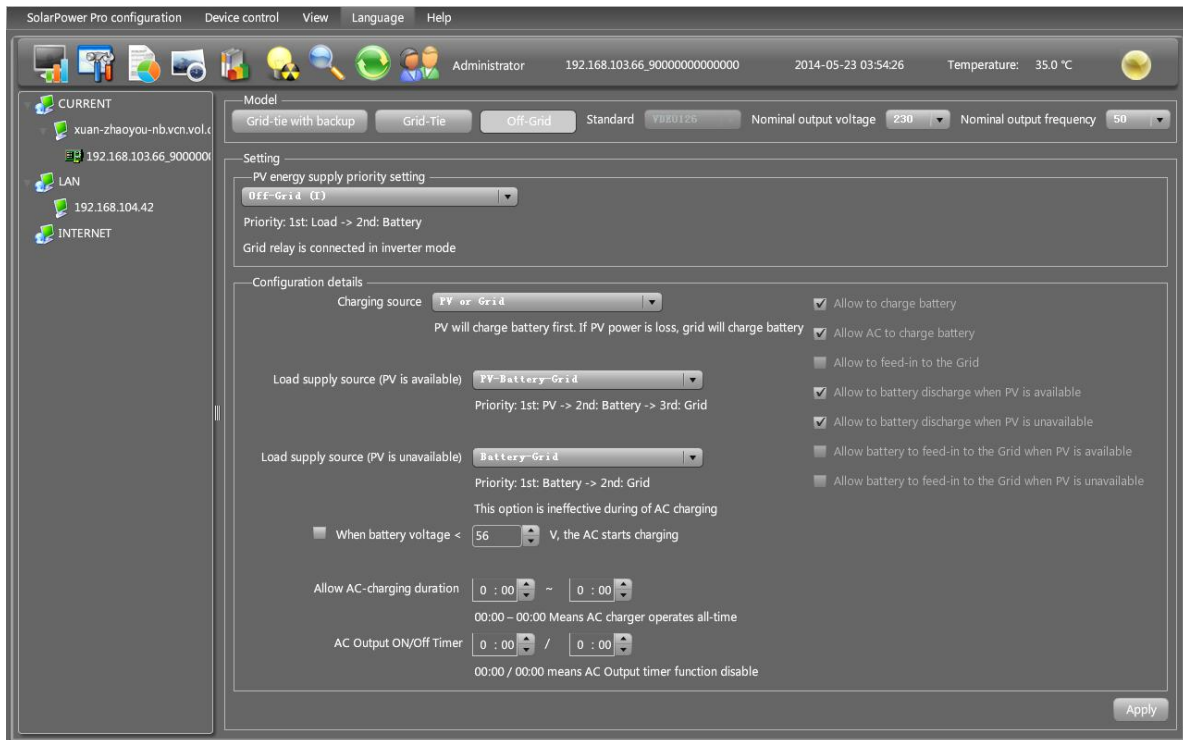
Grid-Tie

Under this operation mode, PV power only feeds-in to the grid. No priority setting is available.



Off-Grid

● Off-Grid (I):



PV energy supply priority setting: 1st Load, 2nd Battery

PV power will provide power to the load first and then charge battery. Feed-in to the grid is not allowed under this mode. At the same time, the grid relay is connected in Inverter mode. That means the transfer time from inverter mode to battery mode will be less than 15ms. Besides, it will avoid overload fault because grid can supply load when connected load is over 3KW.

Battery charging source:

1. PV or Grid: If there is remaining PV power after supporting the loads, it will charge battery first. Only until PV power is not available, grid will charge battery.
2. PV only: It is only allow PV power to charge battery.
3. None: It is not allowed to charge battery no matter it's PV power or grid.

Load supply source:

When PV power is available:

1. 1st PV, 2nd Battery, 3rd Grid

PV power will provide power to the load first. If it's not sufficient, battery power will provide power to the load. When battery power is running out or not available, grid will back up the load.

2. 1st PV, 2nd Grid, 3rd Battery

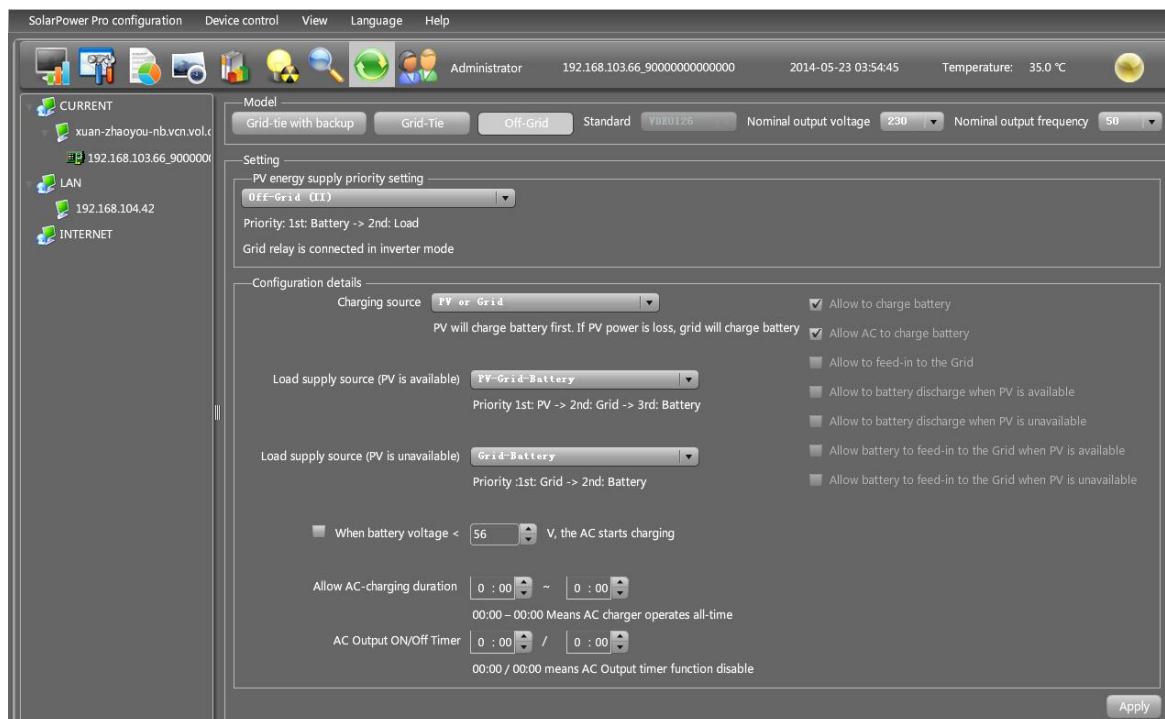
PV power will provide power to the load first. If it's not sufficient, grid will provide power to the load. If grid is not available at the same time, battery power will back up.

When PV power is not available:

1. 1st Grid, 2nd Battery: Grid will provide power to the load at first. If grid is not available, battery power will provide power backup.
2. 1st Battery, 2nd Grid: Battery power will provide power to the load at first. If battery power is running out, grid will back up the load.

NOTE: This option will become ineffective during AC charging time and the priority will automatically become 1st Grid and 2nd Battery order. Otherwise, it will cause battery damage.

- Off-Grid (II)



PV energy supply priority setting: 1st Battery, 2nd Load

PV power will charge battery first. After battery is fully charged, if there is remaining PV power left, it will provide power to the load. Feed-in to the grid is not allowed under this mode. At the same time, the grid relay is connected in Inverter mode. That means the transfer time from inverter mode to battery mode will be less than 15ms. Besides, it will avoid overload fault because grid can supply load when connected load is over 3KW.

Battery charging source:

1. PV or Grid: If there is remaining PV power after supporting the loads, it will charge battery first. Only until PV power is not available, grid will charge battery.
2. PV only: It is only allow PV power to charge battery.
3. None: It is not allowed to charge battery no matter it's PV power or grid.

NOTE: It's allowed to set up AC charging duration.

