Regenerative Bidirectional DC Source PC control software

RBS Series

INSTRUCTION MANUAL

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

The information in this manual was correct at the time of printing. However, Good Will continues to improve products and reserves the right to change specification, equipment, and maintenance procedures at any time without notice.

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Table of Contents

System Architecture

This chapter mainly introduces the Regenerative Bidirectional DC Source PC control software (hereinafter referred to as the control software). It also lists the computer configuration and operating system requirements for the control software.

Introduction

The control software is designed for the Regenerative Bidirectional DC Source.

When using this software, the PC connects to the instrument's communication interface, serving as the channel for communication and control.

Key features include:

- User-friendly graphical interface (Windows environment).
- Supports RS232, RS485, and LAN communication (RS232 as the default method).
- Remote operation of all source functions from the host computer.
- Saving and loading of functional setting parameters.
- Dynamic and static MPPT automatic testing with data recording.
- Data logging, display, historical query, visualization, and export (CSV format).

Computer Configuration

The recommended control computer configurations are as follows:

- Intel CPU with a clock speed of 1.2GHz or higher.
- At least 1GB of storage capacity.
- At least 512MB of memory.
- Standard USB keyboard.
- USB optical mouse.
- Standard 17-inch LCD monitor.
- Support for external communication interfaces such as RS232, USB, and LAN for connection with power products.
- Spreadsheet software that supports the .xlsx format (such as Microsoft Excel or WPS). Without this software, the data saving function of the MPPT feature will not operate properly.

Operating System Requirements

- Minimum supported operating system: Windows 7 SP1
- Minimum display resolution required: 1024×768

Software Installation

Before using this software, install it on your computer.

This chapter provides instructions for installing the control software and reminds you to avoid incorrect operations during the installation process.

Install software

Before using the control software, you must first install it on your computer.

Install the software on Windows 7 SP1 or later.

If an older version of the software is already installed, please uninstall it before proceeding (see page 11).

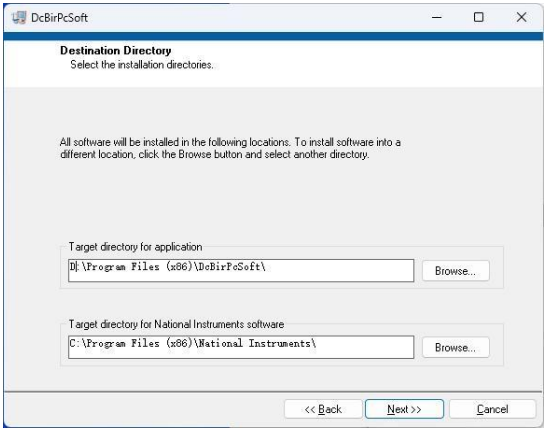
Ensure that at least 1GB of free storage space is available on your computer before installation.

Copy the installation package to a drive other than C: on your local hard disk. The installation package is in .rar or .zip format; please extract it first. Then, double-click the setup.exe file in the installation directory to start the installation.

It is recommended to select a non-C: drive directory for installation, such as D: or E:, as Windows 10 and Windows 11 may have issues with saving files on the C: drive due to system protection.

Figure 2-1-1

Software installation process



Installation steps

1. Double-click the setup.exe file in the installation directory. After a short wait, the target directory selection interface will appear (see Figure 2.1.1). Select the installation path (non-C: drive required, e.g., D: or E:).
2. The second installation directory is for

necessary drivers required by the software. Usually, the default directory can be used.

3. Click the Next button to continue the installation. After installation is complete, click Finish.
4. If prompted to restart the computer, please do so to complete the installation.

Note

If the "Next" button cannot be clicked and the prompt: "Installation Summary: No install or uninstall any software" indicates that the software was not uninstalled before, please follow the steps on page 11.

Running Multiple Instances of the Software

The software only supports connection to a single power supply. If a single computer is connected to multiple power supplies, the DcBirPcSoft software may experience operation or data-saving conflicts, potentially causing software abnormalities. To run multiple instances of the software, please follow these steps:

Procedure

1. After installing the software, locate the installation directory. The default path is "D:\Program Files (x86)\DcBirPcSoft\".
2. Rename the entire DcBirPcSoft directory to DcBirPcSoft1.
3. Open the DcBirPcSoft1 directory, create a shortcut for DcBirPcSoft.exe on the desktop, and rename the shortcut to DcBirPcSoft1.
4. If additional instances are required (up to N), repeat the above steps, creating directories and shortcuts named DcBirPcSoft2 … DcBirPcSoftN.
5. To run the software, launch the shortcuts DcBirPcSoft1 through DcBirPcSoftN separately.

Uninstall software

To uninstall the software, follow these steps:

Procedure

1. Click the Start menu and select Control Panel.
2. Double-click Add or Remove Programs.
3. In the list of installed programs, select DcBirPcSoft, then click Uninstall to remove the software.

File Read/Write Support

1. If file read/write issues occur, in addition to installing the software on a non-C: drive (such as D: or E:), try running the application as an administrator. In some Windows systems, running as administrator allows normal file read/write operations, while in others it may not. Please test accordingly.
2. For MPPT automatic test output tables, spreadsheet software such as Microsoft Excel or WPS must be installed to generate output files properly.

Connection and use with power supply products

This chapter explains how to connect the software to power supply products and operate them.

Start the software

If you follow the instructions in Chapter 2 and have installed the software on your hard disk, a shortcut for controlling the software appears on your computer desktop. Double-click the shortcut to start the control software. Alternatively, you can start by: Start-Program-DcBirPcSoft-DcBirPcSoft to start the control software.

After executing the control software, enter the main interface, as shown in Figure 3-1-1.

Figure 3-1-1

Main interface of the control software

When entering the main interface, the control software opens the port based on the previously configured settings and automatically communicates with the instrument to obtain the instrument model.

The communication indicator shows whether communication is normal: green for normal, red for abnormal. When communication is successful, the instrument model is displayed to the left of the communication indicator. If communication is not established or fails, a communication error message will be displayed. In this case, please check the port configuration and connection status.

Figure 3-1-2 Schematic diagram of successful connection

If the power supply is in the output state, the output will be stopped during the handshake and data synchronization process.

If the connection between the control software and the power supply is abnormal, please troubleshoot step by step according to the subsequent sections of this chapter.

The communication setting parameters are saved when the control software is closed normally, and they are restored the next time the software is launched.

Communication setting parameter check

Follow the steps below in order. After completing each step, attempt to establish communication between the host PC and the power supply. If communication still fails, proceed to the next step.

Verify the software version

Steps

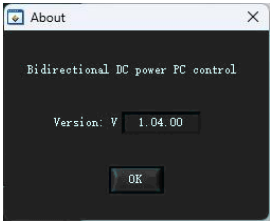
1. Verify the software version
   On the host PC, open Menu > Help > About (see Figure 3.2.1) to view the host software version. Confirm that the power supply firmware/software version matches the version required by the communication protocol on page 1 of the settings interface (see Figure 3.2.2).
2. If the version format is not as expected, please contact customer service for confirmation.
3. If the version number does not match, please contact customer service to obtain the corresponding host PC software version.

	Power version C	Upper-computer software version
Matching version 5	V1.04.00(Latest version)	V1.04.00(Latest version)
Matching version 4	V1.03.01	V1.03.00
Matching version 3	V1.02	V1.02
Matching version 2	V1.01	V1.01
Matching version 1	V1.00	V1.00

Table 3-1-1 for Power software version and host software version match

Figure 3-2-1

Power about interface



Verify that Power Supply Communication Settings Match the Host PC

Steps

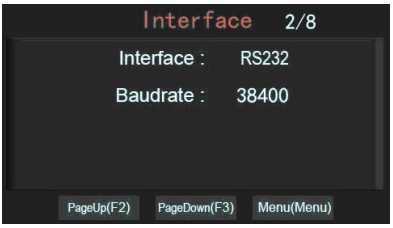
1. Turn on the Regenerative Bidirectional DC Source. In the Menu, press the F4 key to enter the Settings interface.
2. Check the first page and the second page of the settings, as shown in the figure.

Figure 3-2-2

Interface of power supply communication protocol

Figure 3-2-3

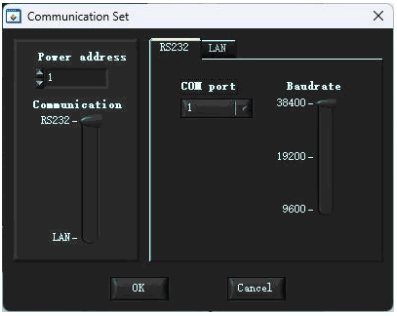
Power communication interface



In the host software, select **Menu → Settings → Port Settings** to enter the **Port Settings** page, as shown in Figure 3.2.4.

Figure 3-2-4

Port setting interface



A) In the power supply communication protocol interface, the **Communication Protocol** must be set to **RBS**.

B) In the power supply communication protocol interface, the protocol address must match the **Power Address** in the host PC communication settings.

C) In the power supply communication interface, the **Communication Interface** must match the **Communication Interface** in the host PC communication settings.

D) In the power supply communication interface, other interface parameters should match the settings in the host PC software, such as the **Baud Rate** for RS232, or **IP Address** and **Port Number** for LAN.

⚠Note	When the power supply Communication Interface is RS485, the Communication Interface in the host PC settings should be set to RS232.

Finally, if communication still fails, refer to the corresponding interface section in this chapter.

RS232 Communication Port Check

Follow the steps below in order. After each step, attempt to establish communication between the host PC and the power supply. If communication still fails, proceed to the next step.

Verify communication parameters according to page 11

Steps

1. The power supply Communication Protocol is set to RBS.
2. The power supply Protocol Address matches the host PC Power Address.
3. The power supply Communication Interface and the host PC Communication Interface are both RS232.
4. The Baud Rate of the power supply matches that of the host PC.

Check whether the host PC COM port number is selected correctly

Example

1. On the desktop, right click " My computer"→ " management" in Windows 10, right-click My Computer on the desktop and select Manage. Then navigate to Computer Management (Local) → System Tools → Device Manager → Ports (COM & LPT).
2. Ensure that the corresponding COM device is listed, and verify that the COM port number selected in the host PC software matches this device (see Figure 3.3.1).

