User Manual for Solar Station Monitor

1. Introduction

As a piece of PC terminal software,this software of solar station monitor can be set through simple operations, and conduct real-time monitoring of the upper computers of solar charge controllers such as our household series products and inverters. Moreover, the software helps users check and modify parameters about charging, discharging, equipment and loading.

1.1 Purposes of This Manual

This manual provides actual operation interfaces together with descriptive text to help users understand operation methods and procedures. The manual introduces basic methods and steps of usage, as well as precautions to ensure that users use the system effectively and properly so as to improve work efficiency. Maintenance staff and users are the targeted readers of this manual.

1.2 References

Operation instructions of our controllers such as home use products and inverters can be referenced.

2. Operating Environment

2.1 Hardware Environment

You are advised to configure a memory bigger than 512M for hardware and over Intel Pentium 4 + 2.0G for CPU.

2.2 Software Environment

Operating systems on which this software can be run are recommended: Windows XP / Windows 2000 Professional / Windows 2000 Server/ Windows7 or Windows8, which are all 32-bit and 64-bit OS.

3. Software Installation

3.1. Software Installation

Double-click **Setup.exe** in the installation package to install the software.

3.2 Software Uninstall

Choose **Solar Station Monitor** on the control panel and click the **Uninstall**.

4. Software Details

Installed on a server or workstation, this software communicates with the solar charge controller via serial port and monitors the working status of the solar power system, such as the solar charge

controller (real-time monitoring), state of solar array, and state of battery. The software also provides functions for browsing and modifying parameters about charge-discharge control, equipment and loading status; and for displaying and analyzing charge-discharge electricity data accumulated by equipment.

4.1 Overview of Software Interfaces

The main interface of the software consists of menu bar, tool bar, station explorer, function and message window.

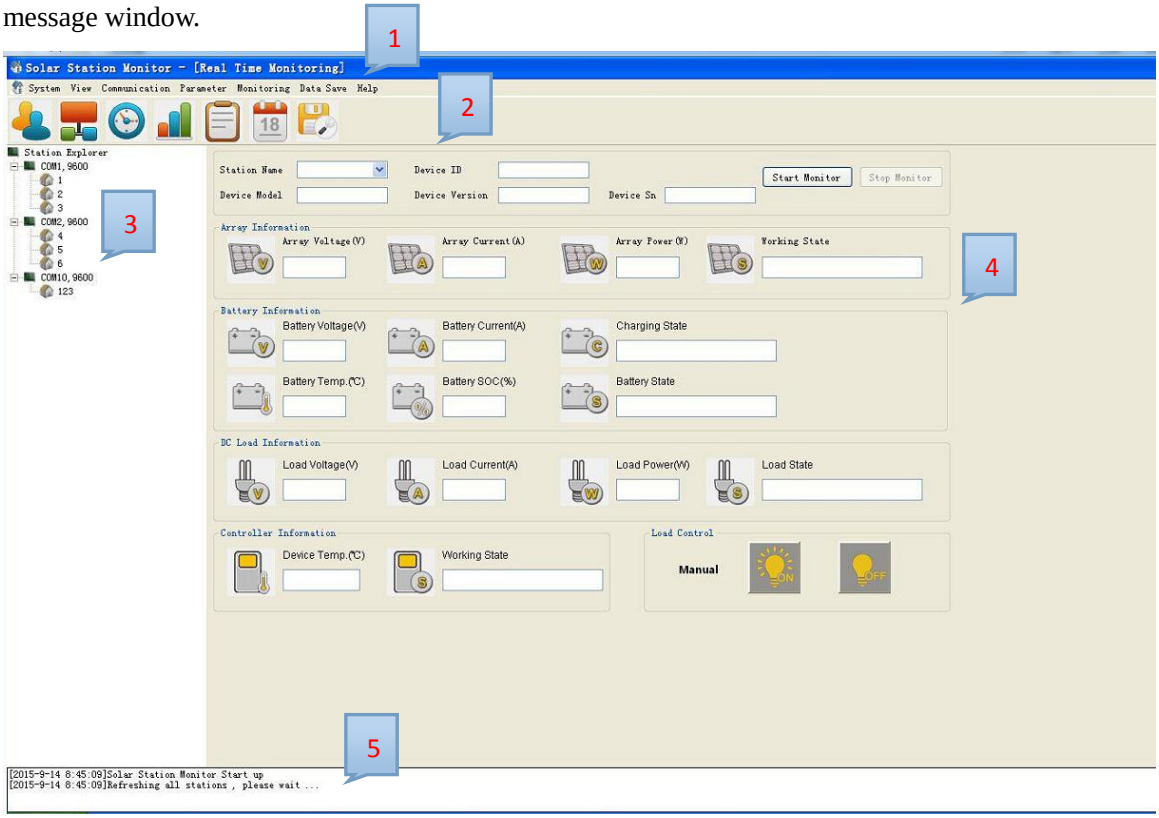

Figure 4-1-1 Main interface of the software

As shown in the figure, Area 1 is the menu bar that serves as the function entry to most functions of the software. Click the menu bar, and menu items are displayed. Area 2 shows the tool bar that provides all kinds of commonly-used tools for users. Area 3 indicates the station explorer in the form of a tree list. Station Explorer provides functions of visual management of user site information and other information. The first-level list displays the communication port numbers, and the second-level list displays station names. Area 4 shows the function window bar that provides effective function operation interfaces for monitoring the software. Area 5 is the message window that displays real-time operation and failure information.

4.2 Function Index

The menu bar provides entry to most functions of the software, as shown in figure 4-2-1:

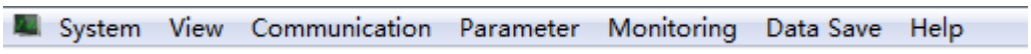

Figure 4-2-1 Menu bar

Diagram 4-2-1: Function description of the menu bar

Menu Bar	First-level Menu	Second-level Menu	Function Description
System	Log Off		Logging off the logged-in user
	User Switch		Switching between users with different permissions
	Change Password		Changing login password
	Exit		Exiting the software
View	Tool Bar		Showing/ Hiding the tool bar
	Station Explorer		Showing / Hiding Station Explorer
	Message Windows		Showing / Hiding the Message Windows
Communication	Port Configuration		Configuring communication port
	Add Station		Adding station information
	Refresh All Stations		Refreshing all stations and showing whether the station can be used
Parameter	Device Parameter	Real Time Clock	Real-time clock
		Device ID Setting	Setting device ID
	Control Parameter		Setting control parameters
	Load Configuration	General GLoad Configuration	Setting general loading parameters
	Factory Operation		Factory operation; recovering default parameters of the controller and cleaning up the data
Monitoring	Real Time Monitoring		Monitoring the data and working status of a single controller
	Daily Monitoring		Monitoring and collecting statistics on the data diagrams of a single controller
	Global Monitoring		Monitoring the data and working status of multiple controllers
	History Monitoring		Reading and conducting chart analysis of previous working conditions of the

			controller
Data Save	Data Save Setting		Saving and setting the data of the controller
Help	About		Describing software information
	Help		Describing software help

Tool bar shows all common tools, as shown in 4-2-2:

Figure 4-2-2 tool bar

Figure 4-2-2: Function description of the tool bar

Tool Bar	Function Description
User Switch	Switching between users with different permissions
Port Configuration	Configuring communication port
Real Time Monitoring	Monitoring the data and working status of a single controller
Daily Monitoring	Monitoring and collecting statistics on the data diagrams of a single controller
Global Monitoring	Monitoring the data and working status of multiple controllers
History Monitoring	Reading and conducting chart analysis of previous working conditions of the controller

4.3 Overview of Operation Step

1. Log in.
2. Configure serial port communication.
3. Add station information.
4. Configure parameters.
5. Choose stations and start monitoring (real-time, global, daily, history).
6. Save and maintain the data.

Note: For stations with configured serial port and information, skip Step 2 and Step 3.

4.4 User Management

1. Login:

After the software is started, the **Login** dialog is popped up, see figure 4-4-1.