Load supply source:

When PV power is available: 1st PV, 2nd Grid, 3rd Battery

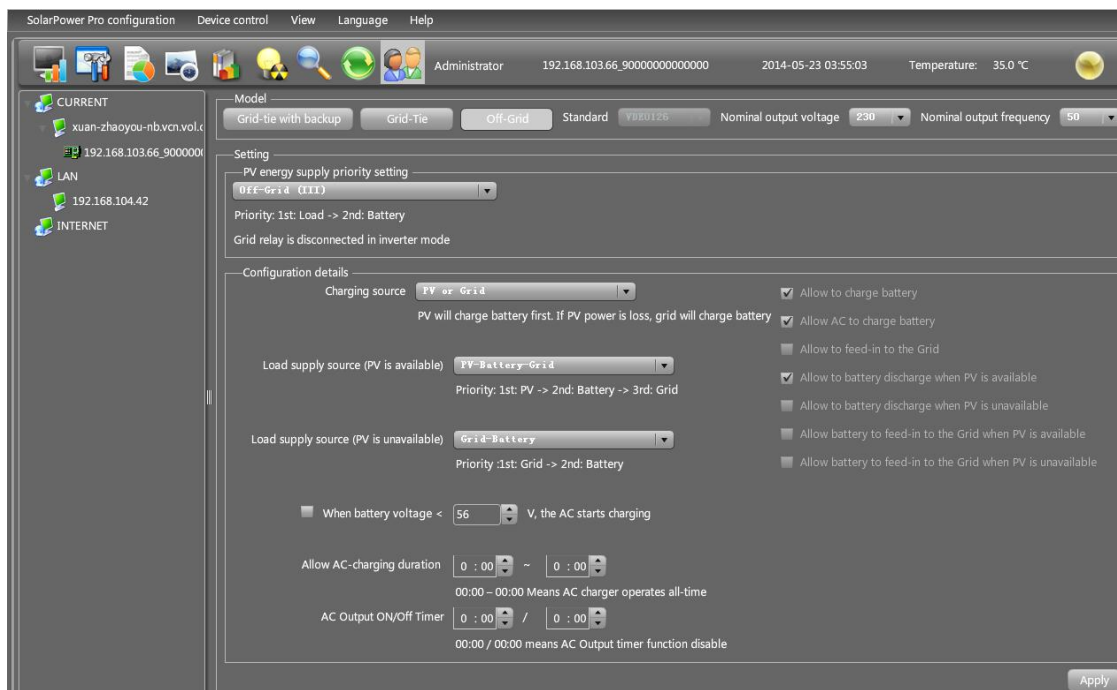
PV power will provide power to the load first. If it's not sufficient, grid will provide power to the load. If grid is not available at the same time, battery power will back up.

When PV power is not available:

1. 1st Grid, 2nd Battery: Grid will provide power to the load at first. If grid is not available, battery power will provide power backup.
2. 1st Battery, 2nd Grid: Battery power will provide power to the load at first. If battery power is running out, grid will back up the load.

NOTE: This option will become ineffective during AC charging time and the priority will automatically become 1st Grid and 2nd Battery order. Otherwise, it will cause battery damage.

● Off-Grid (III)



PV energy supply priority setting: 1st Battery, 2nd Load

PV power will charge battery first. After battery is fully charged, if there is remaining PV power left, it will provide power to the load. Feed-in to the grid is not allowed under this mode. The grid relay is NOT connected in Inverter mode. That means the transfer time from inverter mode to battery mode will be about 15ms. If connected load is over 3KW, this inverter will activate fault protection.

Battery charging source:

1. PV or Grid: If there is remaining PV power after supporting the loads, it will charge battery first. Only until PV power is not available, grid will charge battery.
2. PV only: It is only allow PV power to charge battery.
3. None: It is not allowed to charge battery no matter it's PV power or grid.

NOTE: It's allowed to set up AC charging duration.

Load supply source:

When PV power is available: 1st PV, 2nd Battery, 3rd Grid

PV power will provide power to the load first. If it's not sufficient, battery power will back up the load. Only after battery power is running, Grid will back up the load.

When PV power is not available:

1. 1st Grid, 2nd Battery: Grid will provide power to the load at first. If grid is not available, battery power will provide power backup.
2. 1st Battery, 2nd Grid: Battery power will provide power to the load at first. If battery power is running out, grid will back up the load.

NOTE: This option will become ineffective during AC charging time and the priority will automatically become 1st Grid and 2nd Battery order. Otherwise, it will cause battery damage.

When selected, after battery voltage is lower than setting (xx.x V), AC will start to charge battery. When this condition is selected, it's allowed to enter setting voltage. Otherwise, it's impossible to enter any values.

Allow AC charging duration: It's a period time to allow AC (grid) to charge battery. When the duration is set up as 0:00-00:00, it means no time limitation for AC to charge battery.

AC output ON/Off Timer: Set up on/off time for AC output of inverter. If setting it as 00:00/00:00, this function is disabled.

Allow to charge battery: This option is automatically determined by setting in "Charging source". It's not allowed to modify here. When "NONE" is selected in charging source section, this option becomes unchecked as grey

text.

Allow AC to charge battery: This option is automatically determined by setting in "Charging source". It's not allowed to modify here. When "Grid and PV" or "Grid or PV" is selected in charging source section, this option is default selected. Under Grid-tie mode, this option is invalid.

Allow to feed-in to the Grid: This option is only valid under Grid-tie and Grid-tie with backup IV modes. Users can decide if this inverter can feed-in to the grid.


Allow battery to discharge when PV is available: This option is automatically determined by setting in "Load supply source (PV is available)". When "Battery" is higher priority than "Grid" in Load supply source (PV is available), this option is default selected. Under Grid-tie, this option is invalid.

Allow battery to discharge when PV is unavailable: This option is automatically determined by setting in "Load supply source (PV is unavailable)". When "Battery" is higher priority than "Grid" in Load supply source (PV is unavailable), this option is default selected. Under Grid-tie mode, this option is invalid.

Allow battery to feed-in to the Grid when PV is available: This option is only valid in Grid-tie with backup II or Grid-tie with backup III modes.

Allow battery to feed-in to the Grid when PV is unavailable: This option is only valid in all options of Grid-tie with backup mode.

4.2.2. Parameter Setting

Select Device Control >> Parameter Setting or select shortcut icon . It will display available parameter settings when setting operation mode.

NOTE: This screen may be different for different mode settings of solar inverters.

When setting in Grid-tie with backup mode or Grid-tie mode, some parameters are related to local grid standard and can't be modified without factory password. Please refer to red squares in Diagrams 4-11A and 4-11B. Any mis-setting could cause inverter damage or not working. Please check local dealers for the details. Refer to Diagram 4-12C for off-grid setting mode.

Step 1 Select the functions by clicking "Enable" or "Disable" button. Or change the numbers by clicking up-down arrows or modify the numbers directly in the number column.

Step 2 Click "Apply" button to save the settings. Each function setting is saved by clicking each "Apply" button.

SolarPower Pro configuration Device control View Language Help

Administrator 192.168.107.115_9000000000000 2015-06-09 18:46:26 Temperature: 40.0 °C

Parameters setting | Restore to the defaults | Output synchronization data | Real-time control

Min. grid-connected voltage	184 V	Apply	The waiting time before grid-connection	60 Sec.	Apply
Max. grid-connected voltage	264.5 V	Apply	Max. grid-connected average voltage	253 V	Apply
Min. grid-connected frequency	47.5 Hz	Apply	Max. feed-in grid power	3000 W	Apply
Max. grid-connected frequency	51.5 Hz	Apply	Feed-in power factor	1	Apply

Min. PV input voltage	90 V	Apply	Floating charging voltage	54 V	Apply
Max. PV input voltage	500 V	Apply	Battery cut-off discharging voltage when Grid is available	48 V	Apply
Min. MPP voltage	120 V	Apply	Battery re-discharging voltage when Grid is available	54 V	Apply
Max. MPP voltage	450 V	Apply	Battery cut-off discharging voltage when Grid is unavailable	42 V	Apply
Max. charging current	25 A	Apply	Battery re-discharging voltage when Grid is unavailable	48 V	Apply
Max. AC charging current	25 A	Apply	Feeding grid power calibration	0 W	Apply
Bulk charging voltage(C.V. voltage)	56 V	Apply	Max. battery discharge current in hybrid mode	147 A	Apply
Start LCD screen-saver after	60 Sec.	Apply			

Mute Buzzer alarm	Enable	Disable	Apply	Activate Li-Fe battery while commissioning	Enable	Disable	Apply
Mute the buzzer in the Standby mode	Enable	Disable	Apply	Generator as AC source	Enable	Disable	Apply
Mute alarm in battery mode	Enable	Disable	Apply	Wide AC input range	Enable	Disable	Apply

When float charging current is less than X (A) and continued T (Min),then charger off; when battery voltage is less than Y (V),then charger on again.

X: 0 A T: 60 Min Y: 53 V Apply

Any schedule change will affect the power generated and shall be conservatively made.

System time 2015-06-09 18:46:26 Apply

Diagram 4-11A (Grid-Tie with Backup mode)

SolarPower Pro configuration Device control View Language Help

Guest 192.168.107.118_9000000000000000 2015-06-10 14:45:21 Temperature: 43.0 °C

Parameters setting | Restore to the defaults | Output synchronization data | Real-time control

Min. grid-connected voltage	184 V	Apply	The waiting time before grid-connection	60 Sec	Apply
Max. grid-connected voltage	264.5 V	Apply	Max. grid-connected average voltage	253 V	Apply
Min. grid-connected frequency	47.5 Hz	Apply	Max. feed-in grid power	3000 W	Apply
Max. grid-connected frequency	51.5 Hz	Apply	Feed-in power factor	1	Apply

Min. PV input voltage	90 V	Apply
Max. PV input voltage	500 V	Apply
Min. MPP voltage	120 V	Apply
Max. MPP voltage	450 V	Apply
Start LCD screen-saver after	60 Sec.	Apply

Mute Buzzer alarm ☒ Enable ☐ Disable Apply

Mute the buzzer in the Standby mode ☐ Enable ☒ Disable Apply

When float charging current is less than X (A) and continued T (Min),then charger off; when battery voltage is less than Y (V),then charger on again.