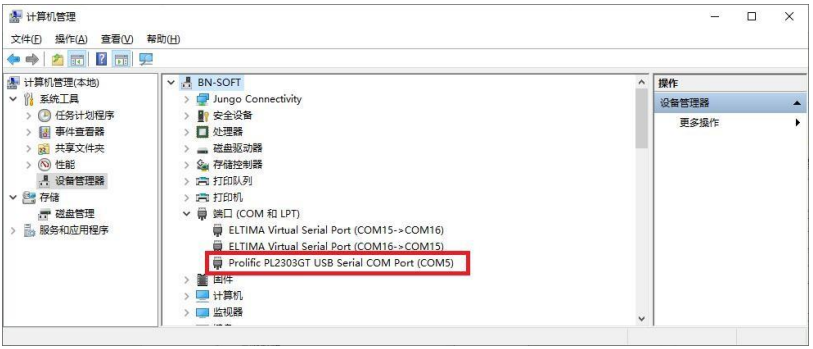


Figure 3-3-1 List of Win 10 port hardware (legend equipment for USB to RS232 equipment)

Check RS232 Wiring

Verify that the RS232 wiring is correct.
The connection diagram between the power supply RS-232 interface and the computer RS-232 interface is shown below.

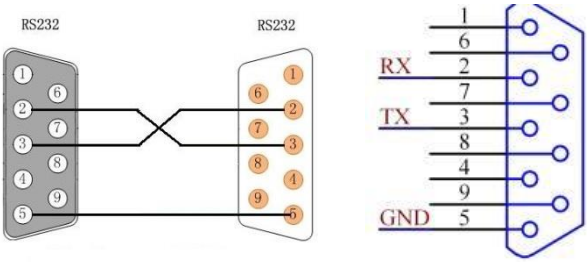


Figure 3-3-2 Pin Definition of DB9 Wire Harness and Connector

The power supply interface uses a DB9 connector, and the computer interface is also DB9. The connection cable should be a DB9 female-to-female crossover cable (pins 2 and 3 crossed).

You can use a multimeter to check the wiring. If a multimeter is not available, disconnect the equipment from the line and short pins 2 and 3 with a wire or solder. Then, use a serial debugging tool on the computer (settings: Parity = None, Data bits = 8, Stop bit = 1) to send data. If the transmitted data matches the received data, the wiring is confirmed to be normal.

RS232 Standalone Communication Test

Connect the computer to the power supply and open a serial debugging tool (settings: Parity = None, Data bits = 8, Stop bit = 1, and ensure the baud rate matches the power supply setting). Enable Hex format for both transmitting and receiving data.

Send the command "3C 01 07 51 53 AC 3E" (7-byte power status query command). If a 27-byte response is returned, the RS232 port is functioning normally.

If the host computer is still unable to connect to the power supply after this test, please contact customer support.

RS485 Communication Port Check

Follow the steps below. After each step, try to connect the host computer to the power supply. If the connection still fails, proceed to the next step.

Verify communication parameters according to page 11

Steps

1. The power supply Communication Protocol is set to RBS.
2. The power supply Protocol Address matches the Power Address on the host computer.
3. The power supply Communication Interface is RS485, and the host computer Communication Interface is set to RS232.
4. The baud rate of the power supply matches that of the host computer.

Check whether the COM port number of the host computer is selected correctly

Example

In Windows 10, right-click This PC on the desktop, select Manage, then navigate to Computer Management (Local) → System Tools → Device Manager → Ports (COM & LPT). As shown in the figure, confirm that the COM port number selected in the software matches the actual device.

Figure 3-4-1 Win10 port hardware list (legend device for USB to RS485 device)

Check RS485 Wiring

For the RS485 interface pin assignment of the power supply, please refer to the user manual. The A/B definition at the power supply RS485 interface may vary depending on the configuration.

The A/B definition of the computer RS485 interface may also differ depending on the interface board or USB converter used. Please refer to the corresponding product documentation.

The connection diagram of the power supply RS485 interface and the computer RS485 interface is shown below:

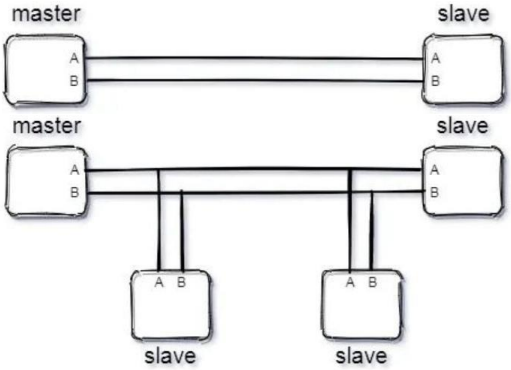


Figure 3-4-2 DB9 Pin Definition and RS485 Wiring Diagram

The power supply interface uses a DB9 male connector, while the computer interface may be a DB9 male connector or a dual-terminal

connector. The cable should correctly connect the A and B lines, and a multimeter can be used to check the wiring harness.

⚠Note	Since RS485 uses only two wires, some USB-to-RS485 adapters with DB9 connectors may not follow a standard pin definition. Always ensure that the adapter's pin assignment matches the wiring harness.

In addition, the power supply RS485 interface includes a built-in 120-ohm termination resistor. In a multi-point RS485 network, termination resistors must be installed only at both ends of the bus, and must not be applied at intermediate nodes.

RS485 Standalone Communication Test

Connect the computer to the power supply and open a serial debugging tool (settings: Parity = None, Data bits = 8, Stop bit = 1, and ensure the baud rate matches the power supply parameter). Enable Hex format for both transmitting and receiving data.

Send the command "3C 01 07 51 53 AC 3E" (7-byte power status query command). If a 27-byte response is returned, the RS485 port is functioning normally.

If the host computer is still unable to connect to the power supply after this test, please contact customer support.

LAN Communication Port Check (Direct LAN Connection to Computer)

Follow the steps below. After each step, try to connect the host computer to the power supply. If the connection still fails, proceed to the next step.

Verify Communication Parameters (per page 11)

Steps	1. The power supply Communication Protocol is set to RBS. 2. The power supply Protocol Address matches the Power Address on the host computer. 3. The power supply Communication Interface is set to LAN, matching the host computer interface. 4. The IP Address and Port Number of the power supply (see Figure 3.5.1) must match the IP Address and Port Number parameters on the host computer (see Figure 3.5.2). 5. The power supply Subnet Mask is 255.255.255.0. The first three octets of the power supply Gateway must match the first three octets of the IP Address, and the last octet must be 0 or 1.
Note	1. Port settings require clicking the Settings / Refresh (F4) button to take effect. 2. If the LAN port parameters cannot be modified in the unlocked state (no lock icon in the upper-right corner), the port may be faulty. If the power is turned off and the parameters still cannot be modified upon restart, contact customer support.

Figure 3-5-1

Parameters of Host Computer LAN Port

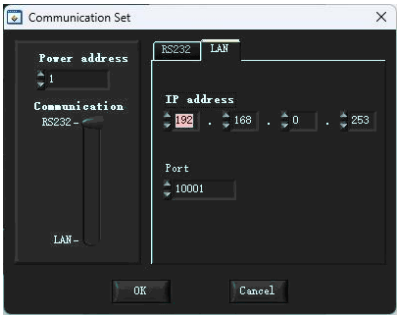
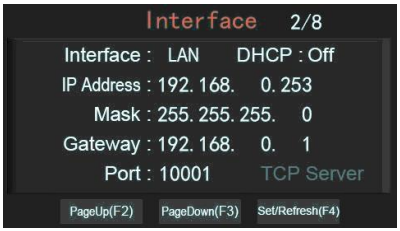


Figure 3-5-2

Power Supply LAN Port Parameters



Verify Host Computer Network Status

Steps

1. If Wi-Fi is enabled, please disable it first.
2. For Windows 10, click Start → Settings → Network & Internet → Ethernet → Status → Advanced Network Settings → Change adapter options (see Figure 3.5.3).
3. After connecting the network cable to both the computer and the power supply, "Unidentified Network" should be displayed, indicating that the network cable is functioning properly.
4. If "Network cable is unplugged" is displayed (see Figure 3.5.4), the network cable or the computer network port may be faulty. Please replace the defective component.

Figure 3-5-3 Win10 network port hardware list (successfully connected)

Figure 3-5-4 Win10 network port hardware list (connection failure)

Right-click Ethernet → Properties → Internet Protocol Version 4 (TCP/IPv4) → Properties (see Figure 3.5.5).

Set the parameters as follows:

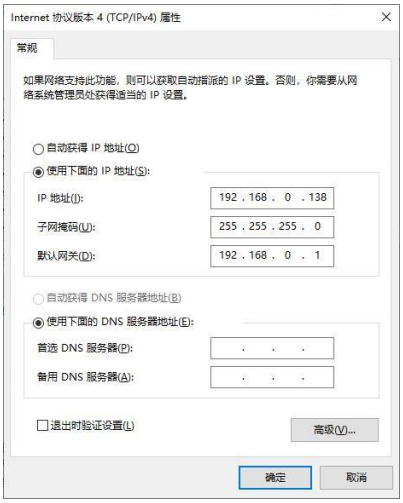
- IP Address: 192.168.0.138 (the last octet must be greater than 10 and different from the power supply)
- Subnet Mask: 255.255.255.0
- Gateway: 192.168.0.138

If the power supply address is not the default 192.168.0.253, the first three octets of the host computer IP Address and Gateway must match the first three octets of the power supply.

After making the changes, wait 3–5 minutes or restart the computer to ensure the settings take effect, then perform the host computer connection test.

Figure 3-5-5

Internet Protocol Version 4 (TCP / IP4) attribute



LAN Standalone Communication Test

Steps

1. Connect the computer and power supply using a network cable.
2. Open a network port debugging tool with the following settings:
   - Protocol Type: TCP Client
   - Remote Host Address and Port consistent with the power supply parameters
   - Enable Hex format for both transmitting and receiving data
3. Send the command "3C 01 07 51 53 AC 3E" (7-byte power status query command). A 27-byte response indicates that the LAN port is functioning properly.

If the host computer still cannot connect to the power supply after this test, please contact customer support.

LAN Communication Port Check (Power Supply Connected via LAN)

Follow the steps below. After each step, try to connect the host computer to the power supply. If the connection still fails, proceed to the next step.

Note

This procedure assumes that the power supply is connected to a LAN through a network cable, and the router or gateway supports auto-negotiation.

Verify Communication Parameters (per page 11)

- The power supply Communication Protocol is set to RBS.
- The power supply Protocol Address matches the Power Address on the host computer.
- The power supply Communication Interface is set to LAN, matching the host computer interface.
- The Port Number of the power supply (see Figure 3.5.1) must match the Port Number parameter of the host computer (see Figure 3.5.2).

Note

1. Port Settings require the Settings/ Refresh (F4) button to take effect.
2. If the parameters of the power network port cannot be modified under the non-keyboard lock state (no lock mark in the upper right corner), there is an abnormality in the port interface. If the power is turned off and still cannot be modified after opening, there may be abnormalities in the port interface, please contact the customer service personnel for support.