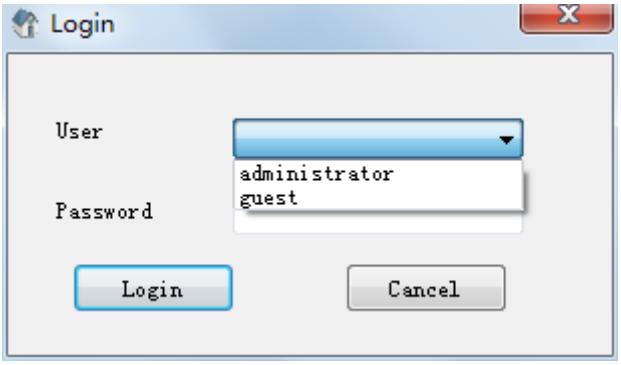

Figure 4-4-1 Login dialog

Log in with the corresponding username. When you click the **Login** button, the system matches the username and the password. If the password is incorrect, a prompt is displayed indicating “Wrong password". If the password is correct, the system displays the corresponding management interface according to the user permission. The login password for Administrator (default) users is 111111. Guest users do not need to enter a login password.

Guest user permission: user switch, real-time monitoring, global monitoring, history monitoring and daily monitoring.

Administrator user permission: all.

Switching between users with different permissions:

Choose **System—>User Switch** on the menu bar or click on the tool bar. Operation on the dialog box is the same on the login dialog box.

User Log-off:

Choose **System—>Log Off** on the menu bar. When a user performs log-off operation, the system logs off the current login interface and logs in the system as a Guest user. Meanwhile, the prompt box "Log Off successfully" is displayed.

Note: If a user logs in the system as a Guest user, the user cannot be logged off.

Changing Password:

Choose **System—>Change Password** on the menu bar, and the following dialog is displayed:

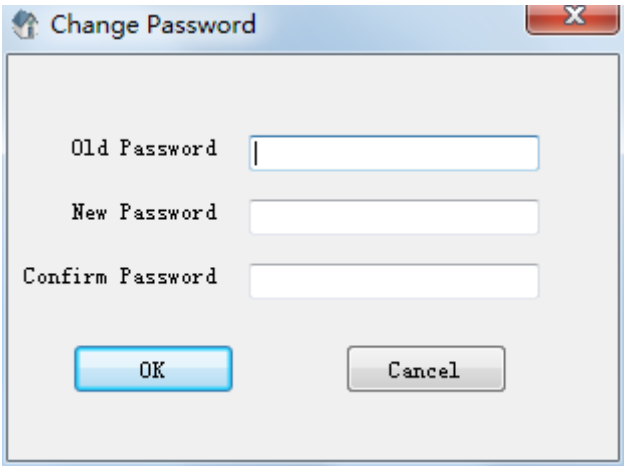

Figure 4-4-2 **Change Password** dialog

The system checks whether the original password is correct and the two newly input passwords are consistent. If they are, the message "Password changed successfully" is displayed; if not, the message "Wrong password" is displayed.

4.5 Basic Communication Configuration

Port configuration

Choose **Communication**—>**Port Configuration** on the menu bar or click  on the tool bar for port configuration, as shown in Figure 4-5-1.

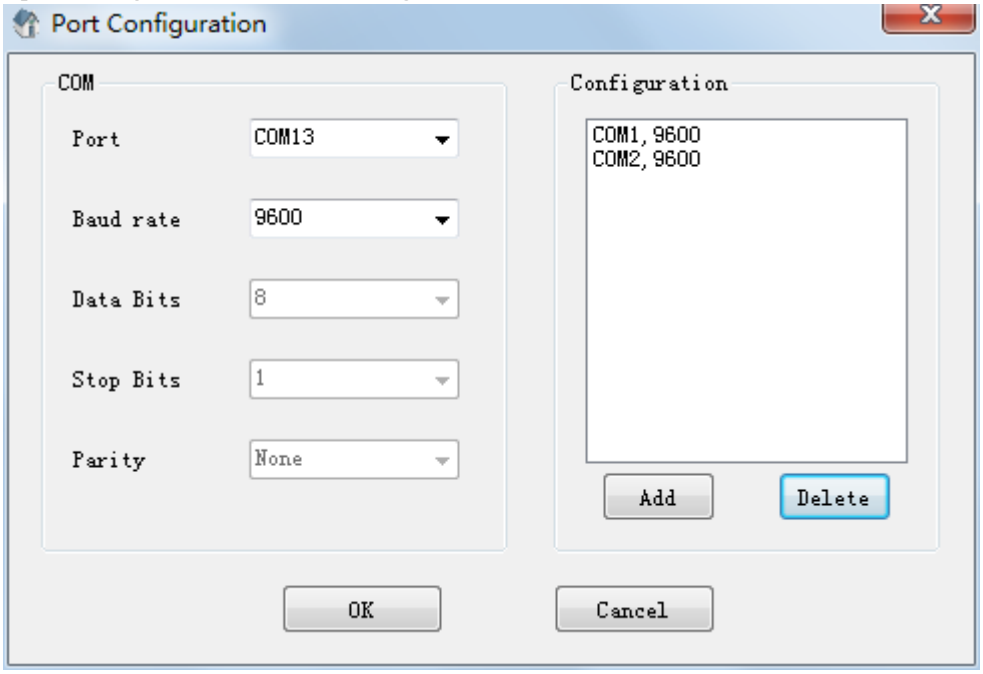

Figure 4-5-1 Port configuration dialog

Adding a port:

Select the COM port and corresponding Baud Rate, click the **Add** button on the right side, and click **OK** to add the port in Station Explorer.

Deleting a port:

Choose **Communication**—>**Port Configuration** on the menu bar or click  on the tool bar, select the port to be deleted from the right port bar, and click **Delete** and OK to delete the port.

Station Explorer:

Adding a station:

Choose the **Communication**—>**Add Station** on the menu bar or right-click the blank area of Station Explorer, and the corresponding option box pops up. Choose **Add Station**, and the corresponding dialog box pops up, As shown in figure 4-5-2, add station information. The following five parts of station configuration information can be added: basic station information, photoelectric cell array information, battery information, loading information and remarks.