X: 0 A T: 60 Min Y: 53 V Apply

Any schedule change will affect the power generated and shall be conservatively made.

System time 2015-06-10 14:45:21 Apply

Diagram 4-11B (Grid-Tie mode)

SolarPower Pro configuration Device control View Language Help

Guest 192.168.107.118_9000000000000000 2015-06-10 14:46:56 Temperature: 43.0 °C

Parameters setting | Restore to the defaults | Output synchronization data | Real-time control

Min. PV input voltage	90 V	Apply	Floating charging voltage	54 V	Apply
Max. PV input voltage	500 V	Apply	Battery cut-off discharging voltage when Grid is available	48 V	Apply
Min. MPP voltage	120 V	Apply	Battery re-discharging voltage when Grid is available	54 V	Apply
Max. MPP voltage	450 V	Apply	Battery cut-off discharging voltage when Grid is unavailable	42 V	Apply
Max. charging current	25 A	Apply	Battery re-discharging voltage when Grid is unavailable	48 V	Apply
Max. AC charging current	25 A	Apply	Feeding grid power calibration	0 W	Apply
Bulk charging voltage(C.V. voltage)	56 V	Apply	Max. battery discharge current in hybrid mode	147 A	Apply
Start LCD screen-saver after	60 Sec.	Apply			

Mute Buzzer alarm ☒ Enable ☐ Disable Apply

Mute the buzzer in the Standby mode ☐ Enable ☒ Disable Apply

Mute alarm in battery mode ☐ Enable ☒ Disable Apply

Activate Li-Fe battery while commissioning ☐ Enable ☒ Disable Apply

Generator as AC source ☐ Enable ☒ Disable Apply

Wide AC input range ☐ Enable ☒ Disable Apply

When float charging current is less than X (A) and continued T (Min),then charger off; when battery voltage is less than Y (V),then charger on again.

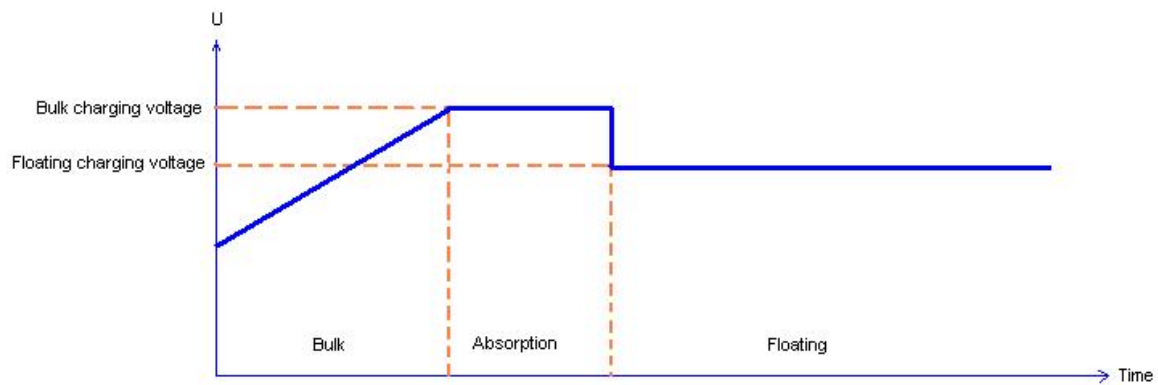
X: 0 A T: 60 Min Y: 53 V Apply

Any schedule change will affect the power generated and shall be conservatively made.

System time 2015-06-10 14:46:56 Apply

Diagram 4-11C (Off-Grid mode)

- Min. grid-connected voltage: The acceptable low voltage point for solar inverter with grid connected.
- Max. grid-connected voltage: The acceptable high voltage point for solar inverter with grid connected.
- Min. grid-connected frequency: The acceptable low frequency point for solar inverter with grid connected.
- Max. grid-connected frequency: The acceptable high frequency point for solar inverter with grid connected.
- The waiting time before grid-connection: The waiting time to establish grid connection after all requirements are met.
- Max. grid-connected average voltage: When the average voltage is higher than this setting, it will be identified as the utility is abnormal.
- Max. feed-in grid power: Maximum power to feed-in to the grid.
- Feed-in power factor: Setting range is -0.99~-0.80 and 0.80~1.00.
- Min. PV input voltage: The acceptable low voltage point for PV terminals when grid connection is established successfully.
- Max. PV input voltage: The acceptable high voltage point for PV terminals when grid connection is established successfully.
- Start LCD screen-saver after: The maximum duration time to activate LCD backlight.
- Min. MPP voltage: The acceptable low voltage point from solar module.
- Max. MPP voltage: The acceptable high voltage point from solar module.
- Max. charging current: The acceptable high charging current point.
- Max. AC charging current: The maximum acceptable charging current from AC. If this AC charging current is higher than max. charging current, max. charging current will be set up as real charging current.
- Bulk charging voltage (C.V. voltage) and Floating charging voltage as below:



- Battery cut-off discharging voltage when Grid is available: It's to set up battery cut-off discharge voltage when grid is available.
- Battery re-discharging voltage when Grid is available: It's to set up battery re-charging voltage when grid is available.
- Battery cut-off discharging voltage when Grid is unavailable: It's to set up battery cut-off discharging voltage when grid is not available.
- Battery re-discharging voltage when Grid is unavailable: It's to set up battery re-discharging voltage when grid is not available.
- Feeding grid power calibration: Calibrate feeding power in watts. Setting range from -300~+300.
- Max. battery discharge current in hybrid mode: It allows to set up maximum battery discharge current in grid-tie and grid-tie with backup mode operation.
- Mute Buzzer alarm: If it's activated, when fault or warning occurs, it will not sound. Vice versa.
- Mute the buzzer in the Standby mode: If it's activated, the buzzer will not sound when the device is in the standby mode. Vice versa.
- Mute the buzzer in battery mode: If it's activated, the buzzer will not sound when the device is in the Battery mode. Vice versa.
- Generator as AC source: If enabled, the unit is able to accept generator as AC power source.
- Activate Li-Fe battery while commissioning: If enable is selected, Li-Fe battery will be activated while commissioning.
- Wide AC input range: If disabled, the acceptable AC input voltage range will be determined by setting voltage between min. grid-connected voltage and max. grid-connected voltage and setting frequency between min. grid-connected frequency and max. grid-connected frequency. If enabled, AC input voltage range will become 170V ~ 280V. The acceptable frequency range become 40Hz ~ 55Hz for

50 Hz system and 55Hz ~ 65Hz for 60 Hz system. When either AC input voltage or AC input frequency is beyond the grid-connected setting range, it's not allowed to feed-in back to grid. At this time, it's only available to provide power to loads or charge battery.

- When float charging current is less than X (A) and lasts T (Min), then charger is off. When battery voltage is less than Y (V), then charger is on again.
- System time: It presents the device time zone. Any modification may effect the calculation of power generation. Please conservatively make any change.

NOTE: All parameter setting should be made at standby mode.

4.2.3. Restore to the defaults

This function will restore all settings to the default and clear all data in database. Therefore, please conservatively execute this function.

Select Device control >> Restore to the defaults. Refers to Diagram 4-12A for grid-tie with backup mode and Diagram 4-12B for Off-Grid mode.

