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Constant Voltage and Constant Current DC Power Supply Instruction

Model: RD6006/RD6006-W

Date: 2019.10.22

Dear users, thank you for purchasing the constant voltage constant current DC power supply produced by Hangzhou Ruideng Technology Co., Ltd. In order to let you know more about the full function of this product, get a better experience and avoid misuse. Please read this instruction carefully before using it. Keep it for future reference.

Note: This instruction is corresponding to firmware V1.24, the page and operation may be different under different firmware versions, please pay attention when using it.



CONTENT

Production introduction.....	1
1.1 Technical Parameter.....	1
1.2 Core Function.....	1
1.3 Panel Description.....	2
1.3.1 Front panel.....	2
1.3.2 Back panel.....	2
1.4 Operation Introduction.....	3
1.4.1 Main Page.....	4
1.4.2 Operation Introduction.....	4
1.4.2.1 Battery Charging Function Introduction.....	4
1.4.2.2 Main Page Output Voltage and Output Current Setting.....	5
1.4.2.3 Data Group Quick Storage and Call out.....	5
1.4.2.4 Keypad lock and unlock.....	5
1.4.2.5 System Setting.....	6
1.4.2.6 Main Page Style Setting.....	7
1.4.2.7 Storage Data Setting.....	7
1.4.2.8 System Information.....	8
Android APP Instruction.....	9
2.1 Mobile Phone APP installation.....	9
2.1.1 APP download:.....	9
2.2 Installation Introduction.....	9
2.2.1 APP Start-up.....	9
2.2.2 APP Interface Display.....	9
2.2.3 APP Connection and Operation.....	11
2.2.3.1 Network Distribution.....	11
2.2.3.2 Proper Wi-Fi Connection.....	12
2.2.3.3 APP Functions.....	13
PC Software Installation and Operation Instruction.....	14
3.1 Software Installation.....	14
3.1.1 Unzip Files.....	14
3.1.2 Software Installation.....	14
3.2 Software Operation.....	14
3.2.1 Installation Succeed.....	14
3.2.2 PC Software Operation Instruction.....	14
3.3 Functions Introduction.....	15
3.3.1 Basic Functions.....	16
3.3.2 Firmware Upgrade.....	16
3.3.3 Calibration Fine Tuning.....	17
3.3.4 Logo Update.....	18
3.3.5 Version Update Detection.....	19
3.3.6 Language Setting.....	19
3.3.7 About.....	20

Appendix 1: Common Battery Voltage Comparison Table.....	21
Appendix 2: Common Electric Vehicle Voltage Comparison Table.....	22