Enable DHCP Auto-Negotiation

Steps

1. Set the power supply parameter “From Negotiation” on the second page to “Open”.
2. Click Set / Refresh (F4), wait 1-2 minutes, then click Set / Refresh (F4) again.
3. If the power supply is properly connected to the network, the IP Address and Gateway will be updated after auto-negotiation.
4. Configure the host computer with the corresponding IP Address settings.

LAN Standalone Communication Test

Steps

1. Open a network port debugging tool with the following settings:
   - Protocol Type: TCP Client
   - Remote Host Address and Port consistent with the power supply parameters
   - Enable Hex format for both sending and receiving data
2. Send the command "3C 01 07 51 53 AC 3E" (7-byte power status query command).
3. A 27-byte response indicates that the LAN port is functioning properly.

The power supply functions like a standalone computer. If the above steps fail to establish normal communication, please use the direct connection method described on page 25.

If communication succeeds via the section on page 25, but fails following the section on page 29, the complexity and diversity of network architectures prevent us from providing effective support. In this case, please contact your network service provider for assistance

Software Function

The software functional architecture is as follows

Functional item	Sub-item Function	Description	Access
Source		Basic function of the power supply	Accessed via the host computer interface
Source2		Basic function of the power supply	
List		Basic function of the power supply	
PV(Some power supply models have this function)	SAS	Basic function of the power supply	
	SAS2		
	EN50530		
	Sandia		
	Photovoltaic online adjustment		
	PV List	Extended function of the control software	
	EN50530 static Sandia static CGC/ GF035 static		
	Weather simulation		
	MPP test		
Setting		Basic function of the power supply	
Battery simulation		Basic function of the power supply	
Battery charge and discharge		Basic function of the power supply	

Load		Basic function of the power supply	
Real-time data recording	Real-time data is saved	Extended function of the control software	**Menu** → **Settings** → **Data Record** window
	Real-time is displayed and can be exported as CSV files		
PV Inverter MPPT test (Some power supply models have this function)	EN50530static	Extended function of the control software	Menu → Working mode → PV Inverter MPPT Auto Test
	Sandia static		
	Custom dynamic		
	EN50530 dynamic		
	Sandia dynamic		
PV Inverter Shadow test (Some power supply models have this function)	Shadow test	Extended function of the control software	Menu → Working mode → PV Inverter MPPT Shadow Test
	Shadow Moving test		
Other	All the set parameter data Save and read function	Extended function of the control software	Right-click to open the Parameter Prompt window Or via Menu → File

Note

The basic functions are inherent to the bidirectional power supply. Even without a host computer, they can also be performed via the power supply front panel.

Main interface function

The main interface of the bidirectional power supply, as shown in Figure 5.0.1, includes the following functions:

1) Menu items that allow access to other modules.
2) Connect to the instrument, display device specifications, and show the status of the communication port.
3) Switch between tabs for key power supply functions: Source, List, PV, Setting, Battery Simulation, Charge & Discharge, and Load.
4) Control the output status and monitor output parameters in real time.
5) Clear alarms.
6) "Save" and "Load" allow storing and loading parameter settings for each mode.
7) The software function options are described in detail in the power user manual and are not repeated in this manual.

Figure 5-0-1

Main interface of the control software

Menu feature introduction

File	Load	Load the parameters for the current working mode from a file.
	Save	Save the parameters for the current working mode to the file
	Save as	
	Exit	Exit the control software
Setting	Communication Settings	Enter the communication setting interface, see Chapter **C** on page 13
	Language	中文/ English
	Data record window	Enter the data processing interface, see Chapter **Data recording and processing** on page 61
Work Mode	DC Supply	Indicates that the current interface is the main interface
	PV Inverter MPPT test	Switch to the PV Inverter MPPT test interface, see Chapter **PV Inverter MPPT Test Function** on page 67
	PV Inverter Shadow test	Switch to the PV Inverter Shadow test interface, see Chapter **PV Inverter shadow Test Function** on page 75
Help	About	Open the About window, with the product name and the version number

Table 5-1-1 Main Interface Menu Items

Basic operation of the main interface function

As shown in Fig. 5.2.1, after the host computer is connected, the power supply enters a ready state. At this time, you can click the corresponding function tab at the top of the main interface to switch to the desired working mode. However, if the power supply is in the output state, you cannot switch the working mode, as shown in Fig. 5.2.2.

Figure 5-2-1 ready page tab

Figure 5-2-2 Start dynamic Page tab

Power output control

Except for the "Setting" function, all other functions can control the bidirectional power supply output. Clicking the circular button/indicator light at the upper right starts or stops the output.

In Fig. 5.2.3, the left gray indicator represents the ready state, the middle green represents the output state, and the right red indicates an alarm state.

When you click the circular button, the power supply switches to the output state, and the indicator light changes from gray to green.

Clicking the button again switches the power supply back to the ready state, and the indicator light changes from green to gray.

Figure 5-2-3

Power Output Page in Ready, Output, and Alarm States (Round Button/Indicator Lamp)

Power Alarm Cancellation

When the power supply encounters a fault or detects a user-defined alarm, it will enter the alarm state, and the round button/indicator light will turn red.

As shown on the right side of Fig. 5.2.3, click the "Clear Alarm" button to clear the alarm state. The underlying fault must be resolved; otherwise, some faults may trigger the alarm again after cancellation.

Real-Time Display of Voltage, Current, and Power

Most functional interfaces (except for the PV function) display the real-time measurement data of the power output. The chart area shows the output curve for the most recent 1 minute.

Figure 5-2-4 Real-time measurement data of the power supply output

Saving and Loading Power Supply Parameters

Each power-related interface contains a parameter bar, as shown in Figure 5.2.5. For example, the power mode corresponds to "Source Parameters," while the battery simulation mode corresponds to "Charge & Discharge Parameters". If the parameter box is empty or shows "*" (the asterisk indicates that modifications have been made), right-click the parameter box to open a menu. From this menu, you can perform operations such as loading, saving, or saving as (equivalent to the "File" options in the main interface menu).

After a file is saved or loaded, the parameter box will display the file name. Files are saved in the software's Sav directory.

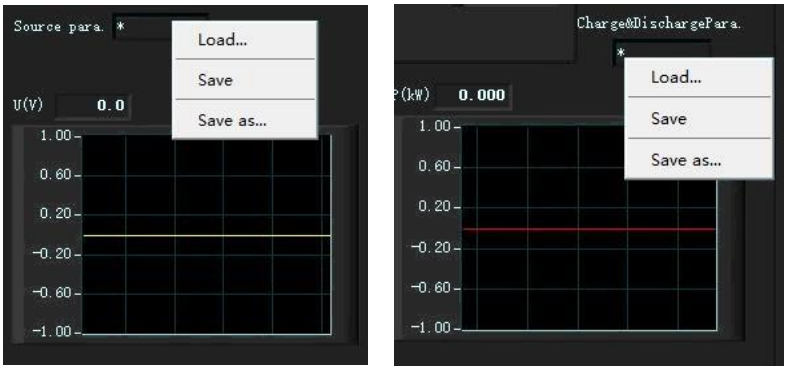


Figure 5-2-5 Operation of each function parameter box

Introduction of the power supply function interface

Source function

The Source functions are shown in Figures 5.3.1 and 5.3.2.

- In the ready state, you can set the voltage, current, power, and Soft Rise (the Soft Rise option is located in the Settings interface).
- In the output state, you can adjust the voltage, current, and power online.
- Click the circular button/indicator light with the mouse to control the power output or stop the output.

Note	The difference between Source and Source2 lies in the way current and power are set. In Power Supply mode, the current and power are assigned both positive and negative values simultaneously. For example, setting 10 A means assigning +10 A and -10 A at the same time. In Source2, however, the positive and negative values for current and power are set as two separate parameters.

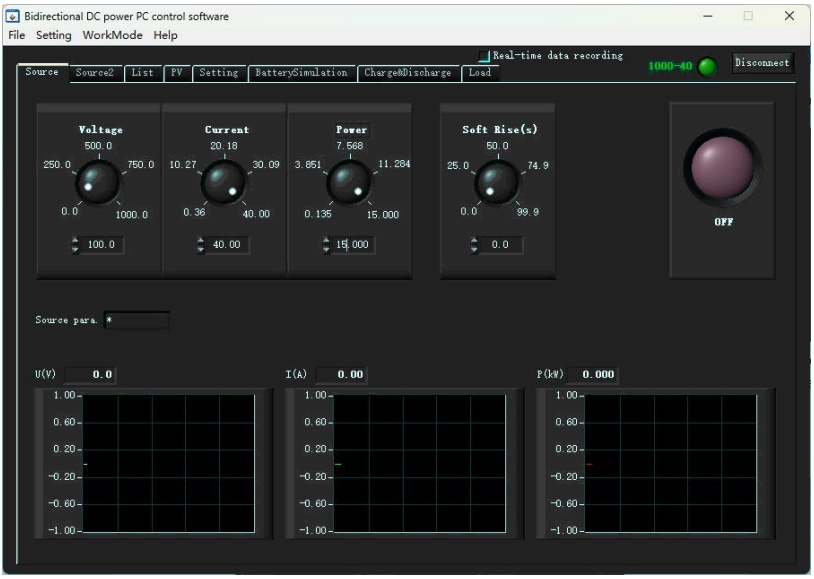


Figure 5-3-1 Source function- -ready mode

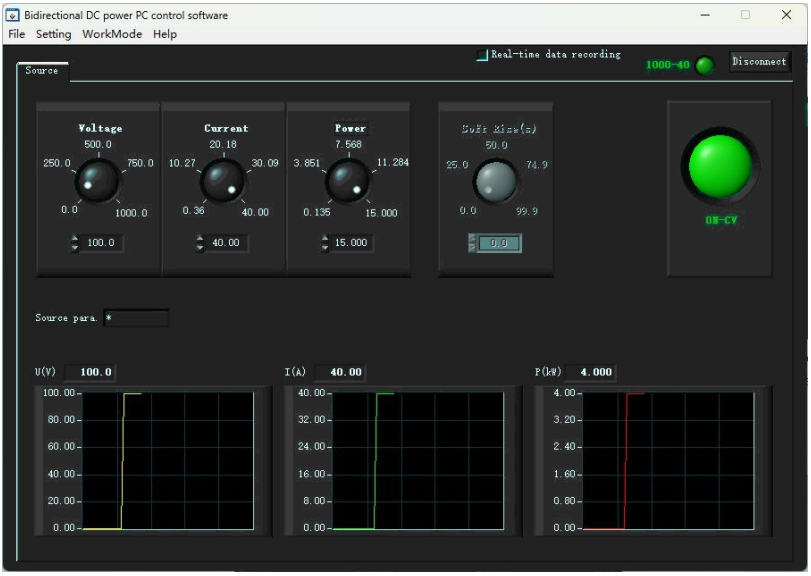


Figure 5-3-2 Power supply function- output interface

Source 2 function

The Source2 function is shown in Figures 5.3.3 and 5.3.4. The main difference from Source mode is that the negative current and negative power can be set separately.