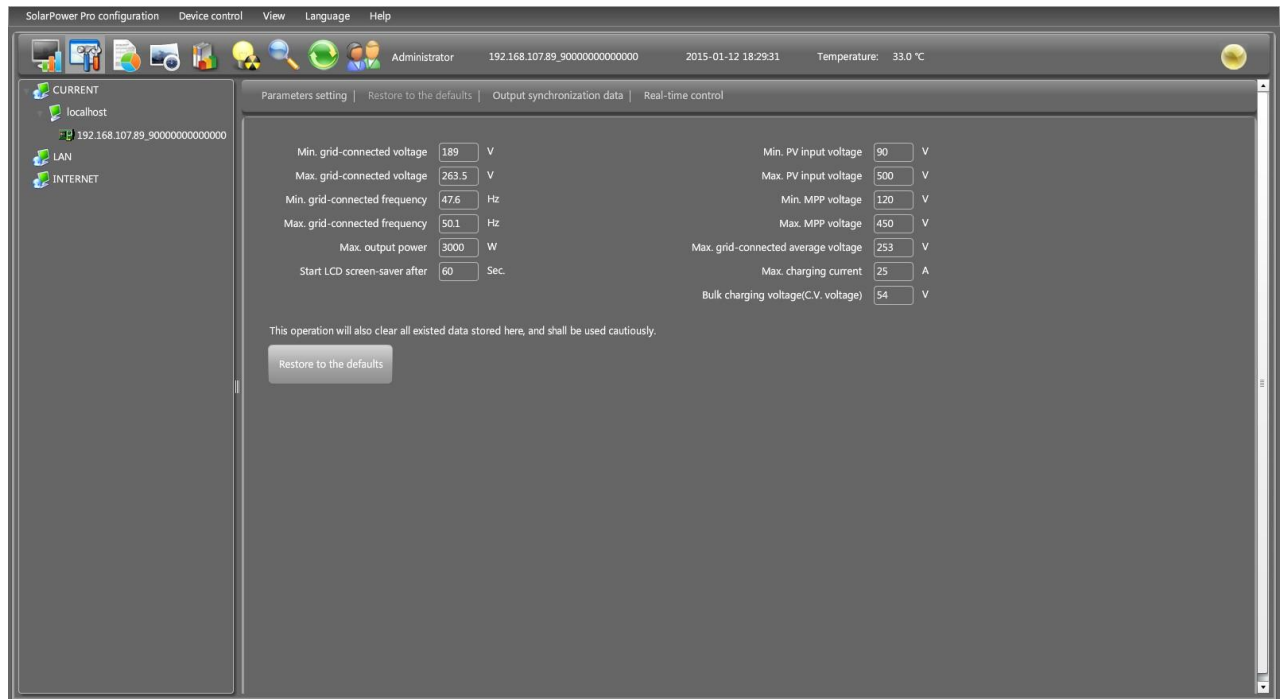


Diagram 4-12A (Grid-tie with backup)

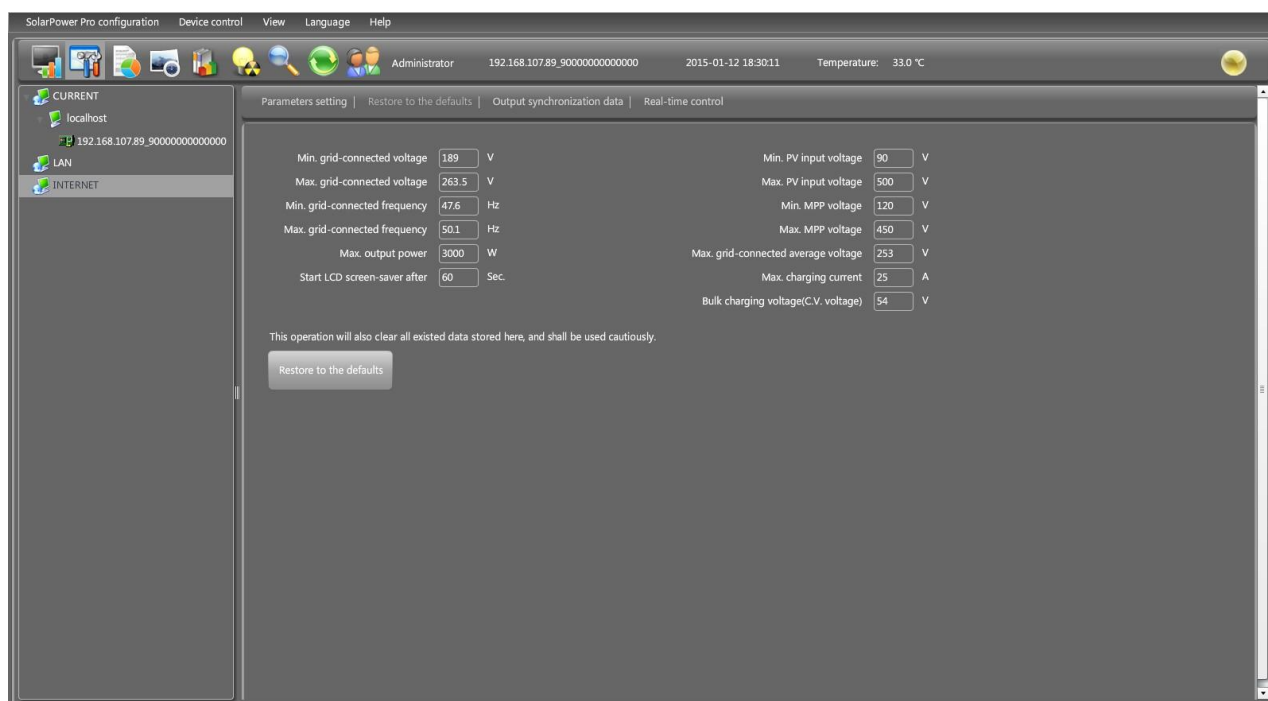


Diagram 4-12B (Off-Grid)

NOTE: This screen may be different for different settings of solar inverters.

4.2.4. Output synchronization data

This function will retrieve saved data in selected solar inverter units to re-save in the database. It can be saved either automatically or manually.

Select Device control >>Output synchronization data. Refer to Diagram 4-13.

Method 1: Automatic output synchronization data. Refer to A section in Diagram 4-13.

Synchronization period: Set frequency (daily, weekly, monthly, and time) to automatically sync output data.

Add schedule: Click "Add" button to add schedule into calendar. Every device supports only one sync schedule.

Delete schedule: Select schedule from the list and click "delete" button to remove.

Method 2: Manual output synchronization data. Refer to B section in Diagram 4-13.

There are two patterns to sync data.

Synchronize all data: It will save data of selected devices to the database immediately.

Synchronize data for selected date: It will save data of selected devices to the database during indicating period.

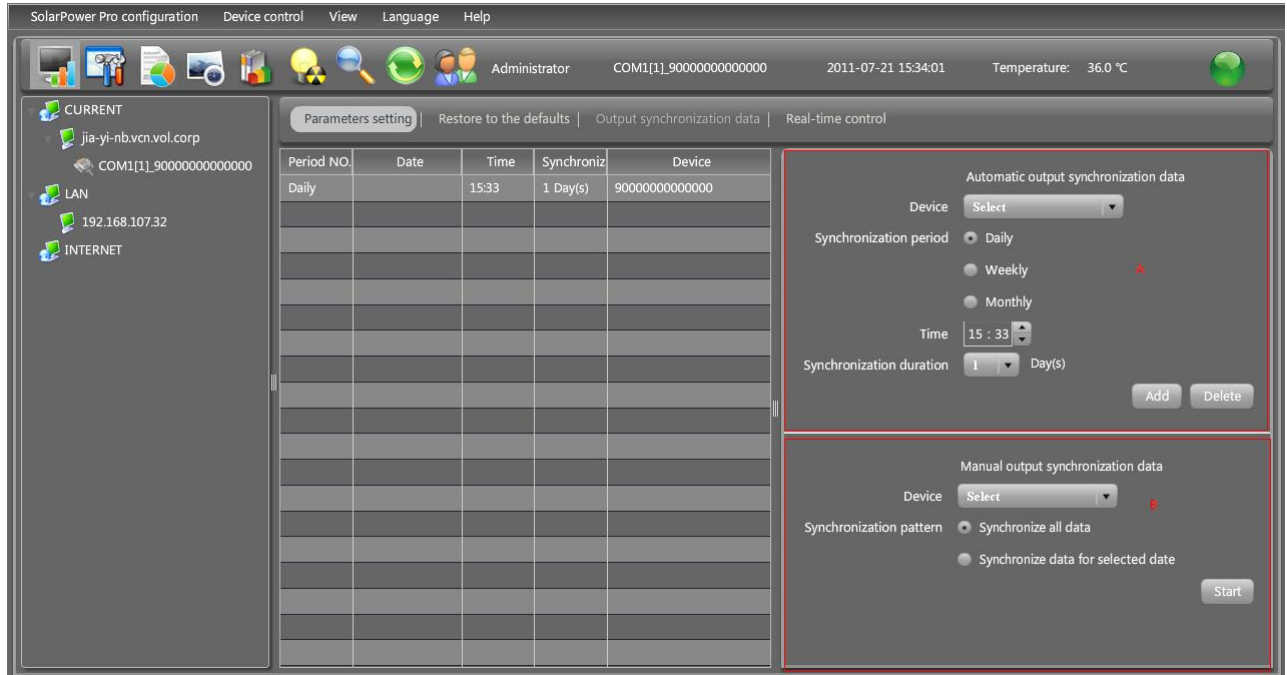


Diagram 4-13

NOTE: No matter it's automatic or manual sync, this action is only applied to the unit which is not updated to database before. If users want to update output data during specific time period, then please delete the data record of this period from power generation log.

4.2.5. Real-time control

It's to real-time control AC output and activate Li-Fe battery.

Select Device control >> Real-time control. Refer to Diagram 4-14.