Production introduction

1.1 Technical Parameter

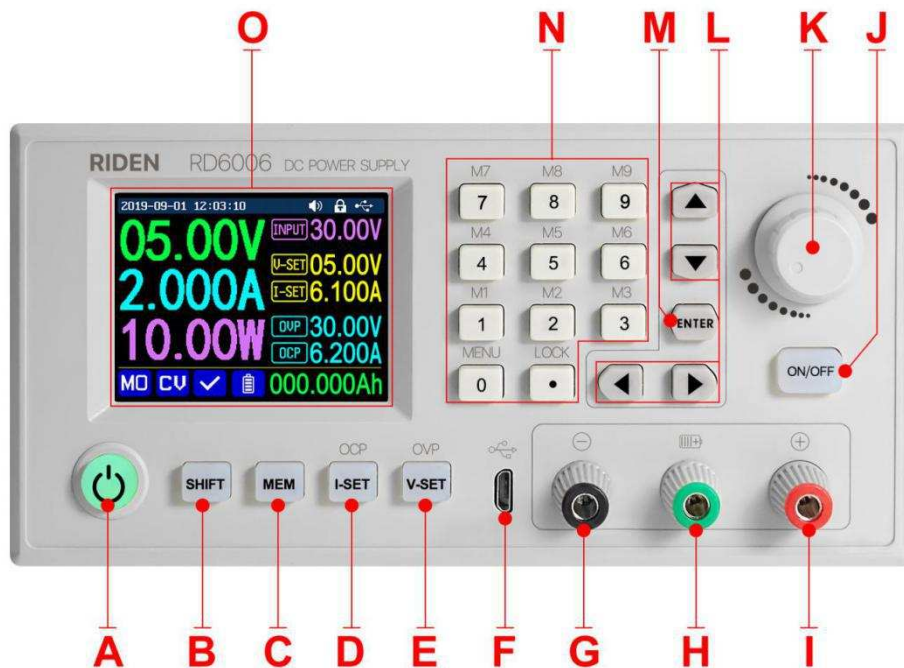
Model:RD6006	Display Screen:2.4 inch color LCD display
Input voltage range: 6-70.00V	Input voltage measurement resolution: 0.01V
Output voltage range: 0-60.00V	Output voltage measurement resolution: 0.01V
Output current range: 0-6.000A	Current setting measurement resolution: 0.001A
Output power range: 0-360.0W	Battery voltage measurement resolution: 0.01V
Output voltage accuracy: $\pm(0.3\%+3$ digits)	Output current accuracy: $\pm(0.5\%+5$ digits)
Input voltage accuracy: $\pm(1\%+5$ digits)	Battery voltage measurement accuracy: $\pm(0.5\%+3$ digits)
Output ripple typical: 100mV VPP	Working temperature range:-10°C~40°C
Constant voltage mode response time: 2ms (0.1A-5A load)	External sensor Temperature detection range: -10°C~100°C/0°F~200°F
Constant voltage mode load adjustment rate : $\pm(0.1\%+2$ digits)	External sensor Temperature detection accuracy: $\pm 3^\circ\text{C} / \pm 6^\circ\text{F}$
Constant current mode load adjustment rate: $\pm(0.1\%+3$ digits)	Capacity measurement range: 0-9999.99Ah
Screen brightness setting: 0-5 level total 6 levels	Energy measurement range: 0-9999.99Wh
Weight(with package): 607g	Capacity and energy statistical error: $\pm 2\%$
Product dimension: 167*81*65mm	Working mode: Buck mode Voltage drop >1V and >10%

1.2 Core Function

- keypad + encoder potentiometer combination adjustment
- 2.4 inch HD color screen
- Battery charging special interface
- Data quick storage & recall
- New PC software
- Wi-Fi connection, Phone APP control

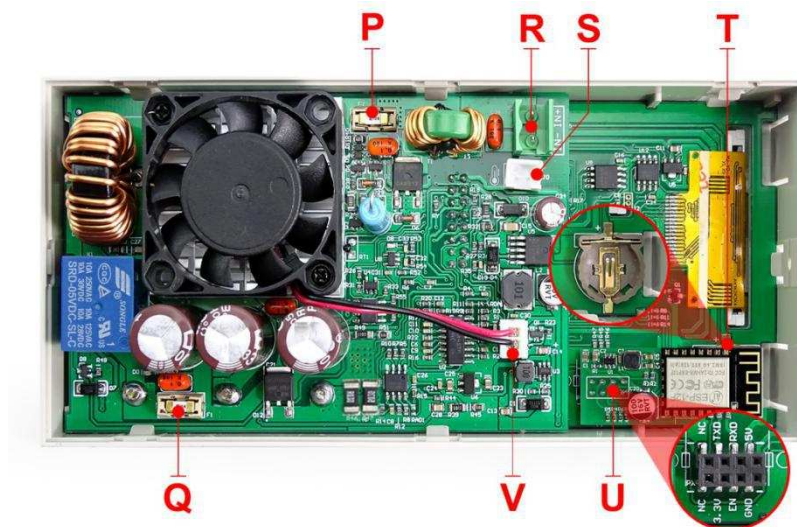
1.3 Panel Description

1.3.1 Front panel



A: Power button	B: Second function button
C: Quick storage button	D: Current/Over current protection value setting
E: Voltage/Over voltage protection value setting	F: Micro USB interface
G: Power supply output negative electrode Battery charging negative electrode	H: Battery charging positive electrode
I: Power supply output positive electrode	J: Output switch
K: encoder potentiometer/Cancel button	L: Direction button
M: Confirm button	N: keypad
O: Screen	