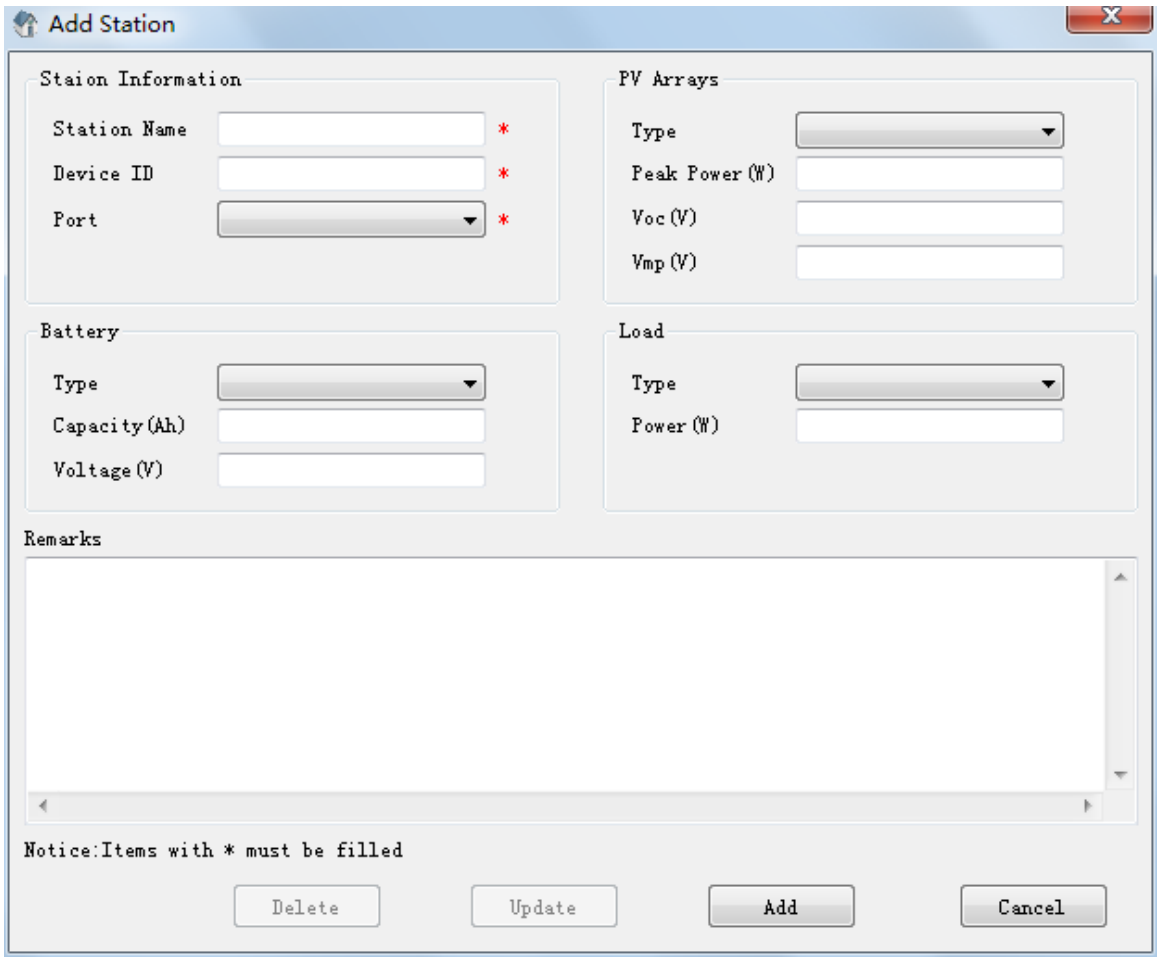

Figure 4-5-2 **Add Station** dialog

Note: Station information marked with "*" in Add Station Windows is mandatory.

Changing a station:

Right-click the blank area in Station Explorer, and the corresponding option box pops up. Choose **Edit Station** to enter the **Edit Station** dialog box and modify the station information, as shown in figure 4-5-3.

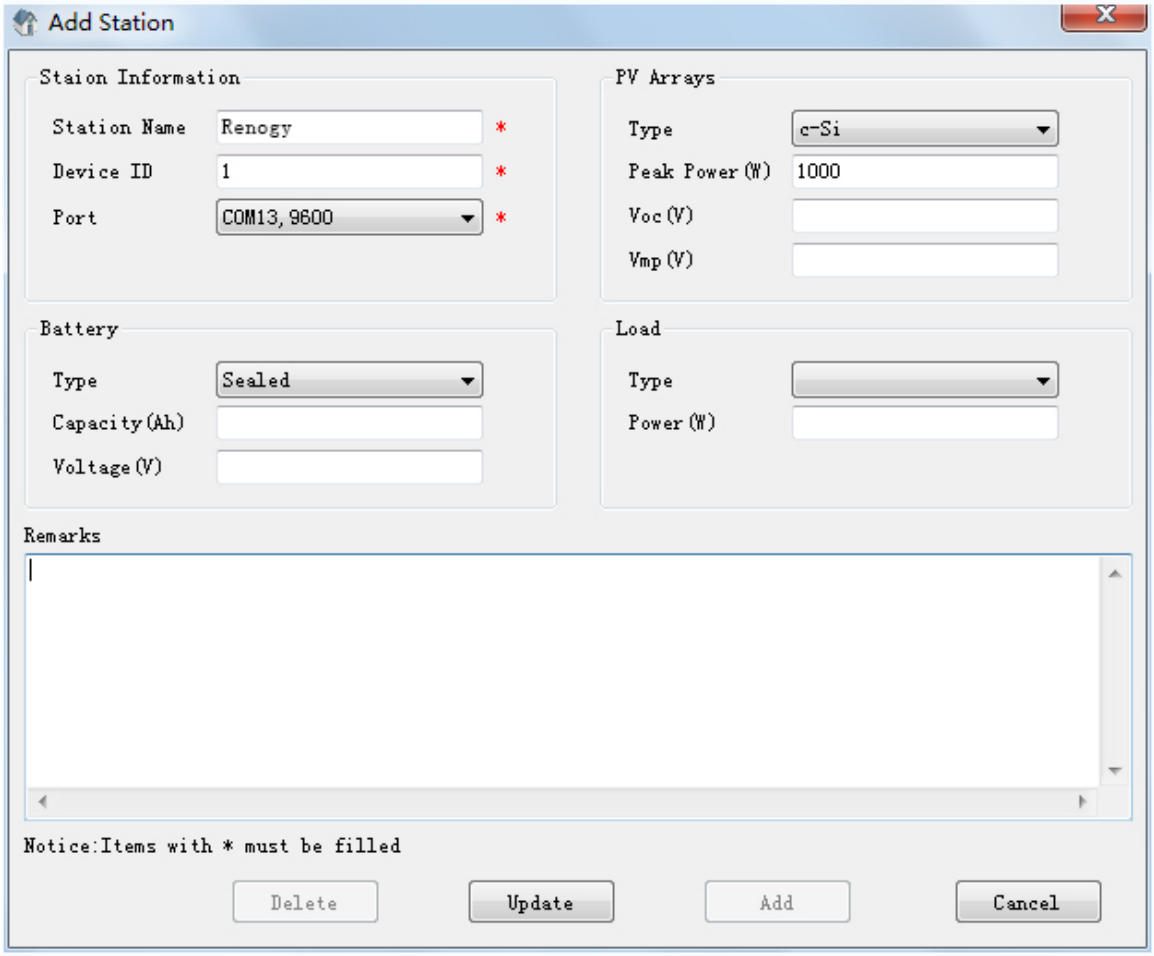

Figure 4-5-3 **Change Station** Dialog

Viewing station information:

In Station Explorer, double-click the name of the station to be checked. Right-click the blank area, and the corresponding option box pops up. Select **View Station** to enter the **Station info** dialog box, where you can view the station information but cannot make modification, as shown in figure 4-5-4.

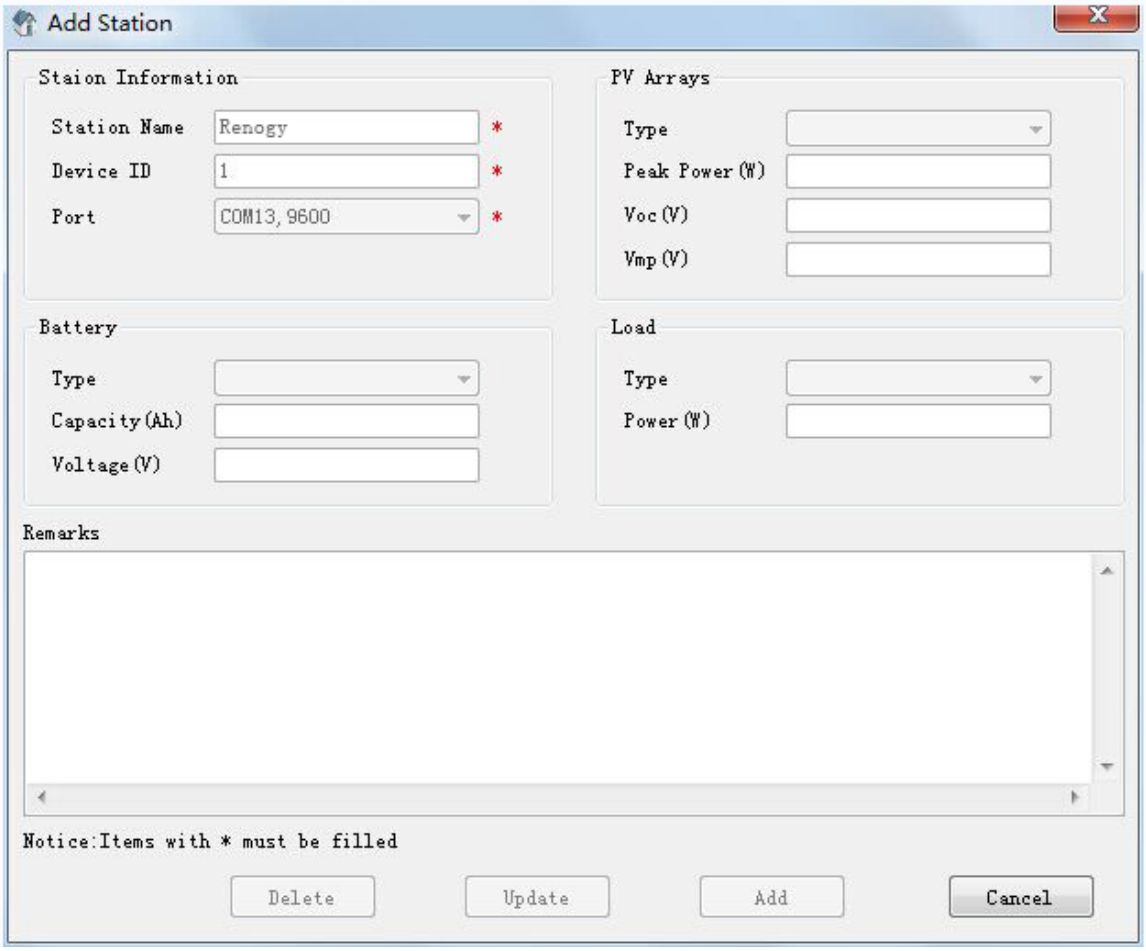

Figure 4-5-4 **View Station Info** dialog box

Refreshing station information:

Choose **Communication**—>**Refresh All Stations** on the menu bar, and you can scan if existing stations can be used, as shown in figure 4-5-5. Stations with red X are not available, while those without red X are available.