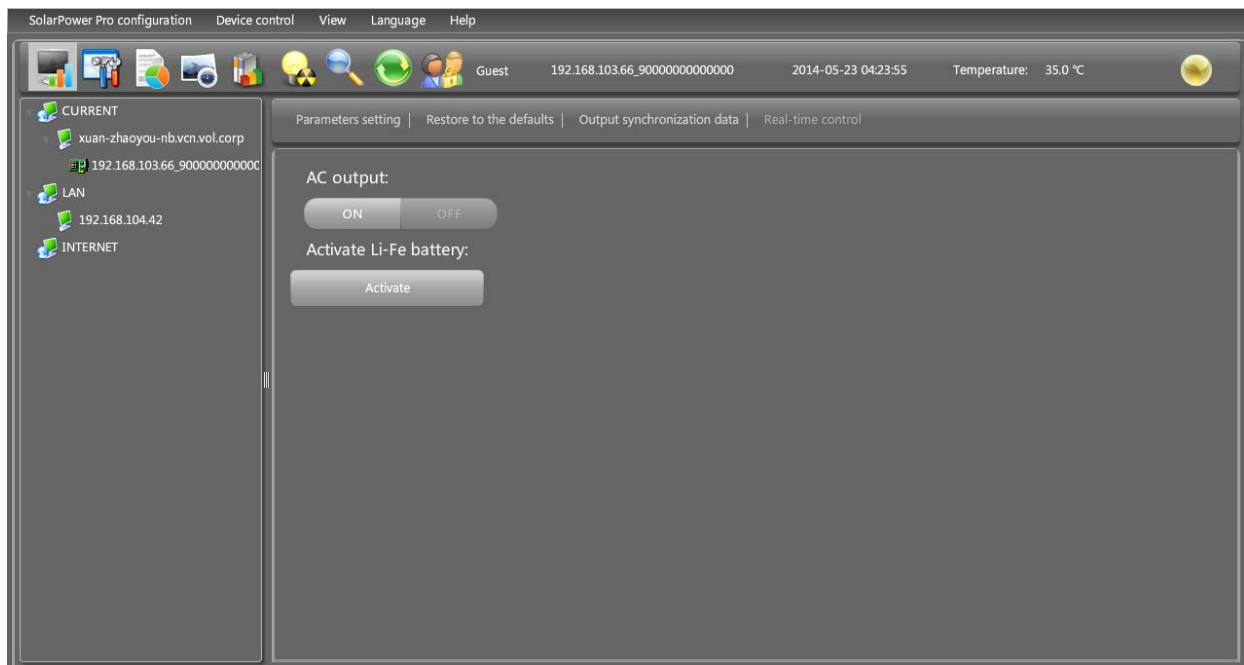


Diagram 4-14

- AC output control: Turn on or turn off AC output immediately when clicking “Apply” button.
- Activate Li-Fe battery: To wake up Li-Fe battery when clicking “Activate” button.

4.3. View

4.3.1. Status

This function is to display power flow, basic information and power generation of current monitored solar inverter.



Select View >> Status or click shortcut icon. Refer to Diagram 4-15.



Diagram 4-15

1. Power flow:

Power flow chart includes solar module icon, solar inverter icon and the utility icon.

Solar module icon presents the numbers of MPP defined by solar inverter.

When this device successfully connects to the grid, there will be power flow animation from solar modules to the utility. If any fault or abnormal situation occurs in solar inverter or the utility, the power flow animation will stop.

When fault occurs in solar inverter, the icon of solar inverter will flash until the fault is solved.

When abnormal situation occurs in the utility, the utility icon will flash until the fault is solved.

2. Basic Information:

This page is to display the current working data based on different types of monitored inverter. The major displayed information includes grid voltage, grid frequency, PV input voltage and Output current.

3. Power Information:

Power information displays real-time output power factor, power generation on recent date, month and year.


Power generation chart:

- Display hourly power generation on current date when selecting “per hour”;
- Display daily power generation on current month when selecting “daily”;
- Display monthly power generation on current year when selecting “monthly”;
- Display annual power generation since the year to purchase the device when selecting “annual”.

4.3.2. Power generation log data

This function is to browse, calculate, or delete power generation data in the datasheets.

- **Datasheets**

Select View >>Power generation log data>>Datasheets or click shortcut icon . Refer to Diagram 4-16.

Select browsed device and period. Then, click “Browse” to get result.

- **“Delete”**: Select specific data and click “Delete” button to delete the record.
- **“Export”**: Click “Export” button to save listed table to local PC in .CSV file.

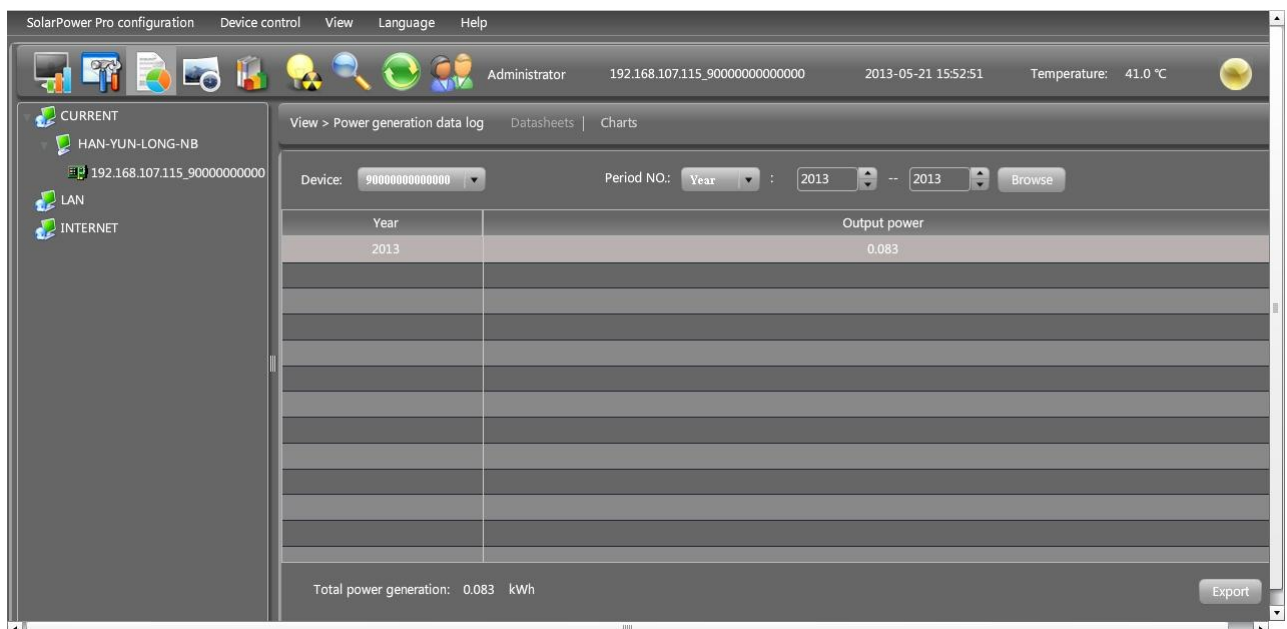


Diagram 4-16

- **Charts**

Select View >> Power generation log data >> Charts. Refer to Diagram 4-17.

Select browsed device and period. Click “Browse” to get result.

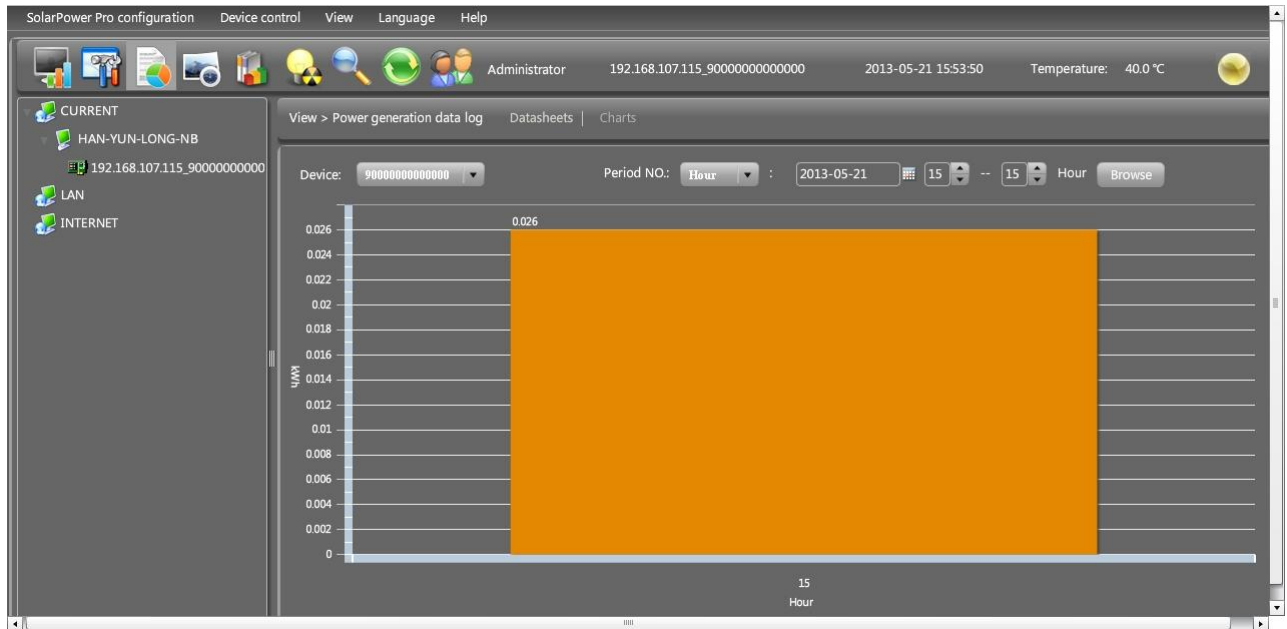


Diagram 4-17

4.3.3. Data

This function is to browse the working data of solar inverter saved in datasheets.