1.3.2 Back panel



P: Input fuse	Q: Output fuse
R: Power source input interface	S: External temperature sensor interface
T: CR1220 battery socket	U: Communication module interface
V: Fan interface	

NOTE:

Power source input interface must be connected to 6-70V constant DC power source. The external sensor cable (as shown on right) must be connected to the external temperature sensor interface. The fan interface cannot be connected to other fans. When the output current is higher than 4A or the system temperature higher than 45°C, the fan start to work, when the temperature is less than 40°C and output current lower than 3.9A, the fan will stop working. When the system temperature is higher than 80°C, the output will be shut down because of OTP. CR1220 is the clock battery(Please prepare by yourself), communication interface is a special interface, please don't connect to other modules or cables.



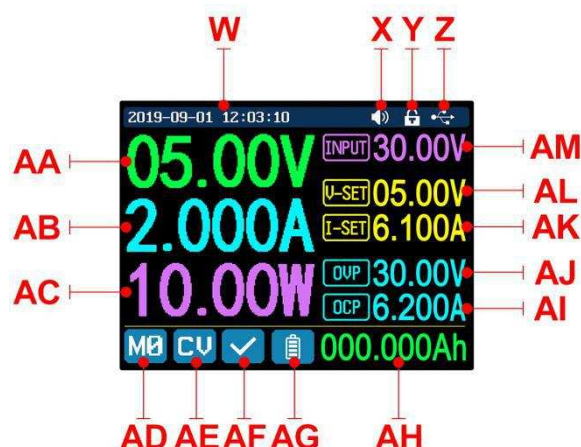
You can see the Wi-Fi module(RD6006-W contains) and RS-485 module in the picture below. If you need RS-485 for industrial wired control, please order it alone.



1.4 Operation Introduction

After power-on, the boot image is displayed first, then enter the main page.

1.4.1 Main Page



W: Time	AF: Protection status indication
X: Button tune	AG: Battery charging indication
Y: Button lock status	AH: Battery related information display area
Z: Communication interface	AM: Input voltage
AA: Actual output voltage	AL: Output voltage preset value
AB: Actual output current	AK: Output current preset value
AC: Output power	AJ: Over voltage protection value
AD: Current data group	AI: Over current protection value
AE: Constant voltage Constant current status	

1.4.2 Operation Introduction

In the menu operation, the icon in red or cursor is the currently selected menu, the icon in blue is the unselected menu, press ENTER to confirm, press the encoder potentiometer to cancel or return, press the direction key to move the cursor or switch menu, rotate the encoder potentiometer to change the setting, the settings will be automatically saved when returning from the menu page. Press and hold the 0 button and power on to restore the factory settings, press and hold the 1 button and power on to restore the factory calibration value, press and hold ENTER and power on to enter the boot mode.

1.4.2.1 Battery Charging Function Introduction

After power-on, at battery related information display area, external temperature, capacity and energy will loop display. When there is output current: capacity, energy automatically Accumulated, and automatically cleared after shutdown.

The green terminal is connected to the positive pole of the battery, and the black terminal is connected to the negative pole of the battery. After the battery is correctly connected, the battery charging indicator turns red and the battery is connected. Press ON/OFF to start charging, the battery charging indicator turns green. When the actual output current is lower than 10mA,

the output will be shut down automatically. Battery with protection board may not be charged. The charging voltage and current should be set on your own.

It is strongly recommended to use the original charger to charge the battery. There is a risk of fire and explosion during the charging process. Non-professionals should not operate. (COMMON BATTERY VOLTAGE can be check in Appendix 1.)