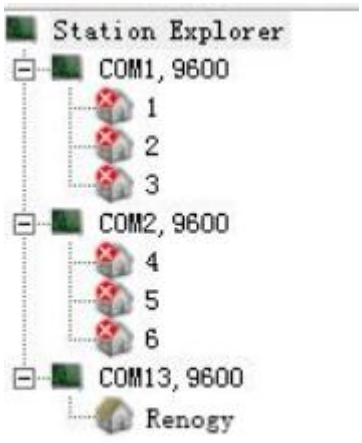

Figure 4-5-5 Station availability display

Note:

1. All stations are scanned to confirm available stations every time when the software is started.
2. After any operation on the station information page, the system scans all stations to confirm available stations.
3. When station information is refreshed, monitoring and other communication are automatically cut off.

Methods of reading an equipment ID:

1、 The LCD of the controller displays an equipment ID, and one controller corresponds to only one ID,

2、 Choose **Parameter**—>**Device Parameter**—>**Device ID Setting** on the menu bar, and the page as shown in fig 4-5-6 appears.

Reading an ID:

Select the corresponding port in the dialog box **Device ID Setting**, and click **Read ID** to obain the equipment ID. Before obtaining the ID, ensure that the only communication controller is connected to the port.

Setting an ID:

Set a new ID to the controller. Once the controller is confirmed as communication-capable after the ID is read, click **Set ID** to set a new ID for the controller. The ID of a controller must be the same as that in the station information.

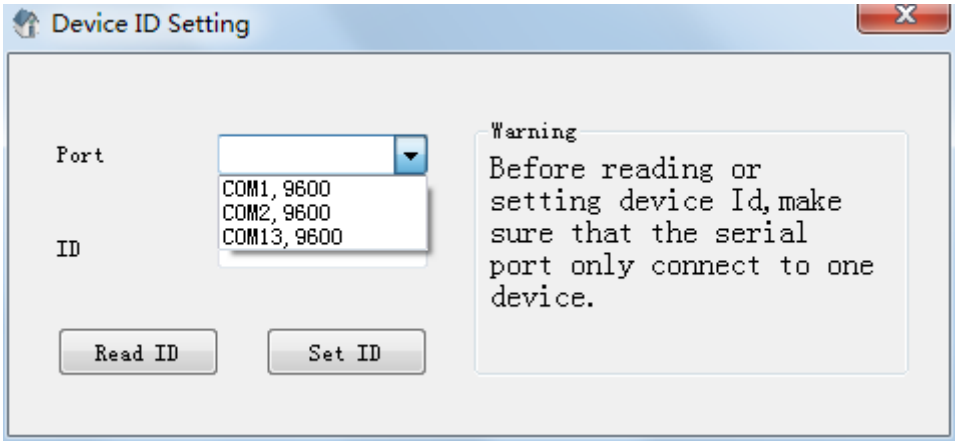

Figure 4-5-6 Dialog box for setting an ID

Note: Before reading and setting the equipment ID, ensure that the serial port is connected to only one piece of equipment. The ID in station information must be the same as the controller ID, especially after the controller ID is changed.

4.6 Modifying Parameters

Modifying control parameters

Choose **Parameter**—>**Control Parameter** on the menu bar, and the **Control Parameter** dialog box pops up, as shown in Figure 4-6-1.

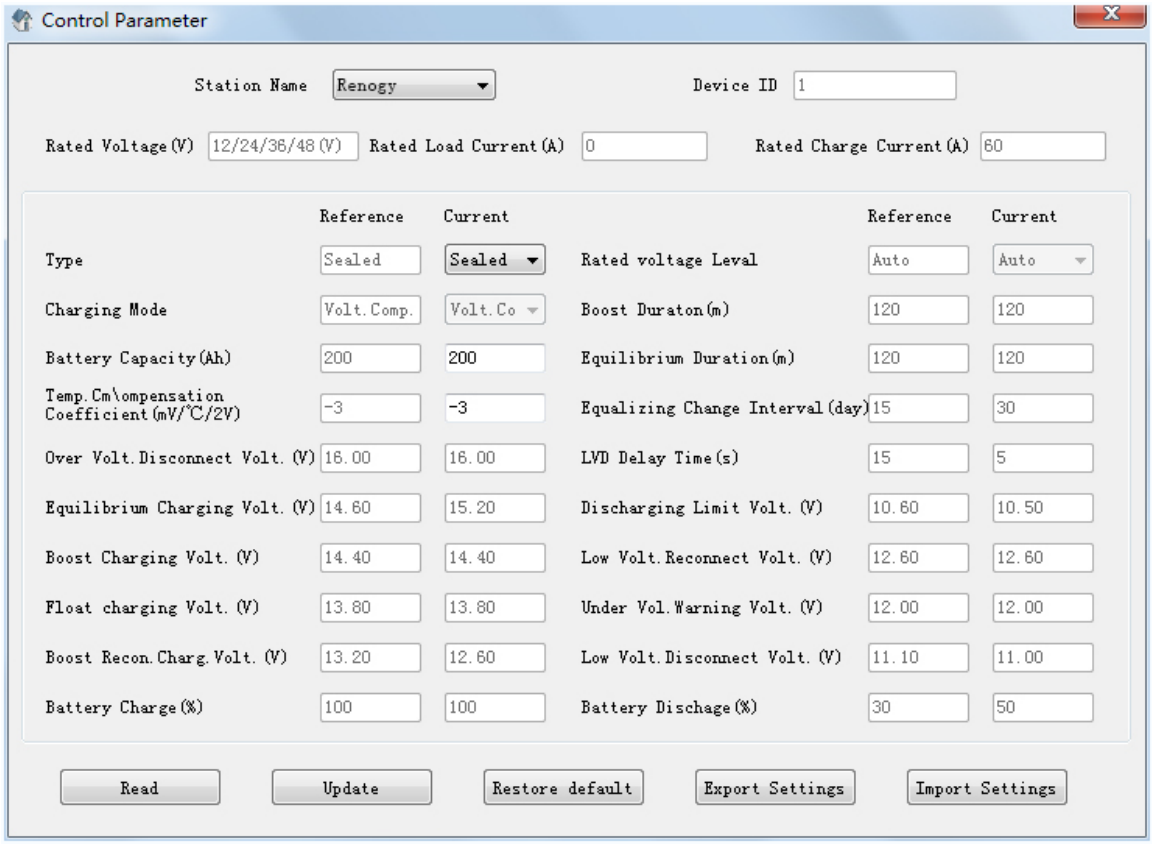

Figure 4-6-1 Dialog box for modifying control parameters

Click the **Read** button, and the Edit Boxes on the interface displays the current parameter data of the controller. After changing a parameter value, click the **Update** button to update the control parameter of the controller.

Click the **Restore default** button and all **Edit Boxes** of the current value on the interface automatically fill ins the default value of the corresponding parameter.

Click the **Export Setting** button to save all the control parameters on the current interface as a.txt file, which is used as backup file of control parameters.

Click the **Import Setting** button to import the original *.txt control parameter backup file into the interface. The file can be used as the modified value of the current control parameters.