- In the ready state, you can set the voltage, positive current, positive power, negative current, negative power, and Soft Rise (the Soft Rise option is located in the Settings interface).
- In the output state, you can adjust the voltage, positive current, positive power, negative current, and negative power online.
- Click the circular button/indicator light with the mouse to control the power output or stop the output.

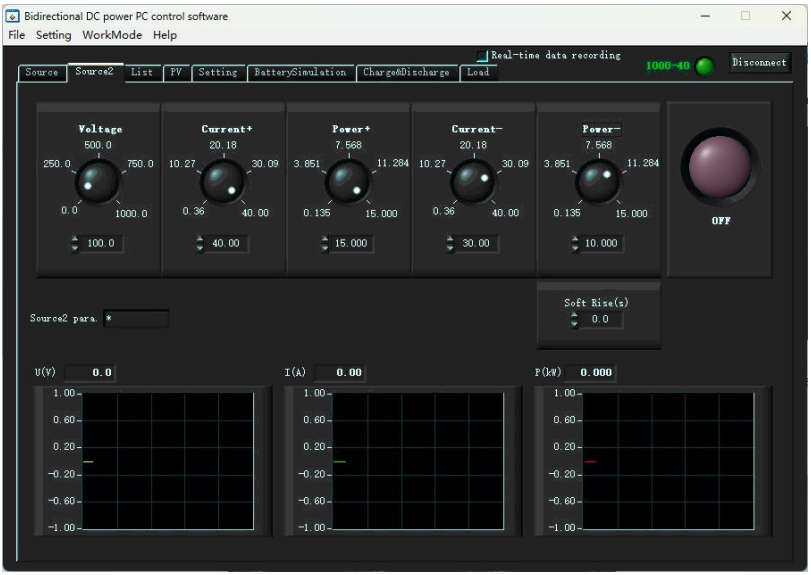


Figure 5-3-3 Source 2 function-ready mode

Figure 5-3-4 Source 2 function-output interface

List Function Interface

List Ready Mode

Click the "List" tab to enter the sequence function of the power supply, as shown in Figure 5.4.1.

The sequence function supports up to 1,000 steps (20 steps × 50 groups). To synchronize the data between the host computer and the power supply, click the "Sequence Data Upload" or "Sequence Data Download" button (parameters will be displayed after being read from a local file).

Because of the large amount of data, a progress bar is displayed as shown in Figure 5.4.2. The synchronization process may take a few minutes to complete.

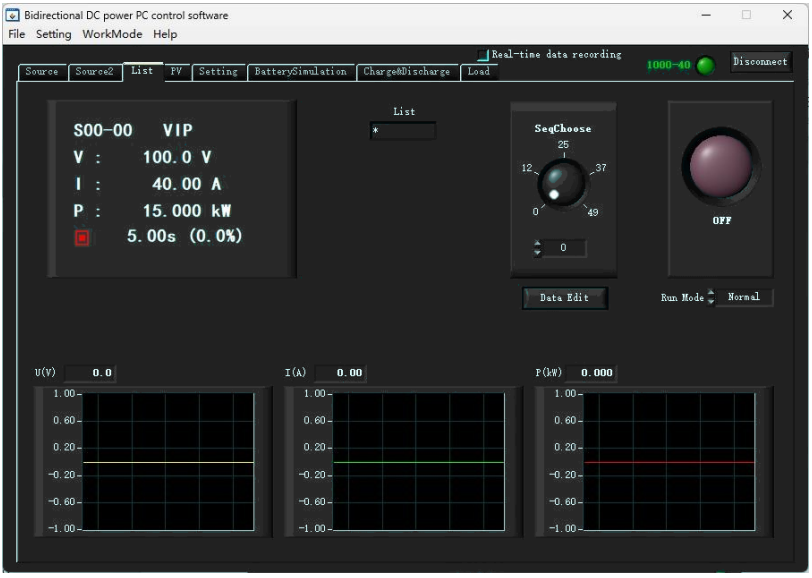


Figure 5-4-1 Sequence function-unsynchronized data status

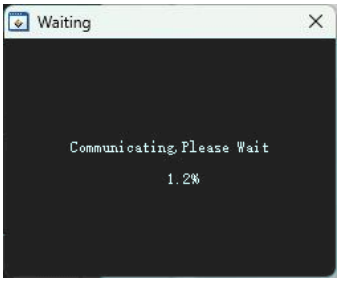


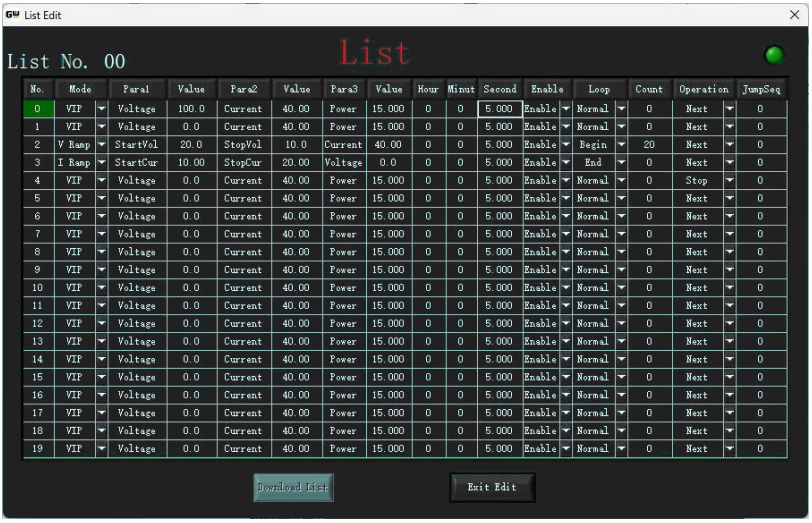
Figure 5-4-2 Sequence function-synchronous data progress prompt window

After data synchronization, the "Data Read" or "Data Download" button disappears, and the "Data Edit" button appears, as shown in Figure 5.4.3.

Using "Sequence Choose", select the sequence to be edited, then click the "Edit Sequence Parameters" button to enter the step editing interface, as shown in Figure 5.4.4.

Click a step parameter to edit it. After completing all edits, click the "Download List" button to transfer the 20 edited steps to the power supply.

Figure 5-4-3 Sequence Function-the "Edit Sequence Parameters" button



No.	Mode	Para1	Value	Para2	Value	Para3	Value	Hour	Minut	Second	Enable	Loop	Count	Operation	JumpSeq
0	VIP	Voltage	100.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
1	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
2	V Ramp	StartVol	20.0	StopVol	10.0	Current	40.00	0	0	5.000	Enable	Begin	20	Next	0
3	I Ramp	StartCur	10.00	StopCur	20.00	Voltage	0.0	0	0	5.000	Enable	End	0	Next	0
4	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Stop	0
5	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
6	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
7	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
8	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
9	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
10	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
11	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
12	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
13	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
14	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
15	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
16	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
17	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
18	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0
19	VIP	Voltage	0.0	Current	40.00	Power	15.000	0	0	5.000	Enable	Normal	0	Next	0

Figure 5-4-4 Sequence Function- “Edit Sequence Parameters” button

List output function

In the List function ready mode, clicking the circular button/indicator light on the right will trigger the following behavior:

- If the data has not been synchronized, a prompt box will appear to request synchronization, as shown in Figure 5.4.5.
- If the data has already been synchronized, the system will enter the sequence output state, as shown in Figure 5.4.6.

Figure 5-4-5 List function-Data prompt box is not synchronized

In the sequence output state, the running sequence can be paused, and the output will remain at the current step. To resume, click the “Continue” button to proceed with the sequence execution.

Clicking the circular button/indicator on the right will stop the sequence and return the power supply to the ready state.

Figure 5-4-6 List function-power output status

Introduction to the PV Function Interface

PV Ready Mode

⚠ Note	Some power supply models do not have the PV function due to hardware limitations, and this tab will not appear after the host computer handshake.

Click the "PV" tab to enter the PV function for the first time, as shown in Figure 5.5.1.

The PV function includes multiple sub-functions, which can be accessed via the tabs at the bottom of the page: SAS mode, SAS 2 mode, EN50530 mode, Sandia mode, PV Sequence mode, EN50530 Static, Sandia Static, CGC/GF35 Static, and Weather Simulation, as shown in Figures 5.5.1 to 5.5.10. The resulting PV curves differ mainly in terms of application standards and the parameters used.

- SAS mode, SAS 2 mode, EN50530 mode, and Sandia mode are the power supply working modes.
- PV Sequence mode provides 100 PV curve sequences added by the host computer.
- The other modes are PV function extensions.

Click the "Edit PV Sequence" button within the PV Sequence tab to enter the sequence step editing interface, as shown in Figure 5.5.6. You can edit up to 100 PV curve steps. If a PV curve setting is invalid, the corresponding step will be displayed as "prohibit" in red.

Click the "PV Set…" button in the lower right corner of the PV main interface to open the PV setting interface, as shown in Figure 5.5.11. The PV parameters here are mainly used to adapt to different PV inverter models. Please modify them under the guidance of the power supply manufacturer's technical personnel.