- Datasheets



Select View >>Data>>Datasheets or click shortcut icon. Refer to Diagram 4-18. Select browsed device and period to display in the screen. Click "Browse" to get result.

- **"Print"**: Print the listed data table.
- **"Delete"**: Select specific data and click "Delete" button to delete the record.
- **"Delete all"**: Click "Delete All" button to delete all records on the listed table.
- **"Export"**: Click "Export" button to save listed table to local PC in .CSV file.

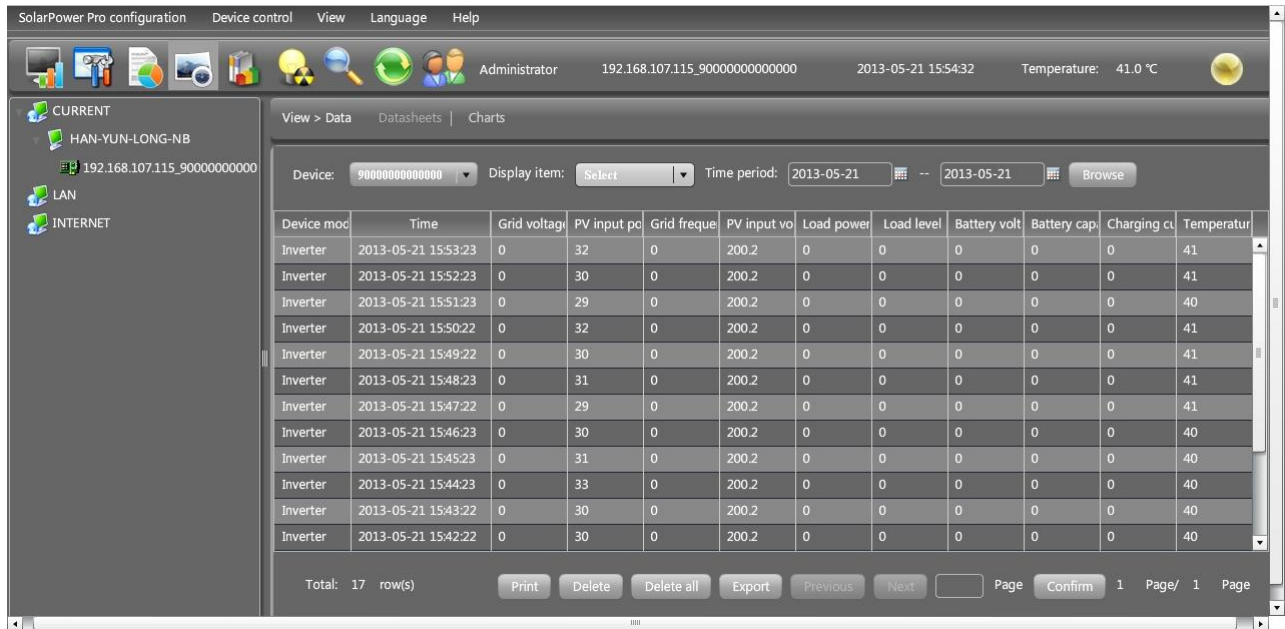


Diagram 4-18

NOTE: It can display 1500 logs in one page. Click "Previous" or "Next" button to browse other pages. Or enter specific page number directly.

● Charts

Select View >>Data>>Charts. Refer to Diagram 4-19.

Select browsed device and period and then click "Browse" to get the result.

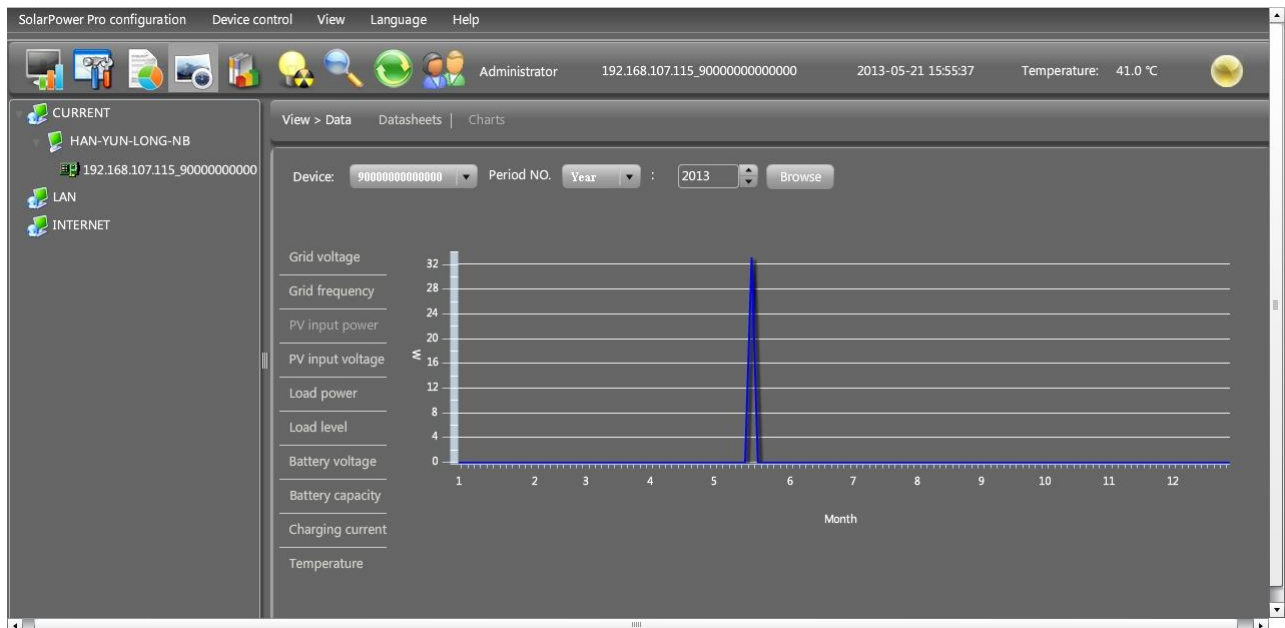



Diagram 4-19

4.3.4. Fault data log



Select View >>Fault data log or click shortcut icon . Refer to Diagram 4-20. Fault data log is to record data for each fault event when fault occurs in solar inverter.

- **"Delete"**: Select specific data and click "Delete" button to delete the record.
- **"Delete all"**: Click "Delete All" button to delete all records on the listed table.
- **"Export"**: Click "Export" button to save listed table to local PC in .CSV file.

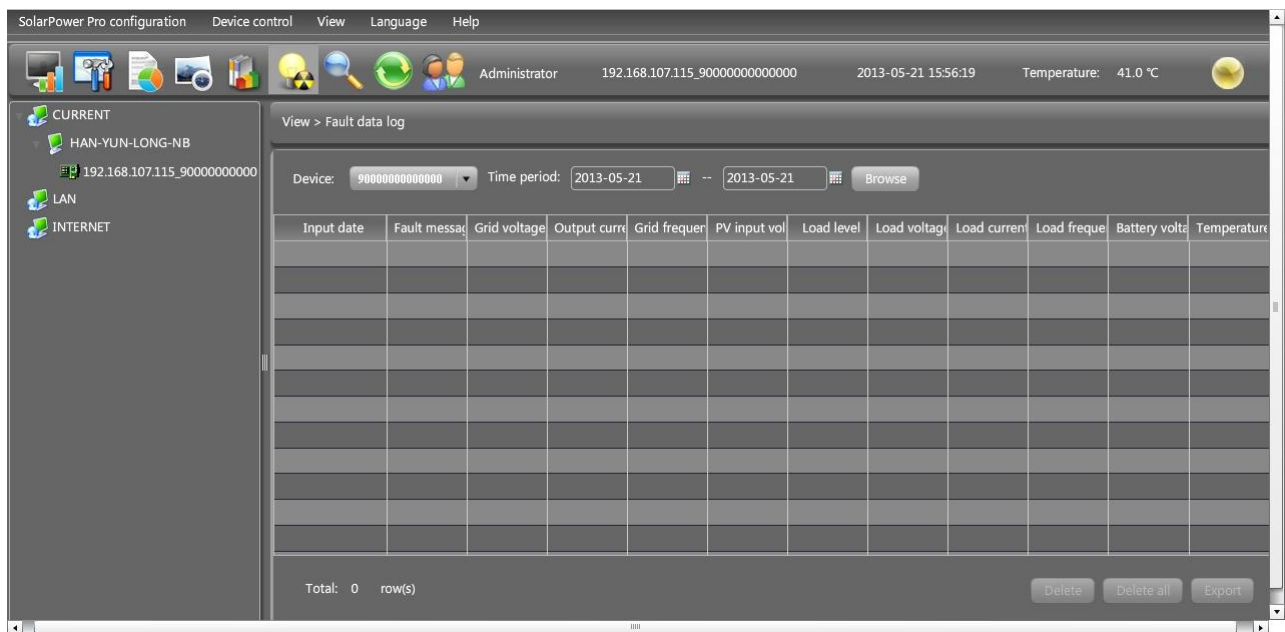


Diagram 4-20

4.3.5. Event log



Select View >>Event log or click shortcut icon  to enter event log.