Diagram 4-6-1 Description of battery types:

Battery Type	Remarks
Sealed (Default)	Control parameters cannot be modified except the battery capacity and temperature compensation coefficient.
Gel	Control parameters cannot be modified except the battery capacity and temperature compensation coefficient.
Flooded	Control parameters cannot be modified except the battery capacity and temperature compensation coefficient.
User	The user can modify control parameters.

Diagram 4-6-2 Description of charging modes

Charging Mode	Remarks
Volt.Comp.	Charging mode of the Volt. Comp. (Default)
SOC	SOC is a charging mode that realizes the charge-discharge control of the battery based on the preset target value for charging and discharging.

Diagram 4-6-3 Parameters about battery voltage (Normal temp. 25℃)

Battery Type	Sealed	Gel	Flooded	User
Over Volt.Disconnect Volt.	16V	16V	16V	9~17V
Equalizing Charging Volt.	14.6V	15.2V	14.8V	9~17V
Boost Charging Volt.	14.4V	14.2V	14.6V	9~17V
Floating Charging Volt.	13.8V	13.8V	13.8V	9~17V
Boost Recov. Charg. Volt.	13.2V	13.2V	13.2V	9~17V
Low Volt. Reconnect Volt.	12.6V	12.6V	12.6V	9~17V
Under Volt. Warning Volt.	12 V	12V	12V	9~17V
Low Volt. Disconnect Volt.	11.1V	11.1V	11.1V	9~17V
Discharging Limit Volt.	10.6V	10.6V	10.6V	9~17V
Equalizing Duration	120 minutes	0	120 minutes	0~600 minutes
Boost Duration	120 minutes	120 minutes	120 minutes	10~600 minutes
Equalizing Charge Interval（0: Close the Equilibrium Charging function）	30 days	0 days	30 days	0-255 days
LVD Delay Time	5 seconds	5 seconds	5 seconds	1-30 seconds

Diagram 4-6-4 Description of other control parameters

Parameter	Default Value	Modification Range
Battery Capacity	200Ah	1~9999Ah
Temp. Compensation Coefficient	-3mV/℃/2V	0~-5mV （0：Close the Temp. Compensation function）
Rated Voltage Level	Auto	Auto/12V/24V/36V/48V
Battery Charge	100%	100% (SOC charging mode)
Battery Discharge	30%	10~80% (SOC charging mode)

Note: User battery is the default battery type. Default voltage parameters of the system are the same as those of the sealed battery. Follow the following logic when modifying charge-discharge parameters:

Over Volt. Disconnect Volt. ＞ Equalizing Volt. ≥ Boost Volt. ≥ Floating Volt. ＞ Boost

Recov. Volt.

Over Volt. Disconnect Volt. ＞ Over Volt. Disconnect Recov. Volt.

Low Volt. Reconnect Volt. ＞ Low Volt. Disconnect Volt. ≥ Discharging Limit Volt.

Under Volt. Warning Volt. ≥ Low Volt. Disconnect Volt.

Boost Recon. Volt. ＞ Low Volt. Reconnect Volt.

Load Configuration

Choose **Parameter**—>**Load Configuration**—>**General Load Configuration** on the menu bar to enter the dialog box **General Load Configuration**, as shown in Figure 4-6-2.

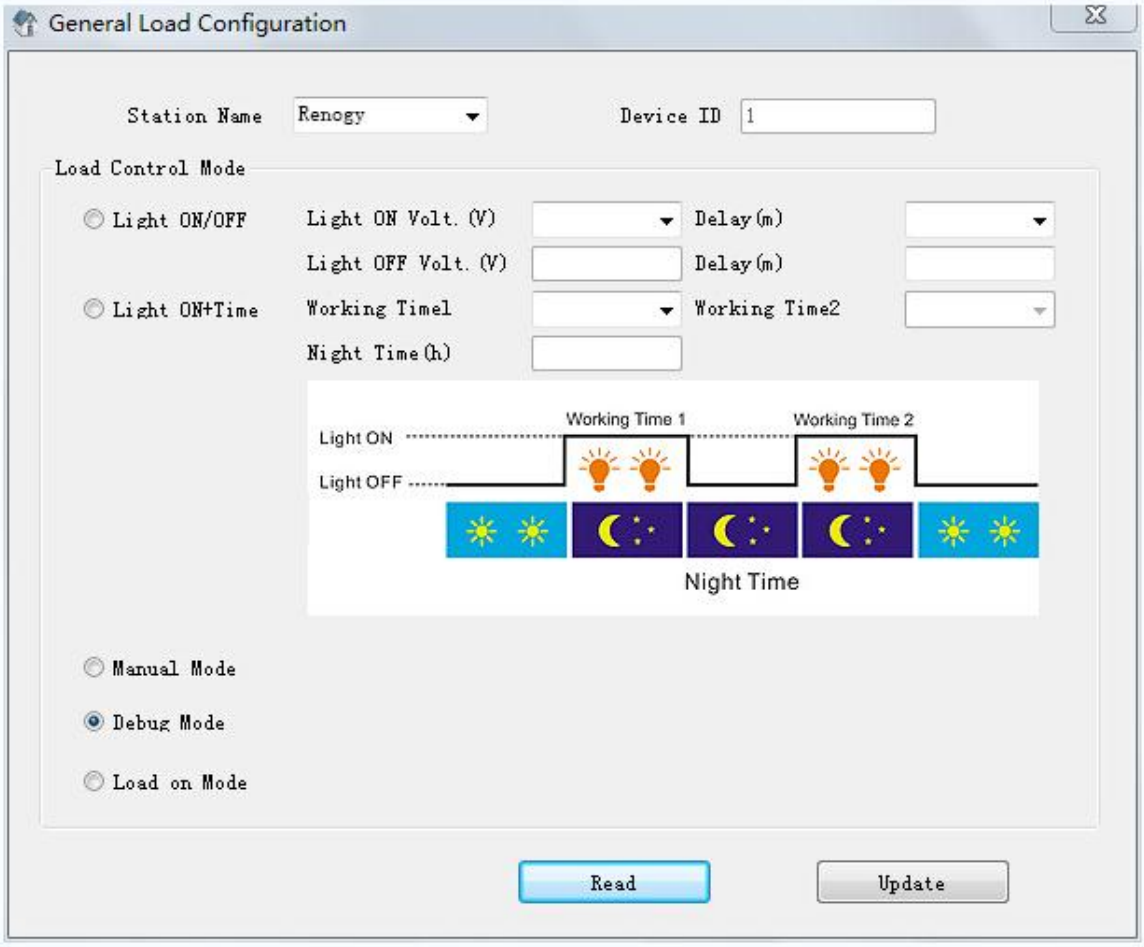

Figure 4-6-2 Dialog box **General Load Configuration**

Click the **Read** button to enter the load control mode of the controller. The default mode is **Debug Mode**. You can select other modes such as Manual Mode, Light ON/OFF, Light ON+Time or Load on Mode, and modify related control parameters. Click the **Update** button to update new load control parameters.

Note: 1. **Manual Mode** enables users to manually handle Switch Load that is on the **Load Control** bar of the **Real Time Monitor** interface. And the **Switch Load** button can only be operated under **Manual Mode**.

Factory operation:

Choose **Parameter**—>**Factory Operation** on the menu bar, and the **Factory Operation** dialog box pops up, as shown in Figure 4-6-3.

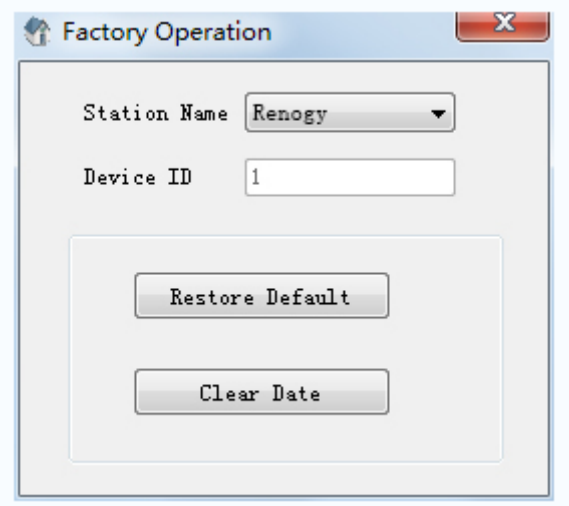

Figure 4-6-3 **Factory Operation** dialog box

Click the **Restore Default** button to restore factory parameters.