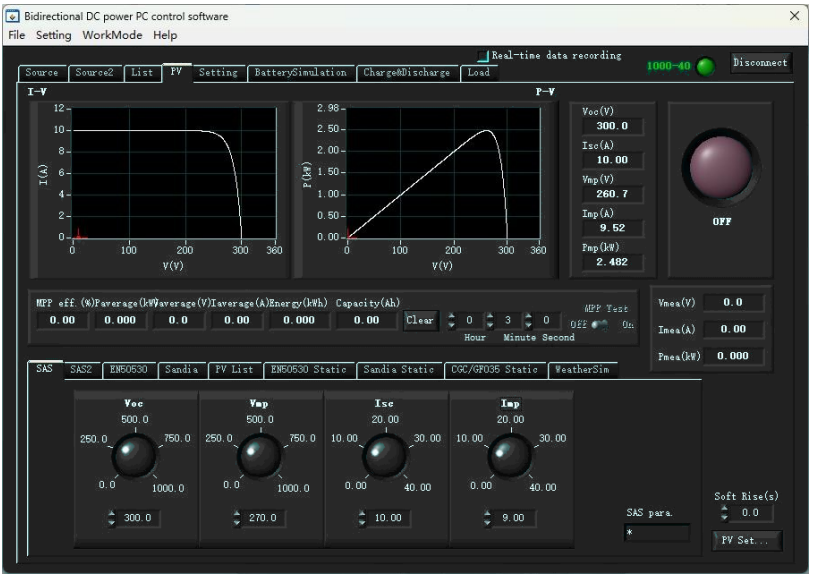


Figure 5-5-1 PV function- SAS ready interface

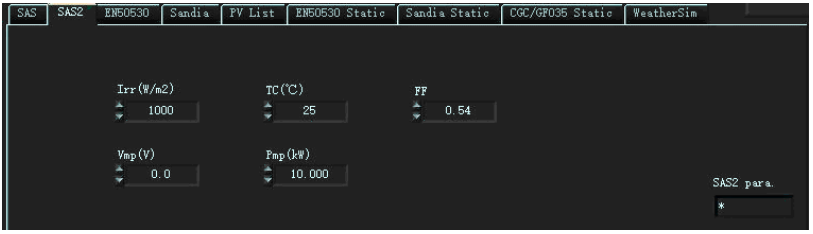


Figure 5-5-2 PV functions- SAS 2 function tab

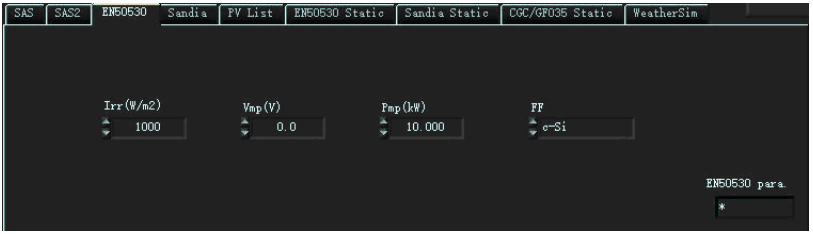


Figure 5-5-3 PV function-EN50530 function tab

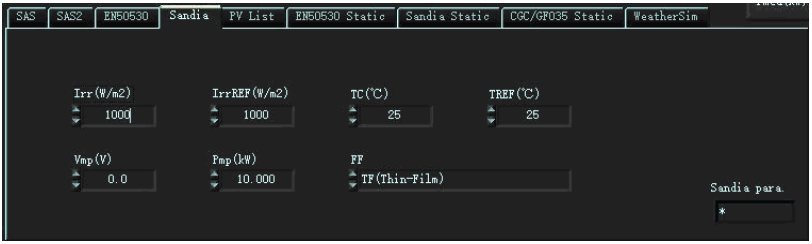


Figure 5-5-4 PV function-Sandia function tab

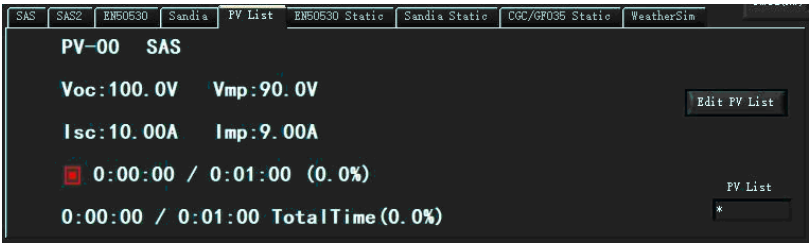


Figure 5-5-5 PV Function-PV Sequence Function tab

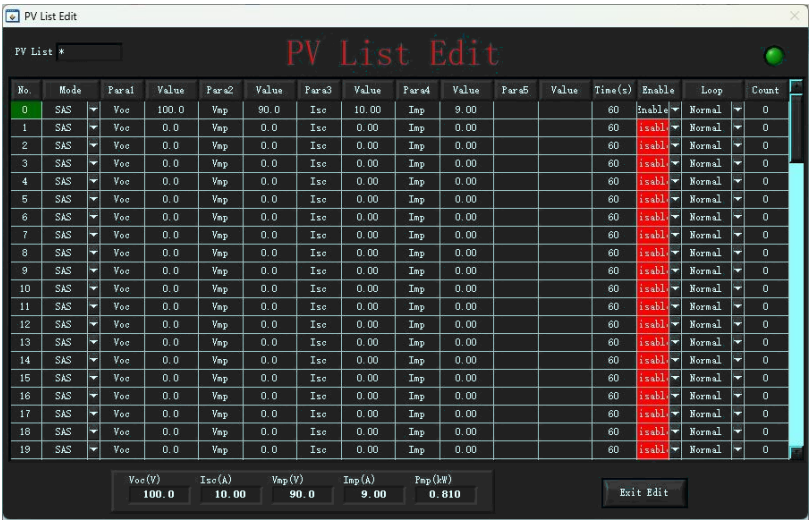


Figure 5-5-6 PV Function-PV sequence step editing interface

Figure 5-5-7 PV Functions-EN50530 static functions tab

Figure 5-5-8 PV function-Sandia static function tab

Figure 5-5-9 PV Function-CGC / GF35 Static Function tab

Figure 5-5-10 PV Function-Weather Simulation Function tab

Figure 5-5-11 PV function-PV setting interface

PV output function, MPP test, online adjustment

In PV mode, when the power supply parameters are correctly set, the IV curve and PV curve at the top of the interface will display a white preview curve, as shown in Figure 5.5.12.

If the parameters are abnormal, an abnormal data warning will be shown, as illustrated in Figure 5.5.13.

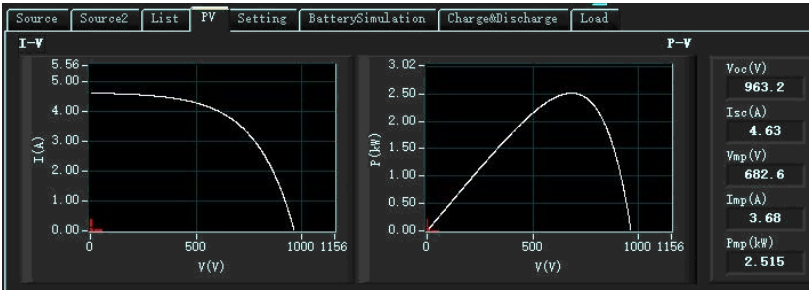


Figure 5-5-12 PV Function-White preview curve

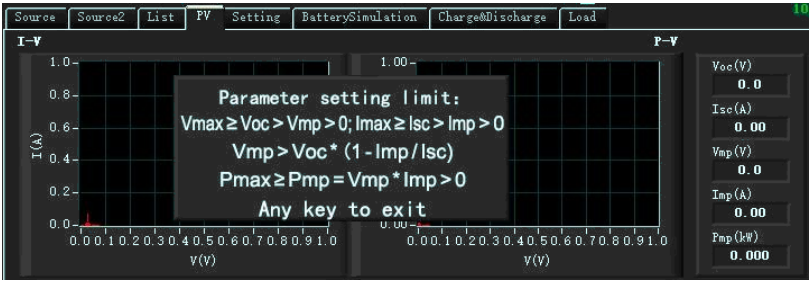


Figure 5-5-13 PV function-data exception prompt

In the ready mode of the PV function, click the circular button/ indicator light on the right to enter the PV output state, as shown in Figure 5-5-14

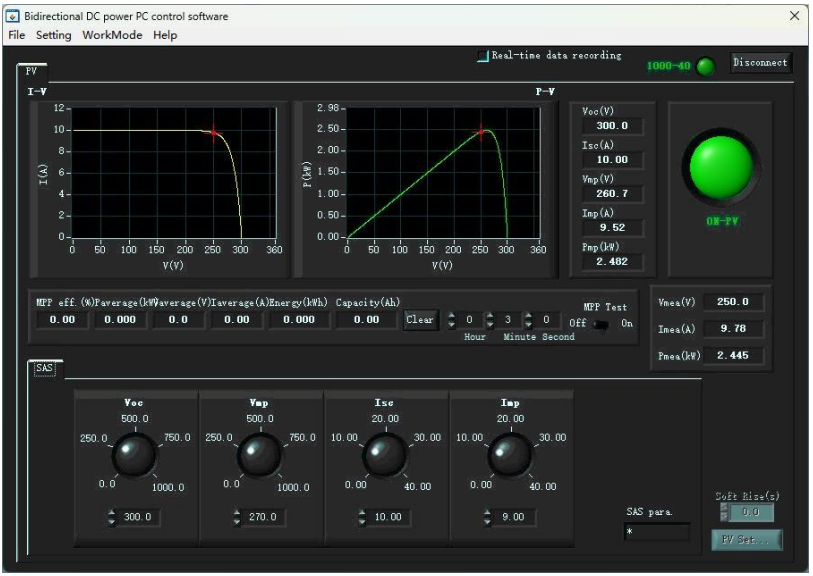


Figure 5-5-14 PV Function-PV Output Status

In the PV output state, an MPP test for a single phase duration can be performed. After the power supply begins output, set the test duration and turn on the MPP test switch. The host computer control software will then collect the power supply data and perform calculations in the data box area, as shown in Figure 5.5.15.

In PV output mode, the following working modes can be adjusted online: SAS mode, SAS 2 mode, EN50530 mode, Sandia mode, EN50530 Static, Sandia Static, and CGC/GF35 Static.

- As shown in Figure 5.5.15, when a PV parameter is modified online, the "Restore" and "Online" buttons appear on the right side of the parameter.
- A white preview curve will appear in the IV and PV curve boxes above.
- Click the "Online" button, and the host computer control software will send the updated parameters to the power supply.

Figure 5-5-15 PV function-PV MPPT test and online regulation function

Settings Interface

Click the "Settings" tab to enter the power supply Settings interface, which is mainly used to configure the common parameters of the power supply, as shown in Figure 5.6.1.

After modifying the parameters, click the "Down Setting" button to save the changes.