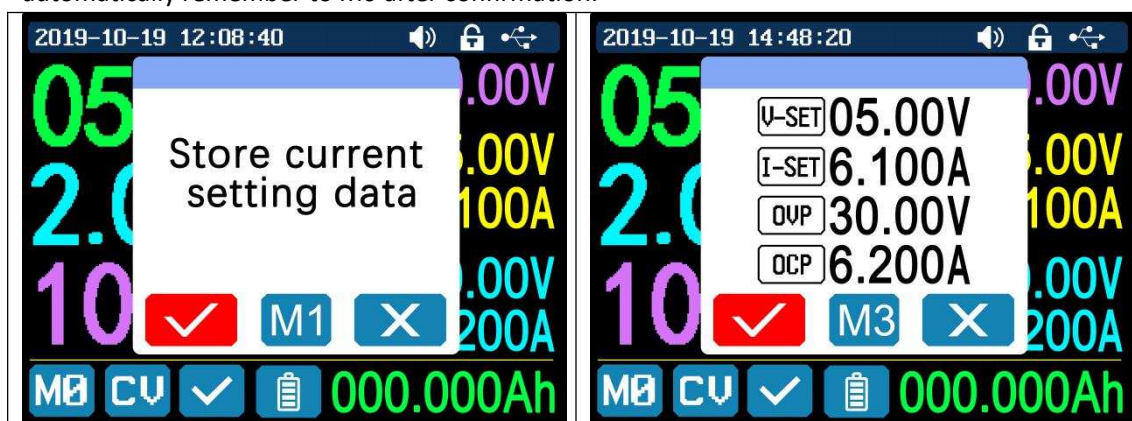
1.4.2.2 Main Page Output Voltage and Output Current Setting

Press “I-SET” button to set the output current value, you can use encoder potentiometer to adjust the output value directly, press the direction button to move the cursor. Of course you can use keypad to set the value, and press “ENTER” to confirm. If you set the wrong value, you can press encoder potentiometer to cancel.

Press “V-SET” button to set the output voltage value, the operation method is similar to output current setting.

Press “SHIFT”+ “I-SET” button or “SHIFT”+ “V-SET” button to set the over current protection/ over voltage protection value. The operation method is similar to output current setting.

M0 is the default data group when RD6006 is powered on, manually modify the settings and automatically remember to M0 after confirmation.





1.4.2.3 Data Group Quick Storage and Call out

Press “MEM”+keypad button 1-9, you can store the output voltage value, output current value, over voltage protection value, over current protection value into the corresponding data group(as shown above), then press “ENTER” to confirm, or press the encoder potentiometer to cancel.

Press “SHIFT”+keypad button 1-9 to quick call out the saved data(as shown above). Press “ENTER” to confirm, or press the encoder potentiometer to cancel.

1.4.2.4 Keypad lock and unlock

Press “SHIFT”+“LOCK” to lock or unlock the keyboard. And the keypad will be automatically locked when communication starts, there will be  displayed on the top(can not unlock manually), and the keypad will be automatically unlocked when the connection disconnected

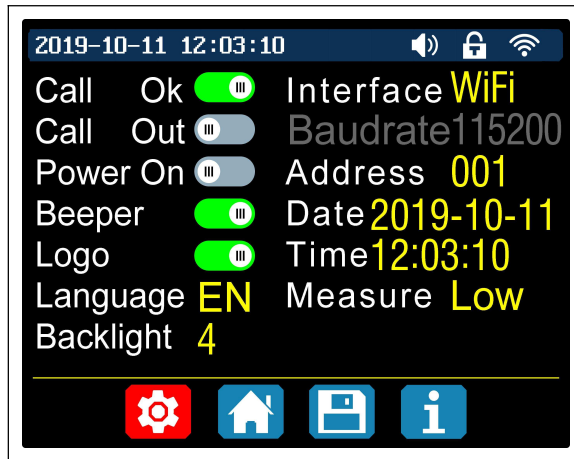
manually, there will be  displayed, the keypad will be automatically unlocked when the connection disconnected abnormally, and the power off button can be used when the keypad is locked.