Click the **Clear Data** button to save the data.

Note: Perform this operation with caution as it involves clearing of data used by the controller.

4.7 Functions

Real-time monitoring (monitoring of controller status data)

Choose **Monitoring**—>**Real Time Monitoring** on the menu bar or click on the tool bar, and the **Real Time Monitoring** window appears. Then, click **Start Monitor**, and real-time monitoring is enabled, as shown in Figure 4-7-1.

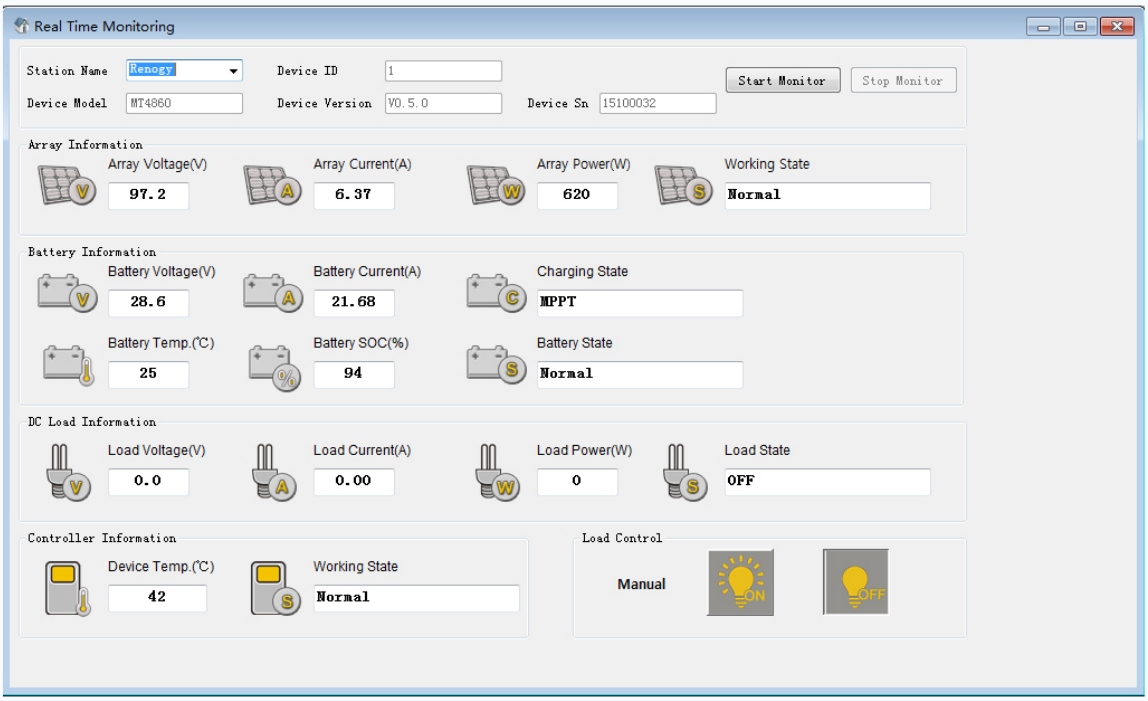

Figure 4-7-1 **Real Time Monitoring** dialog box

Diagram 4-7-1 Description of working parameters:

Name	English Name	Status Value
Controller working state	Controller working state	Normal, Divice Over Temp
Battery Charge state	Battery Charge state	MPPT, EQU, BST, Floating, Idle, Start, Limit
Array working state	Array working state	Array Over Voltage, Array Reverse, Array Over Power
Battery working state	Battery working state	Normal, Low Volt. Disconnect, Under Voltage Warning, Over Volt. Disconnect, Batt. Over Temp
Load State	Load State	ON, OFF

Diagram 4-7-2Description of parameter information

Name	Detailed Parameters
Array Information	Array Voltage, Array Current, Array Working State, Array Power
Battery Information	Battery Voltage, Battery Current, Battery Temperature, Battery SOC, Charge State, Battery State
DC Load Information	Load Current, Load Voltage, Load Power
Controller Information	Device Temperature, Device Working State

Note: Only under **Manual Mode** can the user click the **ON**/**OFF** button of Switch Load.

Daily monitoring (data diagram display and statistical data collection):

Choose **Monitoring**—>**Daily Monitoring** on the menu bar or click  on the tool bar to enter the **Daily Monitoring** window, as shown in Figure 4-7-2. During daily monitoring, the window monitors diagrams about **Array**, **Battery**, **Load** in terms of **Voltage**, **Current** and **Power**; and displays related parameters.

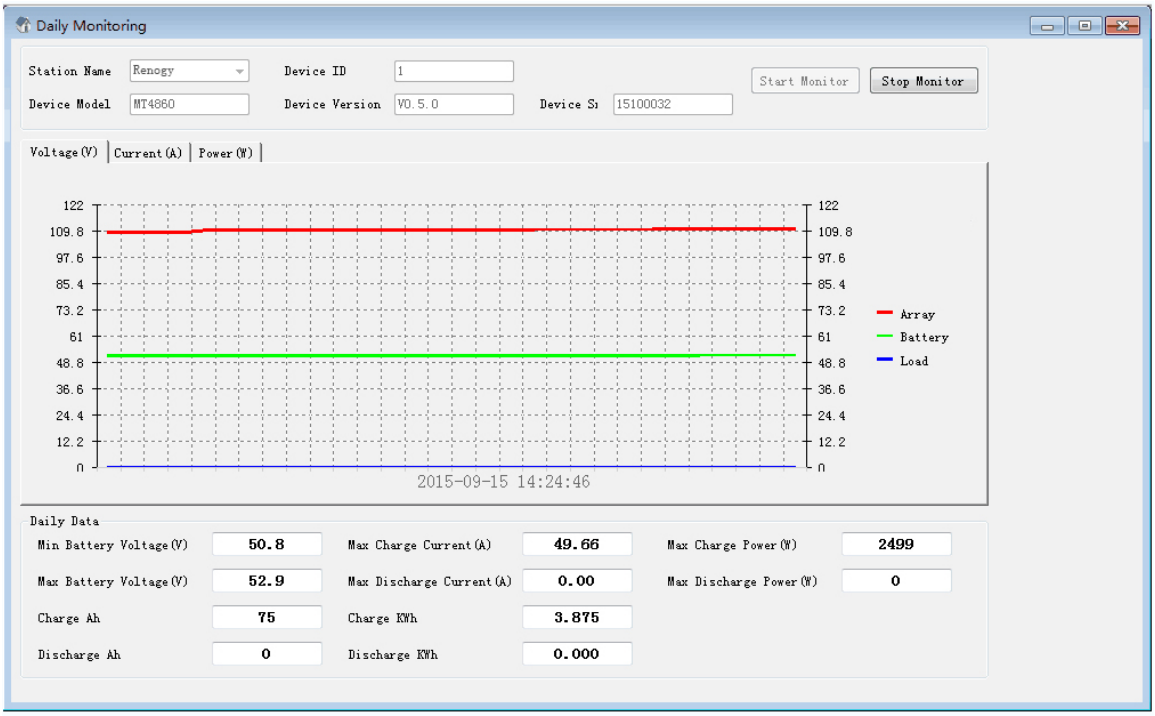

Figure 4-7-2 **Daily Monitoring** window

Diagram 4-7-3 Description of monitoring parameters:

Name	Description
Max/Min Battery Voltage	Maximum/minimum battery voltage
Max Charge/Discharge Current	Maximum charge/discharge current
Max Charge/Discharge Power	Maximum charge/discharge power
Charge/Discharge Ah	Charge/discharge Ah
Charge/Discharge KWh	Charge/discharge KWh

Global monitoring (recent working status of the controller)

Choose **Monitoring**—>**Global Monitoring** on the menu bar or click on the tool bar to enter the **Global Monitoring** window, as shown in Figure 4-7-1. The window monitors the working status of multiple controllers and collects statistics on related information such as **Charge KWh**, **Batt. LVD times**, **Batt**, and **Charge fully times**. For relevant parameters, see Figure 4-7-1 and 4-7-3.