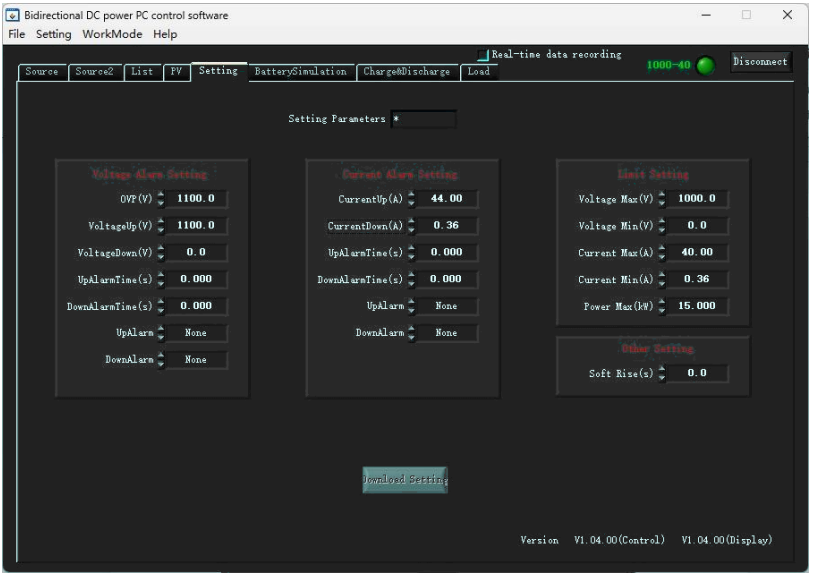


Figure 5-6-1 Settings function

Battery Simulation Interface

Click the "Battery Simulation" tab to enter the power supply Battery Simulation interface, as shown in Figure 5.7.1.

Set the battery-related parameters; a battery simulation curve preview box is displayed on the left.

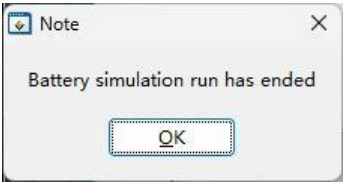
Click the circular button/indicator light on the right to start the battery simulation output state, as shown in Figure 5.7.2.

When the battery simulation is completed (the "SOC Limit" option is set to "Stop"), the host computer control software will display the charge/discharge completion dialog, as shown in Figure 5.7.3. Click OK to return to the ready interface.

Figure 5-7-1 Battery simulation function- -ready interface

Figure 5-7-2 Battery simulation function- Output interface

Figure 5-7-3 Battery simulation Completion Dialog



Charge & Discharge Interface

Click the "Charge & Discharge" tab to enter the power supply Charge & Discharge interface, as shown in Figure 5.8.1.

After setting the Charge & Discharge–related parameters, click the circular button/indicator light on the right to enter the Charge & Discharge output state, as shown in Figure 5.8.2.

When charging and discharging are completed, the charge/discharge completion dialog will appear, as shown in Figure 5.8.3. Click OK to return to the ready interface.

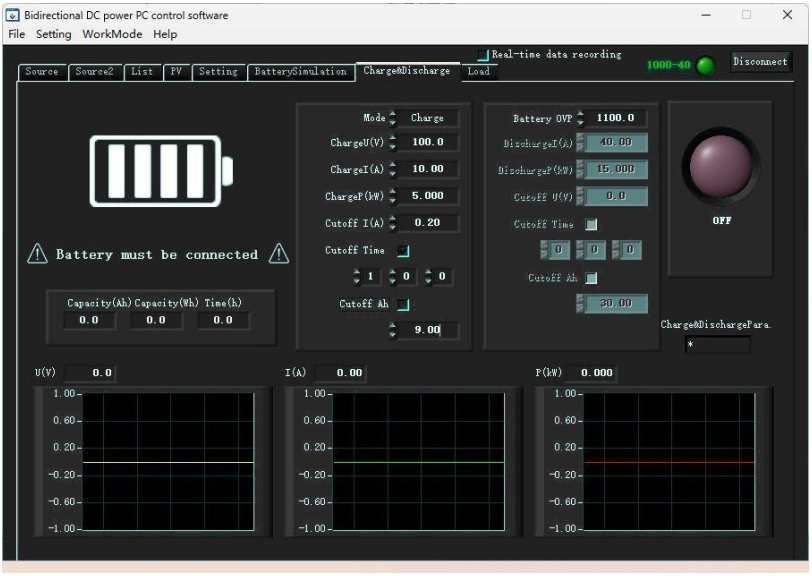


Figure 5-8-1 Charge & Discharge function-ready interface

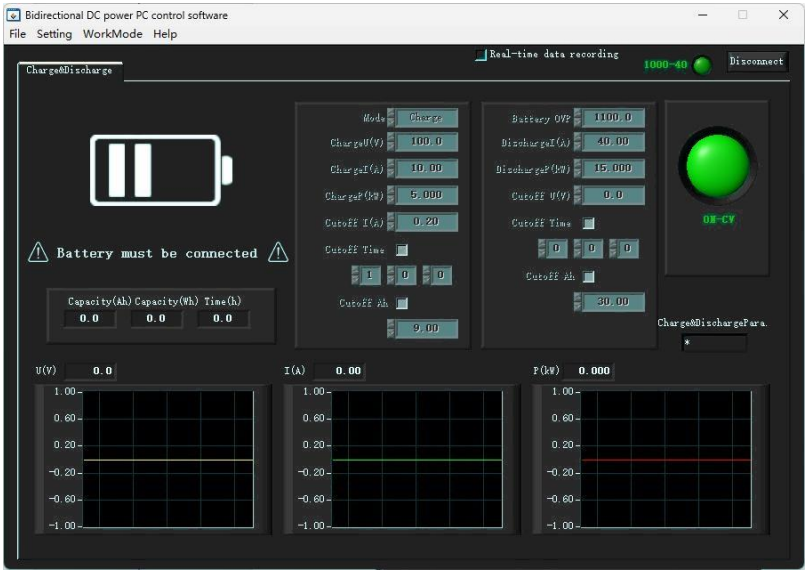
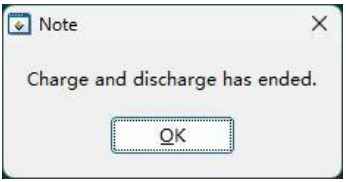


Figure 5-8-2 Charge & Discharge function- -Output interface

Figure 5-8-3 Charge & Discharge Completion Dialog



Introduction to the load function interface

Load functions, as shown in Figure 5-9-1 and 5-9-2.

The ready state can set the mode, voltage, current, power, resistance; The output state can be adjusted online for voltage, current, power, resistance.

Click the circular button/ indicator light to control the power load mode output/ stop output.

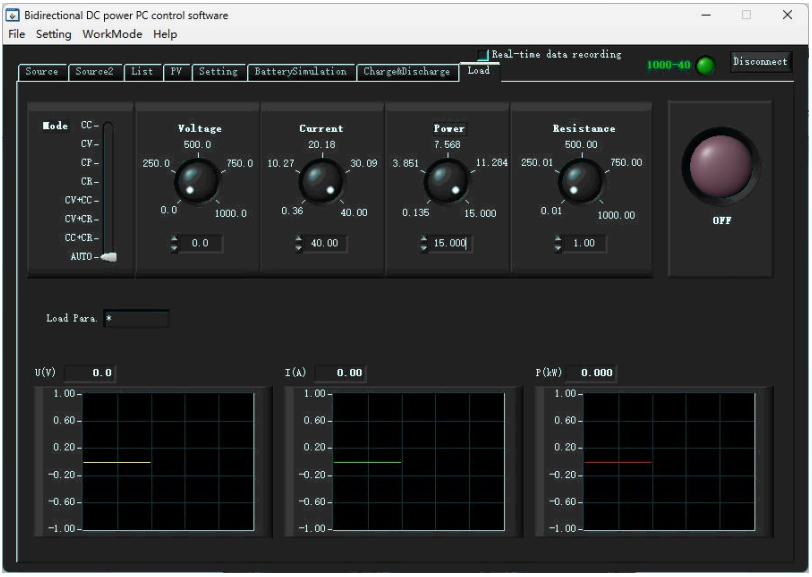


Figure 5-9-1 Load function-ready interface

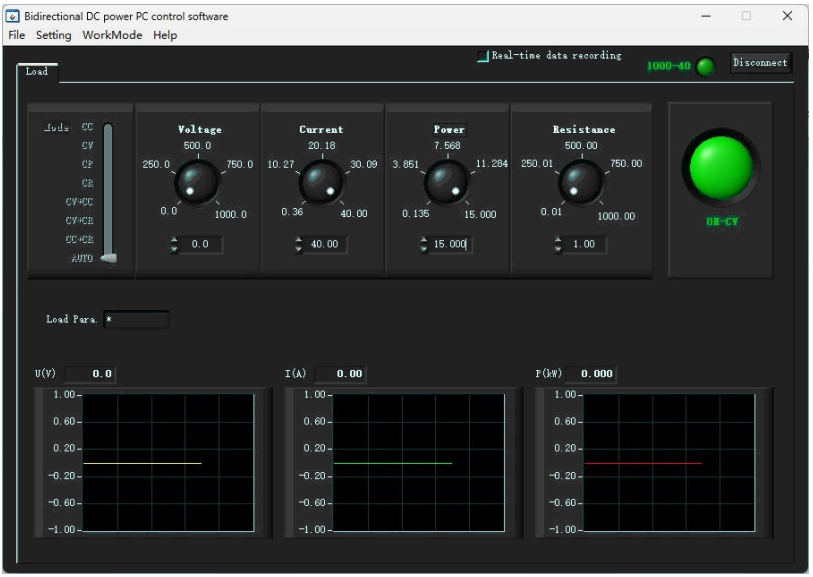


Figure 5-9-2 Load function-Output interface

Data recording and processing

Figure 6.0.1 shows that clicking Menu → Setting → Data Recording can display or hide the data recording window. The data recording window is shown in Figure 6.1.1.

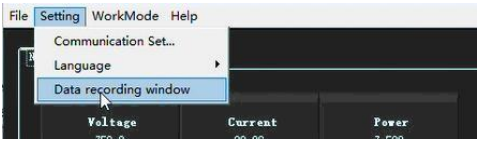
The upper computer control software records the data recording settings upon normal shutdown and restores them the next time the software is opened.

The data recording window contains two separate tabs:

- **Data Record** tab: Displays real-time recording of the current running data, setting parameters, and related record information.
- **Data Display and Export** tab: Reads previous data record files, displays the running curves, and exports them to a CSV file.

Figure 6-0-1

Data recording function- Menu entry



Data recording function

The data recording window is shown in Figure 6.1.1.

When the "Real-time data recording" option is not checked, you can modify the settings in the data recording window.

When the "Real-time data recording" option is checked, the data recording window can only be used to view the data curves and cannot be modified, as shown in Figure 6.1.2.

After configuring the settings, the data recording function can be started by directly selecting the "Real-time data recording" option on the main interface without opening the data recording window.

The files are saved in the software's DataReport directory.