It's to record history events. Users can browse event list according to date. It lists all detailed information and statistics for history events. Refer to Diagram 4-21.

- **"Delete"**: Select specific data and click "Delete" button to delete the record.
- **"Delete all"**: Click "Delete All" button to delete all records on the listed table.
- **"Export"**: Click "Export" button to save listed table to local PC in .CSV file.

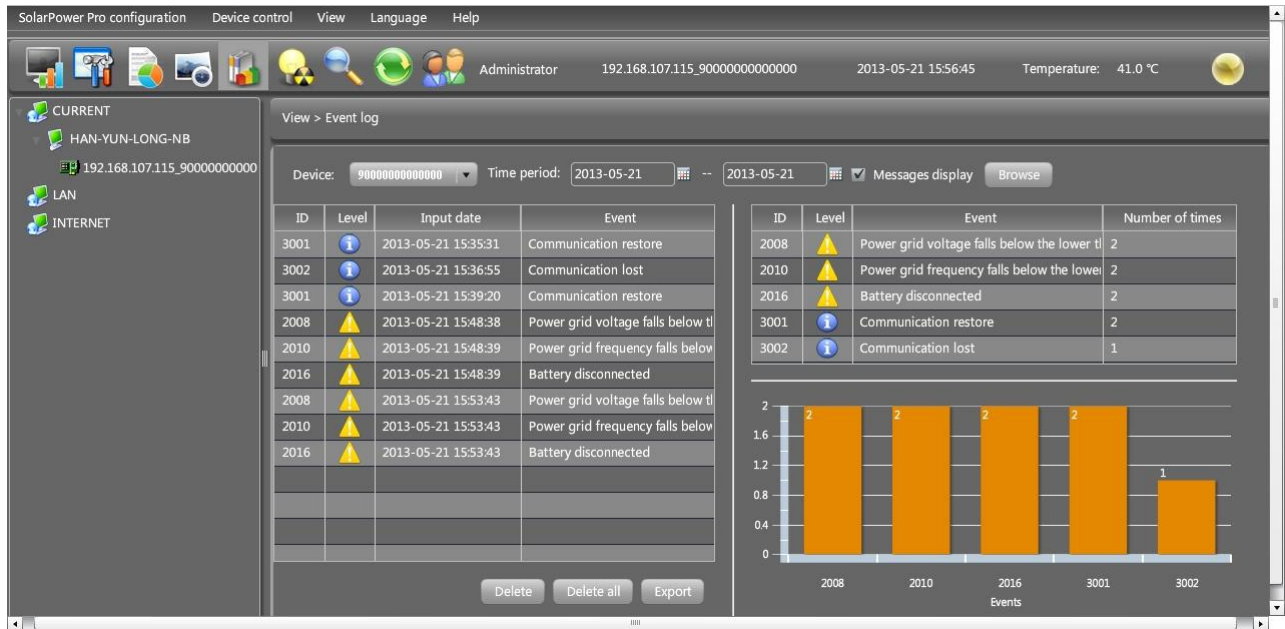





Diagram 4-21

4.4. Log in and Log out

Icon  to display users don't log in SolarPower Pro.

Icon  to display users has logged in SolarPower Pro.

Click icon  and enter password to login the software. The default password is "administrator". Refer to Diagram 4-22.

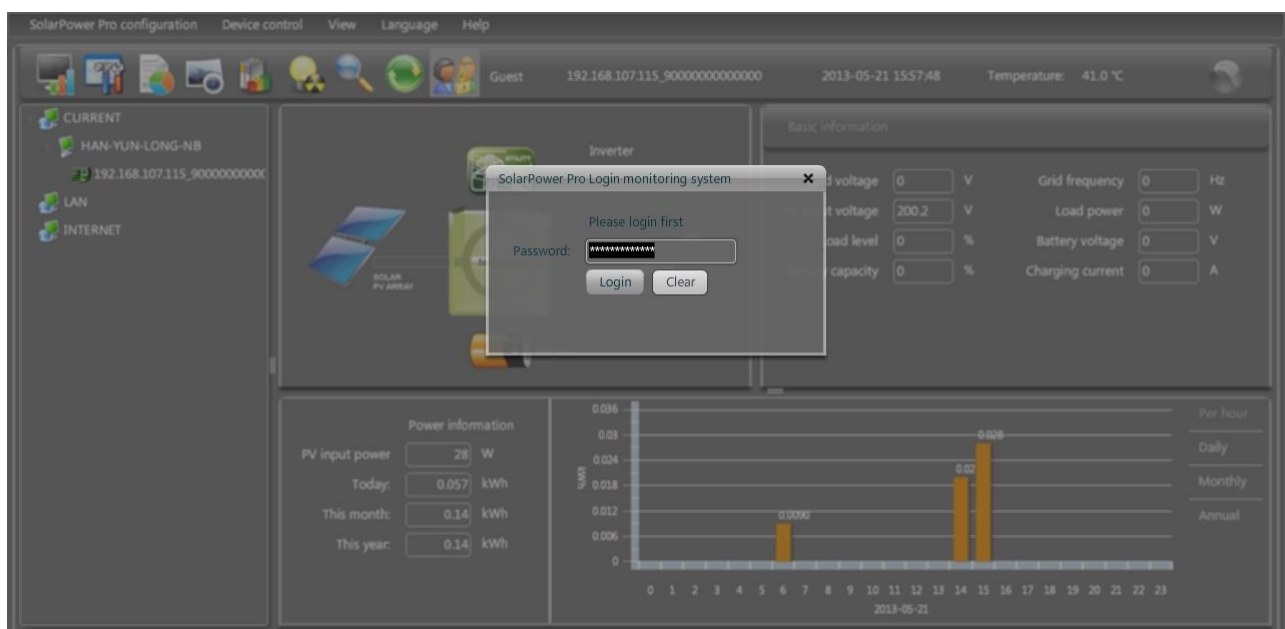



Diagram 4-22

Click icon  to log out. Refer to Diagram 4-23.

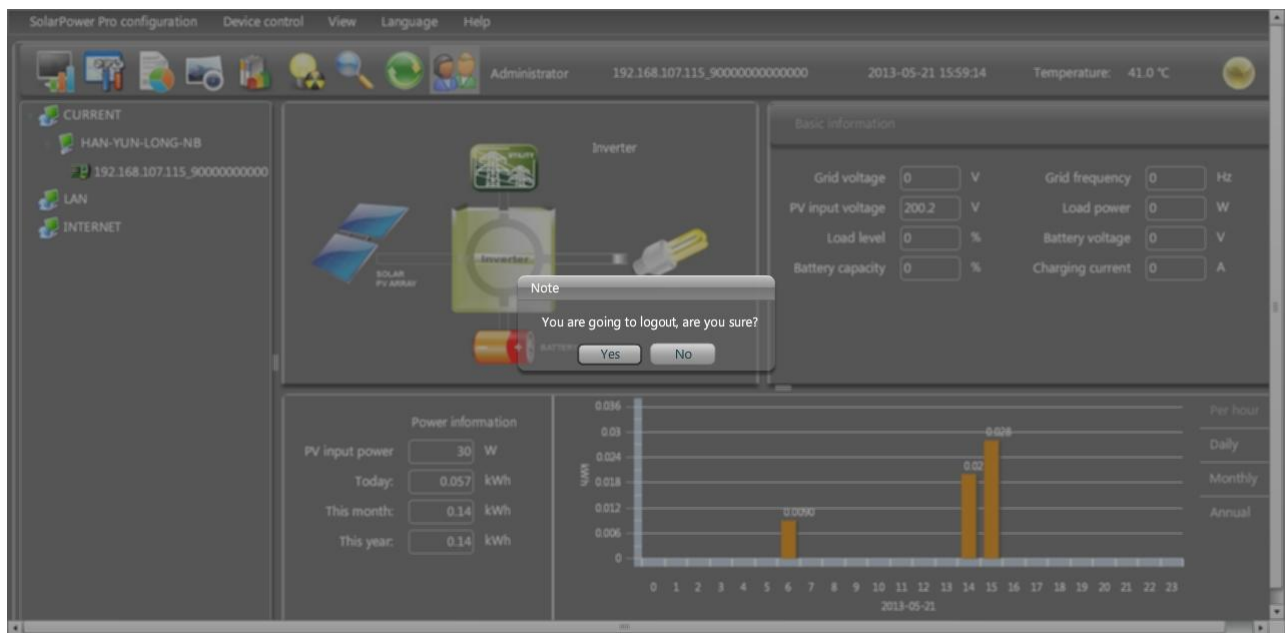


Diagram 4-23

4.5. Refresh



Click icon  to refresh screen. Refer to Diagram 4-24.