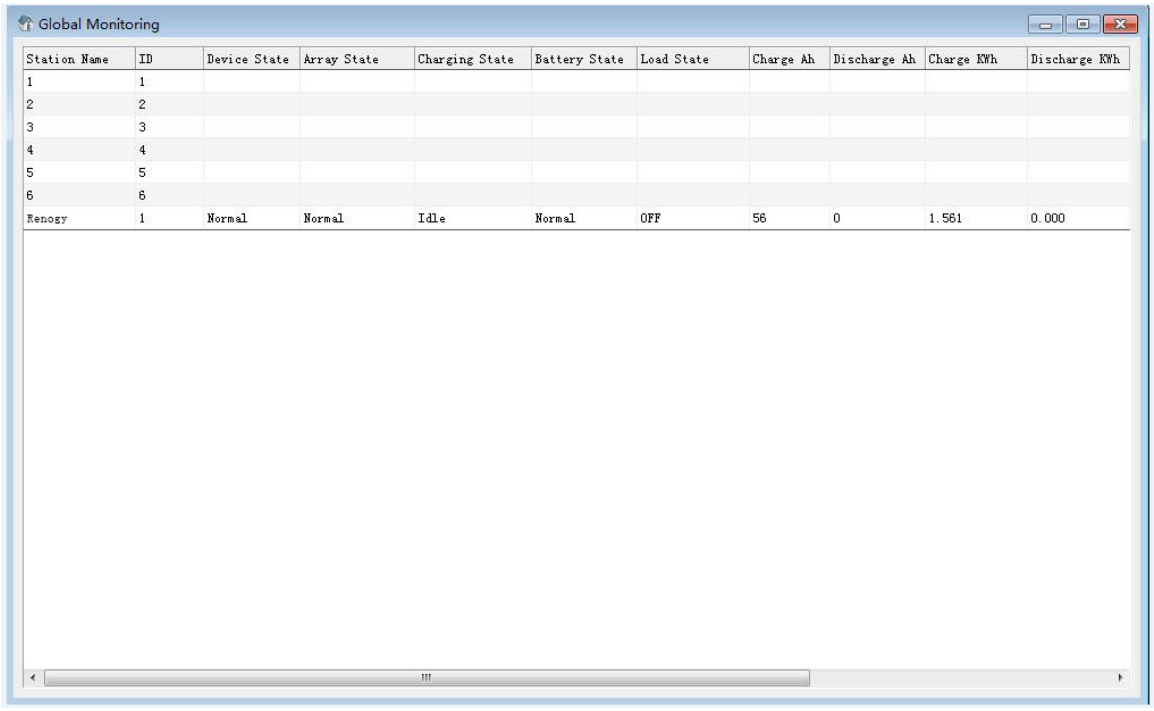

Figure 4-7-3 **Global Monitoring** window

History monitoring (monitoring history display and diagram analysis):

Choose the Monitoring—>History Monitoring in the menu bar or click on the tool bar to enter the **History Monitoring** window, as shown in Figure 4-7-1. The window reads recent monitoring information and performs diagram analysis of related data. For relevant parameters, see Diagram 4-7-3.

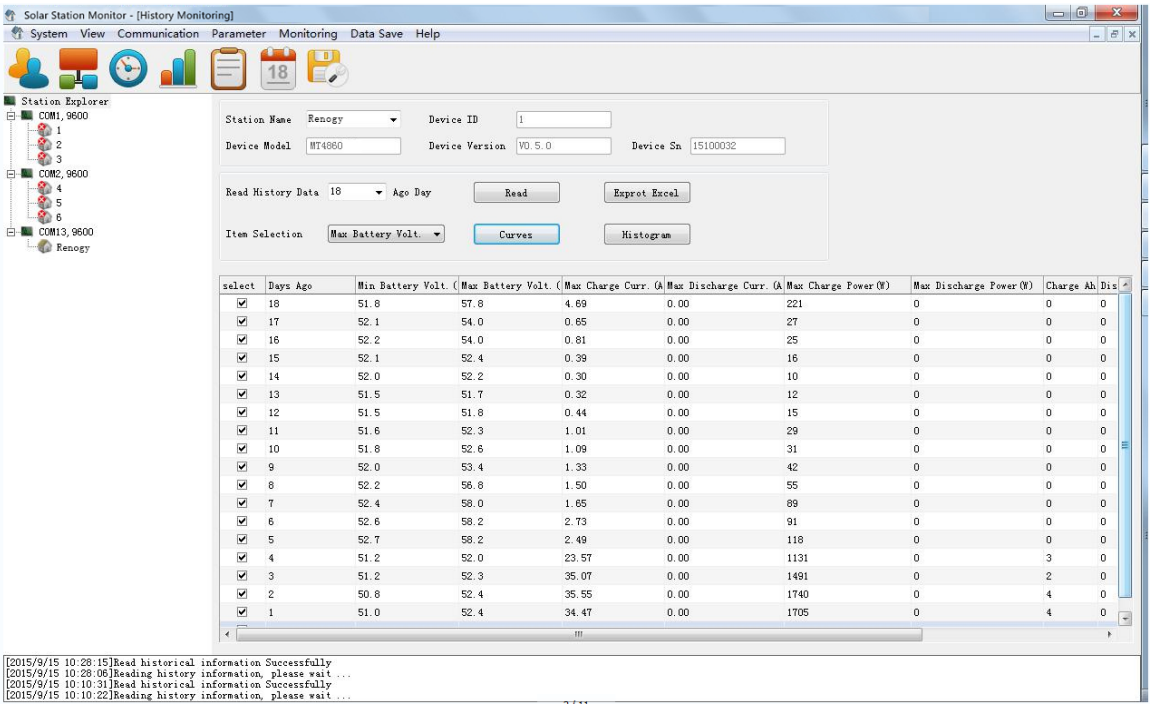

Figure 4-7-4 **History Monitoring** window

Reading historical data:

Select the number of days in history from the drop-down list of **Read History Data** and click the **Read** button. The recent working status of the controller is displayed.

Saving historical data:

After reading historical data, click the **Export Excel** button to save the data in a .csv file, as shown in Figure 4-7-5.

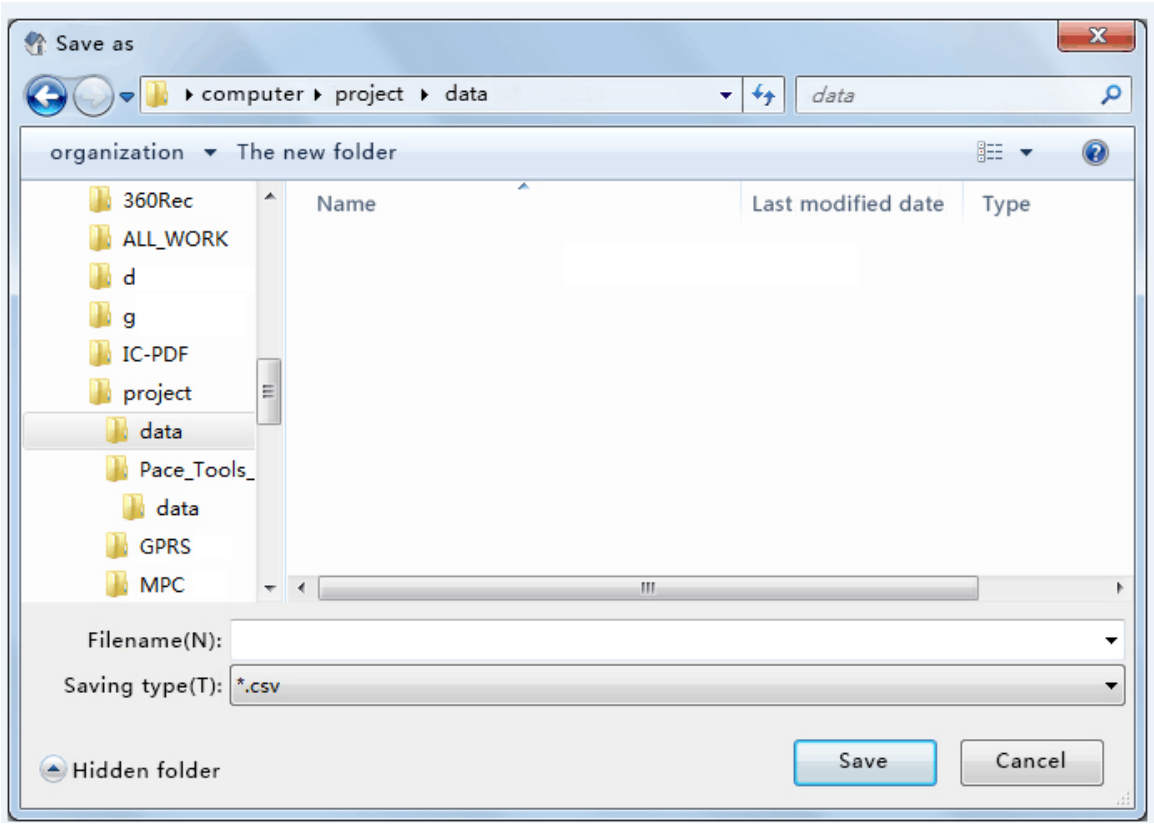

Figure 4-7-5 **Export Excel** dialog box

Graphical analysis of historical data:

After reading historical data, select the parameter (refer to diagram 4-7-3) for which graphical analysis is to be performed from the drop-down list of **Item Selection**, click the **Curves** button for curve analysis (Figure 4-7-6), or click the **Histogram** button for histogram data analysis (Figure 4-7-7).