Project name	Project description
Real-time data recording	This option is located above the main interface and the data recording window. When selected, the software automatically records the current running data into a data file according to the specified parameters.
Data Recording Mode	After selecting the "Real-time Data Recording" option: • Record online all data: Records all data in real time. The data file name ends with _all. • Record online running data: Records only the running data in real time. The data file name ends with _run.
Filename format	Data file naming rules: • Power model + Time • Time + Power model
Saving interval	1–30 minutes: Automatically records data to the file at a set interval, similar to the AutoSave feature in Word, to prevent data loss in case of unexpected computer shutdown.
Record name	File Name During Recording
Display data	All, voltage, current, power, MPPT (PV mode only valid other mode is 0)

Display duration	Length of the current recording curve: 1 minute, 5 minutes, 10 minutes, 30 minutes, 60 minutes, 120 minutes

Table 6-1-1 “Data Record” setting option table

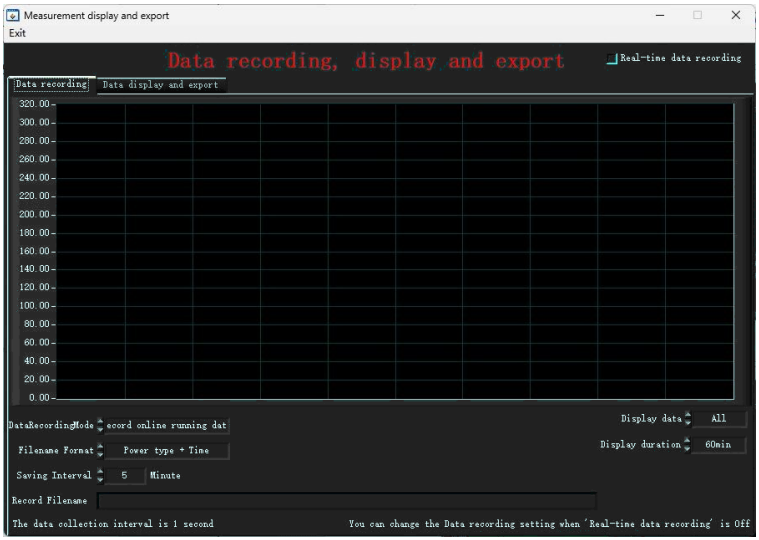


Figure 6-1-1 Data Recording Function — Unexecuted Data Status

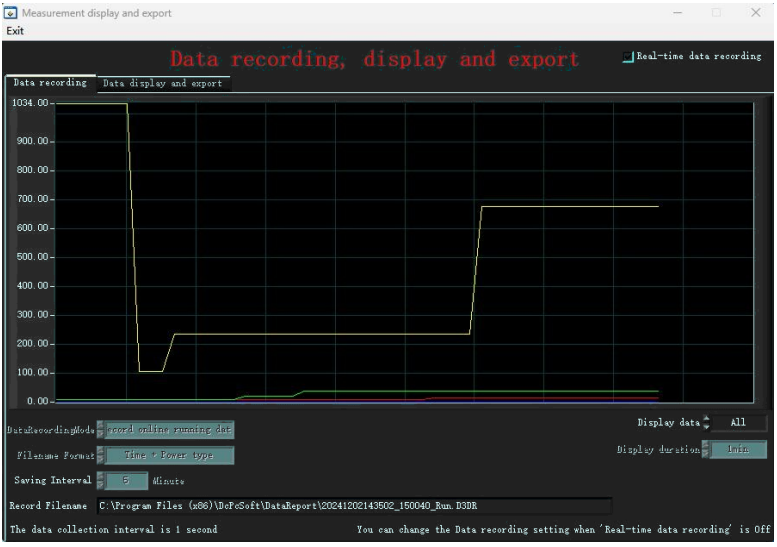


Figure 6-1-2 Data recording function- -Executive data recording status

In Figure 6-1-2, the yellow curve is voltage, the green curve is current, the red curve is power, and the blue curve is the MPPT efficiency value in PV state.

Data display and export function

To record data quickly, the upper computer control software saves data in a custom format, which can be exported as a CSV format for convenient use.
Click the "Data Display and Export" tab to enter the data display and export window, as shown in Figure 6.2.1.
In the "Data Display and Export" interface, if the "Real-time Data Recording" option is checked, operations cannot be performed.

Figure 6-2-1 Data Display and Export interface

After selecting the import file name, choose the data to be displayed (yellow curve = voltage, green curve = current, red curve = power, blue curve = MPPT efficiency value in PV mode), and click the "Display Data" button to show the selected curves.

After selecting the import file name, enter the export file name, set the export time interval (data is recorded once per second; if the dataset is too large, increasing the interval can reduce the exported data and make processing easier), and specify the export data length (either check "Export all data" or enter the "Export total duration").

Then click the "Export Data" button to export the data in CSV format.

If successful, an export success prompt window will appear, as shown in Figure 6.2.2. The exported CSV file can then be opened with spreadsheet software, as shown in Figure 6.2.3.

Figure 6-2-2

Export success prompt

Figure 6-2-3

Content diagram of the export table

start tir	duration:export ti	export interval:1s		
Time(s)	voltage(V	current(A	Power(kW)	MPPT(%)
0	1034	10	10	0
1	1034	10	10	0
2	1034	10	10	0
3	1034	10	10	0
4	1034	10	10	0
5	1034	10	10	0
6	1034	10	10	0
7	104.6	10	10	0
8	104.6	10	10	0
9	104.6	10	10	0
10	235.3	10	10	0
11	235.3	10	10	0
12	235.3	10	10	0

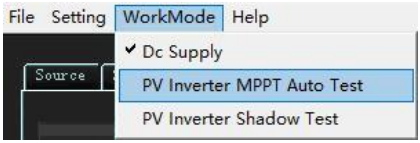
PV Inverter MPPT Test Function

Click Menu → Work Mode → PV Inverter MPPT Auto Test to enter the PV Inverter MPPT test window, as shown in Figure 7.1.1. At this point, the main window interface will be hidden.

If the power supply does not support the PV function, this feature is unavailable.

Figure 7-0-1

PV MPPT Test function-Menu entry



PV MPPT Single-step automatic test setup

The PV inverter MPPT test is used to measure the MPP efficiency value of the PV inverter based on a specified PV sequence, and to determine whether the requirements are met according to the MPP efficiency value.

The control software supports both dynamic and static tests according to CGC/CF004, EN50530, and Sandia standards. Figures 7.1.1 to 7.1.5 show the setup interfaces for the corresponding standards.

This interface is similar to the PV interface under the main window, but it is used only for parameter configuration. Since the MPPT test is essentially a series of PV sequence curves, the preview window displays the maximum and minimum curves of the series to indicate the PV curve range. For dynamic tests, the middle portion of the curve is also displayed.

For the test parameters specified in the standards, please refer to the corresponding documents. Only additional functional options outside the standards are described here:

- **Static "Initial time" and Dynamic "Init time"**: These refer to the warm-up stabilization time required for a PV inverter to start operation, typically 1–10 minutes depending on the manufacturer and model. During this period, the MPPT efficiency value is unstable and therefore excluded from the test interval. This can be considered the PV inverter warm-up time. In the control software, this corresponds to the waiting time of the first PV sequence.
- "**Test time" parameter (static test)**: Defines the running time length of each PV curve after the warm-up period, during which the MPPT efficiency data is recorded.
- **"Order" parameter (static test)**: Specifies whether the test sequence is arranged by power change or voltage change.
- **Save/read function**: All parameters can be saved and read, either as a complete set or separately for static and dynamic parameters.

Figure 7-1-1 PV MPPT Test function- -EN50530 Static

Figure 7-1-2 PV MPPT Test Function- -the Sandia Static tab

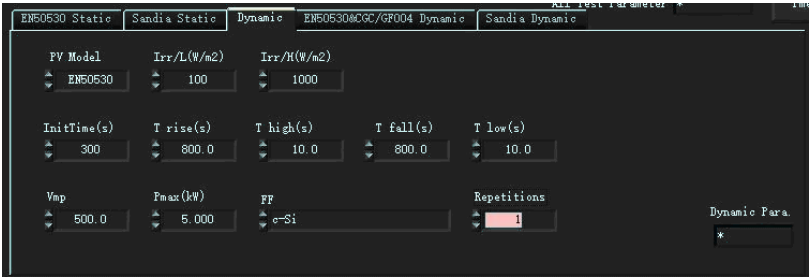


Figure 7-1-3 PV MPPT Test Functions-Custom Dynamic tab

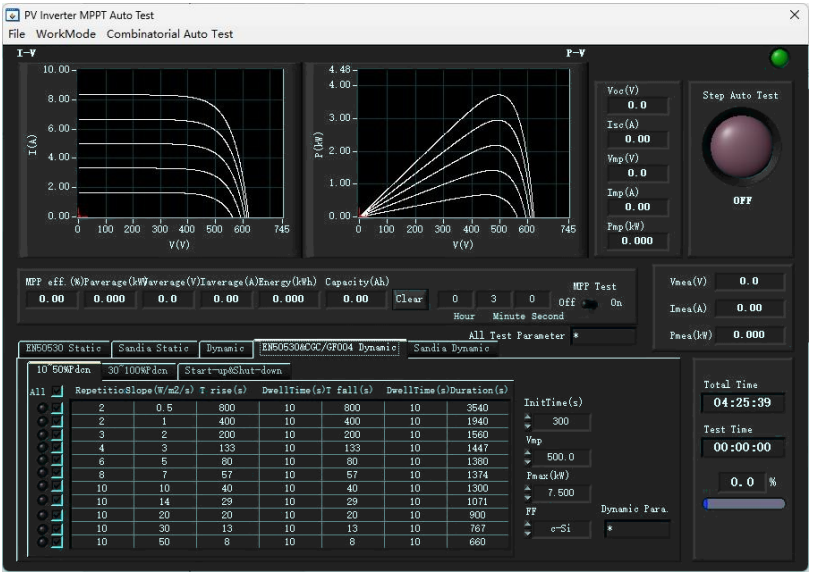


Figure 7-1-4 PV MPPT Test function- -EN50530 dynamics

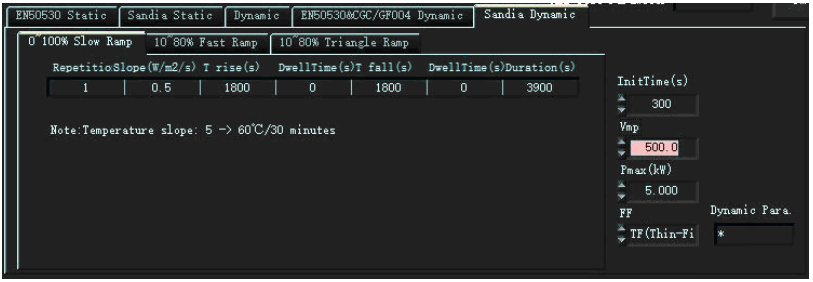


Figure 7-1-5 PV MPPT Test Function- -Sandia Dynamic tab

PV Inverter MPPT Single-step automatic test run

When the PV MPPT test is in the ready state and the power supply parameters are set correctly, the IV and PV curves in the upper part of the interface will display multiple white preview curves, as shown in Figure 7.1.1 or Figure 7.1.4. Otherwise, an abnormal data prompt will be displayed.