Diagram 4-24

NOTE: After refresh, system will automatically restore to logout status.

4.6. Searching

Step 1 Click icon  to search solar inverters. Refer to Diagram 4-25.

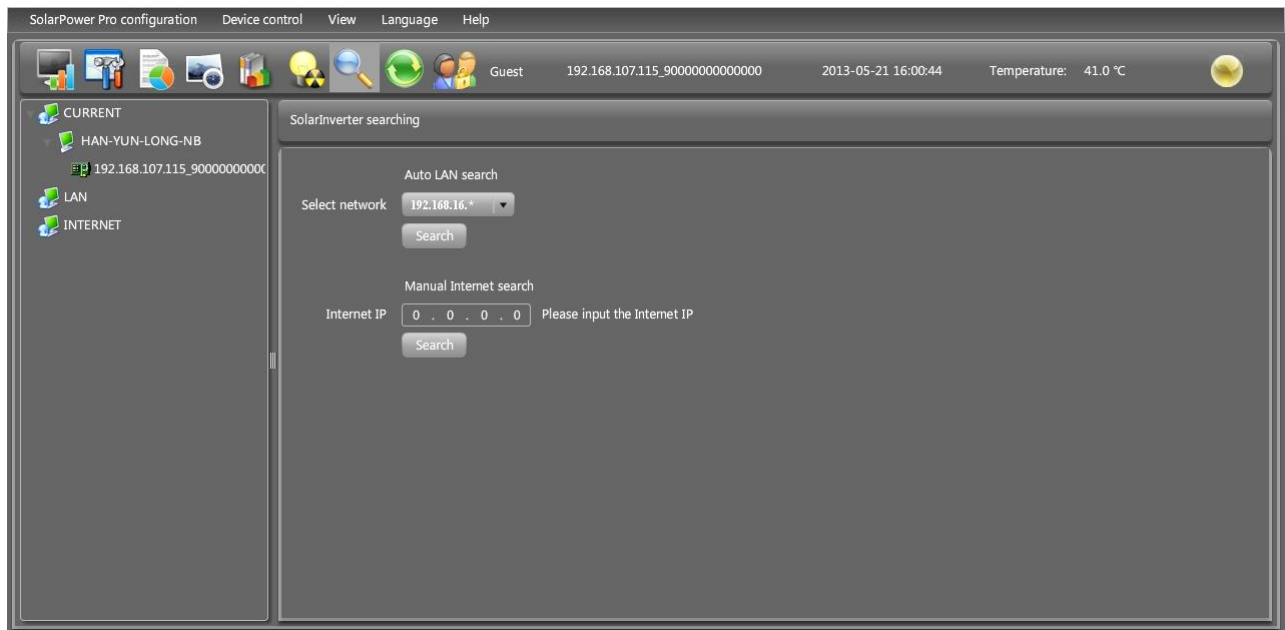


Diagram 4-25

Step 2 Select LAN band for LAN search or enter IP address for INTERNET search.

Step 3 Click "search" button and the system will start search devices. All devices found in LAN or INTERNET will be listed in inverter navigation section.

4.7. Warning messages

When fault occurs in solar inverter, LED located on the top right corner will become red to warn users. When warning occurs, it will become yellow. At this time, click LED icon to pop up warning message board. Refer to Diagram 4-26.

- Green LED: Normal operation
- Yellow LED: Warning reminder
- Red LED: Fault alarm



Diagram 4-26

4.8. Solar Inverter Navigation

It displays all device found through searching function.

CURRENT means directly connected PC and solar inverter device

LAN means connected PCs and solar inverter devices in local area network

INTERNET means connected PCs and solar inverter devices in wide area network

NOTE: The definition of LAN and INTERNET depends on the local PC location.

4.8.1. Monitored Device Information

This screen will display basic information of monitored device, including Product information, Rated information and Purchasing information. Refer to Diagram 4-27.

- Product information includes Model type, Topology, Main CPU processor version, Secondary CPU processor version, Output phase, Nominal input voltage, Nominal output voltage and so on.
- Rated information includes Nominal output power, Nominal grid-connected voltage, Nominal grid-connected frequency, Nominal grid-connected current, Maximum input current for each PV, Number of maximum-power-tracing units and so on.
- Purchasing information includes Purchasing date, Warranty for device, Device P/N, and so on.

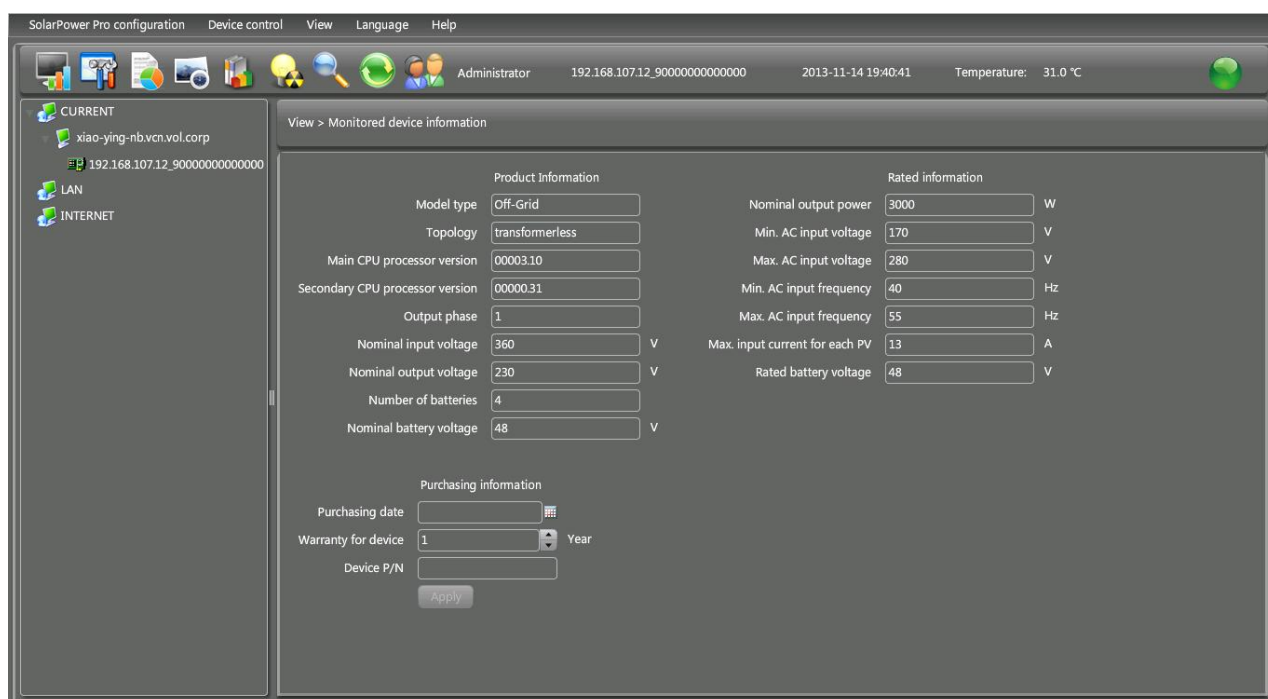


Diagram 4-27

NOTE: This screen may be different for different types of solar inverters.

4.9. Language

Currently, software offers some languages for selection:

- ✓ Chinese(Simplified)
- ✓ Chinese(Traditional)
- ✓ English
- ✓ German
- ✓ Italian
- ✓ Polish
- ✓ Portuguese
- ✓ Russian
- ✓ Spanish
- ✓ Turkish
- ✓ Ukrainian
- ✓ French

When first using the software, it will search proper language to display according to OS language.

4.10. Help

- **About:** Click "Help" menu and select "About" item. It represents the copyright information about software
- **Help:** Click "Help" menu and select "Online help" item. It will open the help manual. Before operating software, please read manual carefully.