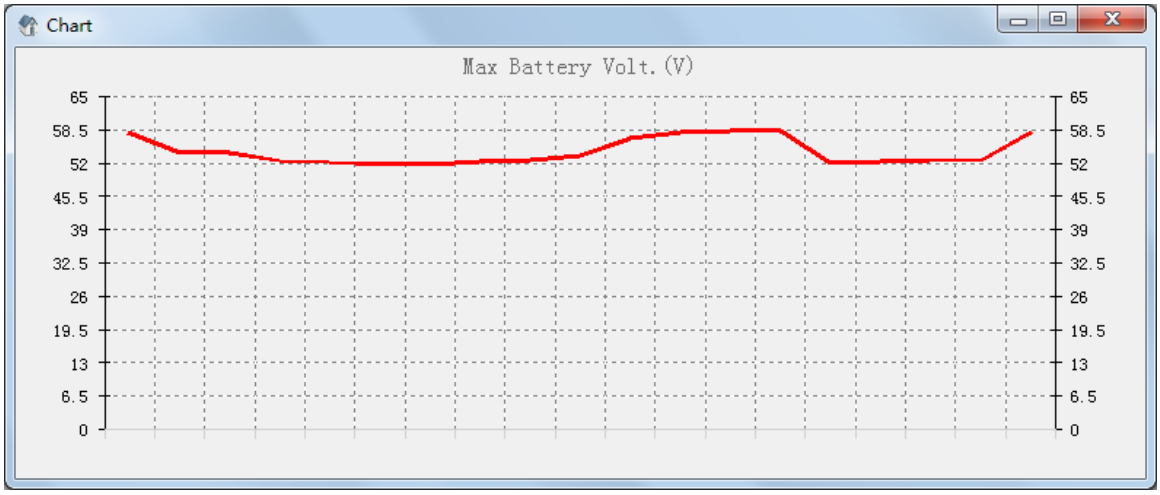

Figure 4-7-6 Curve data analysis

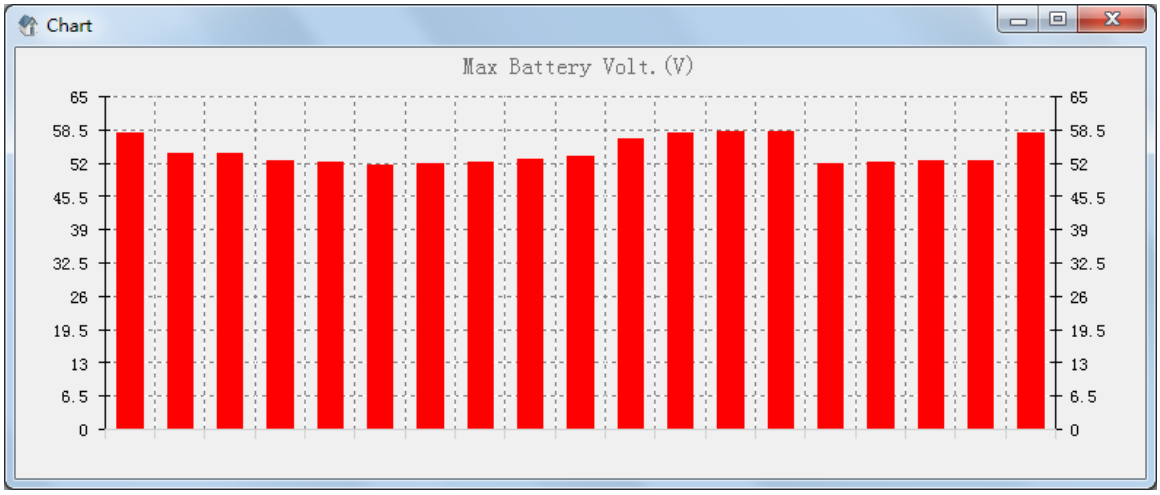

Figure 4-7-7 Histogram data analysis

4.8 Saving Data

Choose **Data Save**—>**Data Save Setting** on the menu bar or click on the tool bar to enter the **data saving** dialog box, as shown in Figure 4-8-1.Data saving can be set with reference to the Figure 4-8-1.

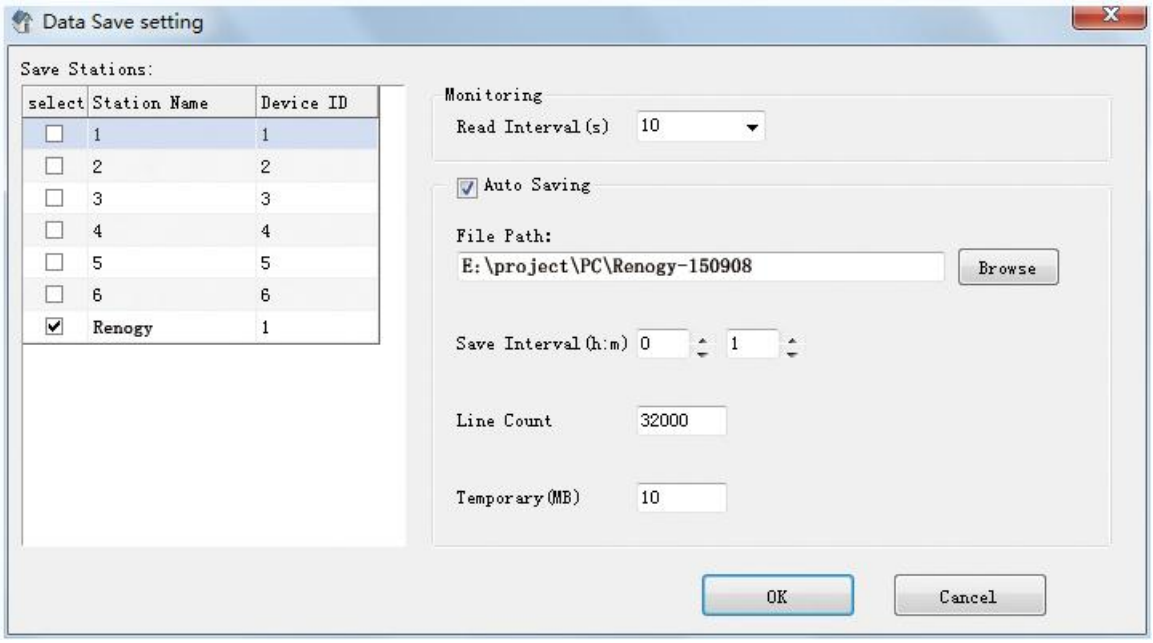

Figure 4-8-1 **Data Save** dialog box

Diagram 4-8-1 Description of data save setting:

Name	Function Description
Read Interval	Changing the interval time of data update in the monitoring function widow.
Auto Saving	Choose whether to save data automatically.
File Path	File save path.
Save Interval	Changing the interval time of saving data.
Line Count	Data is saved in the form of excel. file. The **Line Count** parameter limits the rows of data to be saved in the excel. file.
Temporary(MB)	Maximum capacity of data to be saved.

Note: The capacity of data to be saved is subject to the smaller value of the **Line Count** and **Temporary** parameters.