In the PV MPPT test ready state, clicking the circular button/indicator on the right will switch the system to the PV MPPT test output state, as shown in Figure 7.2.1. At this point, the curves in the upper graph will automatically update according to the set values, and the MPPT function will automatically record each step.

After the test is completed, a file named MpptReport_Date_Time.xlsx will be generated in the software Sav directory. For example, an EN50530 static test report in xlsx format is shown in Figure 7.2.2.

⚠ Note	Ensure that software supporting the xlsx format, such as Microsoft Excel or WPS Office, is installed. Otherwise, the report cannot be opened (see the section on page 12).

Figure 7-2-1 PV MPPT Test function- -EN50530 static operation

EN50530-Static MPPT Test Report(c-Si)								
Pmp=5.00k	5%	10%	20%	25%	30%	50%	75%	100%
Vmin=600.	99.38%	99.20%	99.61%	99.68%	99.73%	99.84%	99.89%	99.88%
Vnom=675.	93.73%	94.49%	94.89%	94.97%	95.02%	95.12%	95.07%	95.12%
Vmax=750.	86.39%	87.20%	87.20%	87.04%	87.32%	87.46%	87.46%	87.42%

Figure 7-2-2 PV MPPT Test Function- -EN50530 Static Test Report

PV MPPT Combined automatic test function

If you want to perform a series of dynamic and static tests on a PV inverter, it is cumbersome to carry out the tests and generate reports individually. In this case, you can use the MPPT Combination Automatic Test. Click the menu → Combination Automatic Test (as shown in Figure 7.3.1) to enter the Combination Automatic Test option interface (as shown in Figure 7.3.2).

After selecting the test items and the test order, first click the Run Parameters Check button to ensure that all parameters in the test process are correct. Once verified, click the Start Automatic Test button. The control software will automatically enter the Combination Automatic Test running interface (as shown in Figure 7.3.3).

After the test is completed, a file named MpptReport_AutoRun_Date_Time.xlsx will be generated in the software Sav directory.

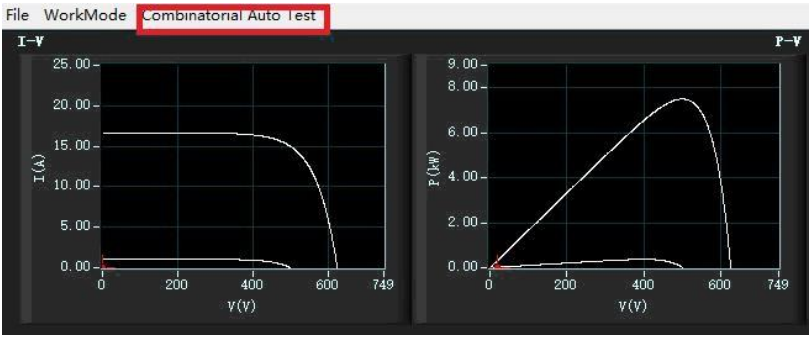


Figure 7-3-1 PV MPPT Test function- Combined automatic test menu entrance

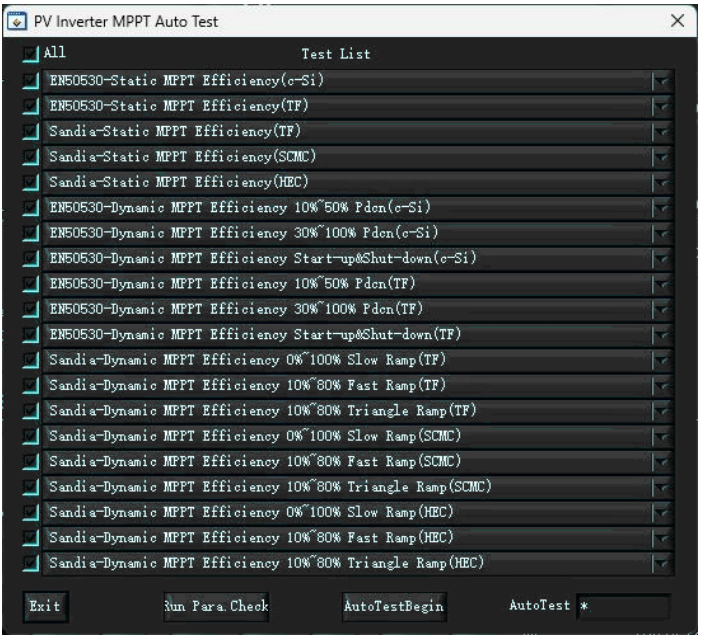


Figure 7-3-2 PV MPPT Test function-Combined automatic test options

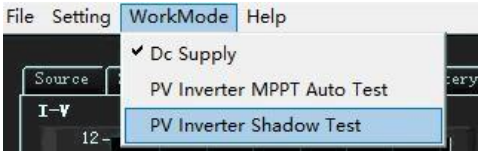
Figure 7-3-3 PV MPPT Test Function- -Combined automatic test run

PV Inverter shadow Test Function

In Figure 8.0.1, click the menu → Work Mode → PV Inverter Shadow Test to enter the PV Shadow Test window, as shown in Figure 8.1.1, which hides the main window interface.

This function is unavailable if the power supply does not support PV functionality.

Figure 8-0-1



PV cloud block test function-menu entrance

PV shadow test

As shown in Figure 8.1.1, the PV Shadow Test is mainly used for testing PV solar panel arrays under cloudy conditions.

When solar irradiance varies across series and parallel connections, the resulting PV curve exhibits multiple peaks.

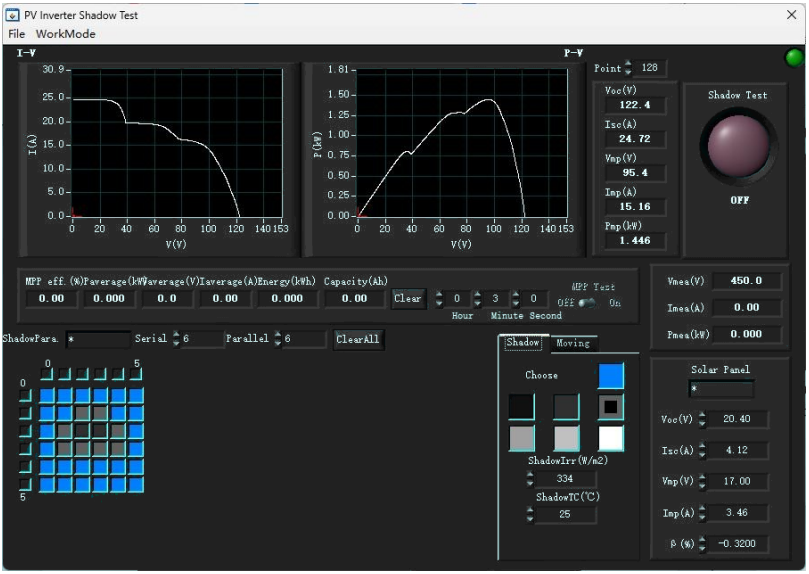


Figure 8-1-1 PV cloud blocking test function

When using Table mode (power supply function) in the control software, the points in the upper right corner represent the number of points used to generate the curve, ranging from 128 to 1024.

Generally, the more points, the more accurate the PV curve, but the execution speed will be slower, especially when clouds are moving. Fewer points result in lower curve accuracy but faster execution speed. Typically, the number of points can be selected as the number of peaks × 32. For example, in the figure, there are 3 peaks, 3 × 32 = 96, so 128 points can be selected.

The lower right shows the solar panel matrix. After selecting different series and parallel combinations, the middle matrix sets the

cloud shading intensity, and the left matrix represents the cloud shading state.

The parameters of individual solar panels are displayed on the right.

Once the PV curve is generated, the operation is similar to conventional PV tests, and the cloud shading state can also be modified. Other MPP tests are performed the same way as conventional PV tests and will not be repeated here.

PV shadow moving test

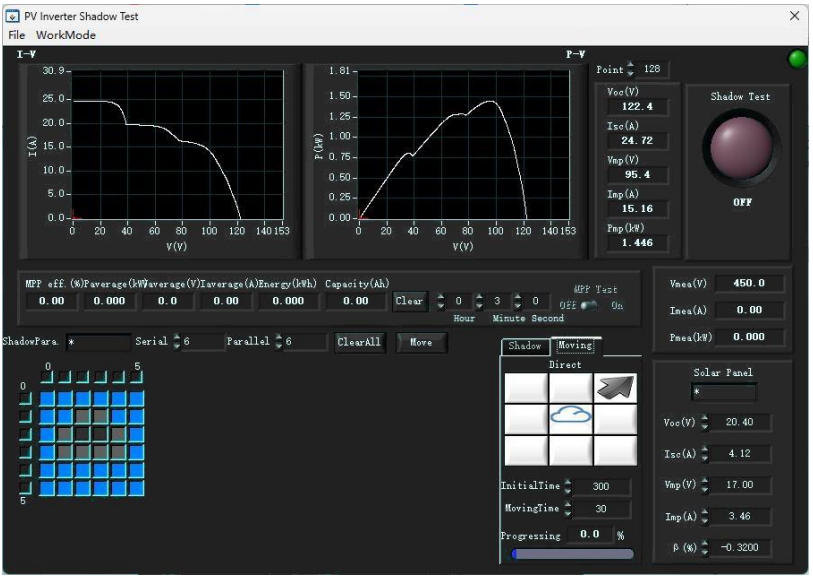


Figure 8-2-1 PV Cloud Mobile test function

After setting the shadow state, you can also test cloud movement in a specific direction. Click the "Moving" tab to set the movement direction and duration, then click start to begin the test. The cloud will move in the specified direction until it disappears, completing the cloud mobile test.

The "Initial time" parameter refers to the warm-up period required for the PV inverter to reach a stable operating state, typically 1–10 minutes depending on the manufacturer and model. During this period, the MPPT efficiency may be unstable and is not included in the test interval. This warm-up period is equivalent to the cloudless state in the cloud mobile function.

The "Moving time" parameter specifies the total duration from the start to the end of cloud movement after the inverter has warmed up. The minimum setting depends on the number of points and the number of cloud movements.