1.4.2.5 System Setting

Press “SHIFT”+”MENU” to enter the system setting menu as shown on the right, press



“ENTER” to enter the menu, press direction button to select option, the option in red is the option be chosen, rotate the encoder potentiometer to change setting.

Turn on the “Call OK”, a confirmation window will pop up when you quick call out a data group. If you turn it off, the setting values will be modified directly when you call out a data group.





Turn on the “Call out”, the output will be turn on automatically when you call out a data group. If you turn it off, the output will keep the previous status.

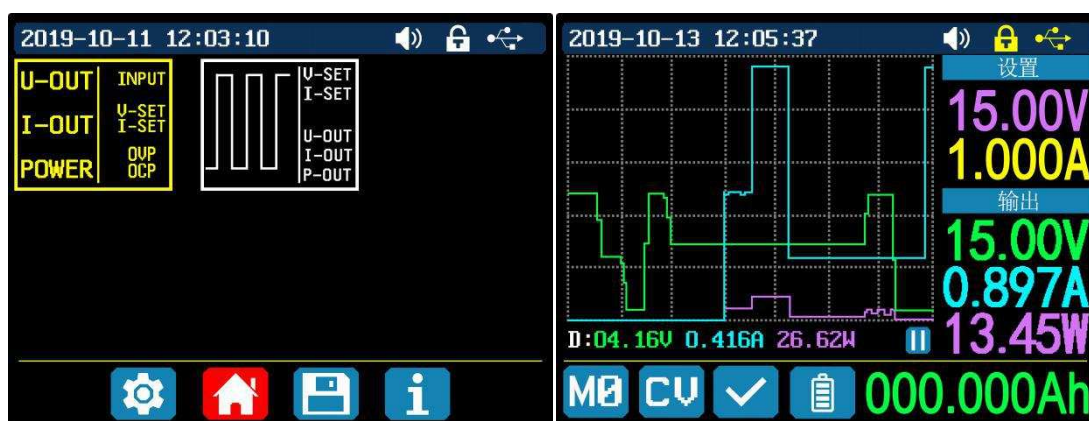
Turn on the “Power On”, it will turn on the output automatically when start. If you turn it off, the output will keep OFF status when started.

Turn on the “Beeper”, you will hear button tune when press the button, and there will be  on the top. If you turn it off, there will not be button tune when press the button, and there will be  on the top.

Turn on the “Logo”, it will display Logo first and then enter the main page when boot RD6006. If you turn it off, you will enter the main page directly.

The system language supports Simplified Chinese and English for the time being; the screen brightness can be set from level 0 to level 5; The communication interface can be set to USB, Wi-Fi or TTL, **USB** interface is the Micro-USB interface on the front panel interface, you can see the  on the top when communication starts. **Wi-Fi** interface is the Wi-Fi module connected to the communication interface, you can see the  on the top when communication starts

(connect mobile phone by Wi-Fi, but you need to choose Wi-Fi interface first, Wi-Fi module can not be installed or removed when RD6006 is powered on), **TTL** is not available for the time being; When the interface is changed, you need to reboot RD6006 to apply the modification. The baud rate can be set 9600/19200/38400/57600/115200 under USB mode; The Baud rate under Wi-Fi is fixed at 115200. Device address can be set from 001-255. You can set the date and time by rotating the encoder potentiometer, the setting will be saved immediately after modification. Please do not set a wrong time, it may cause the date to not be automatically accumulated. Press the encoder potentiometer to return, and the set value will be saved automatically. **Measure** is the refresh rate of read back voltage and current in the main page, you can set it to low, middle and high. Press encoder potentiometer to return and it will be automatically saved.



1.4.2.6 Main Page Style Setting

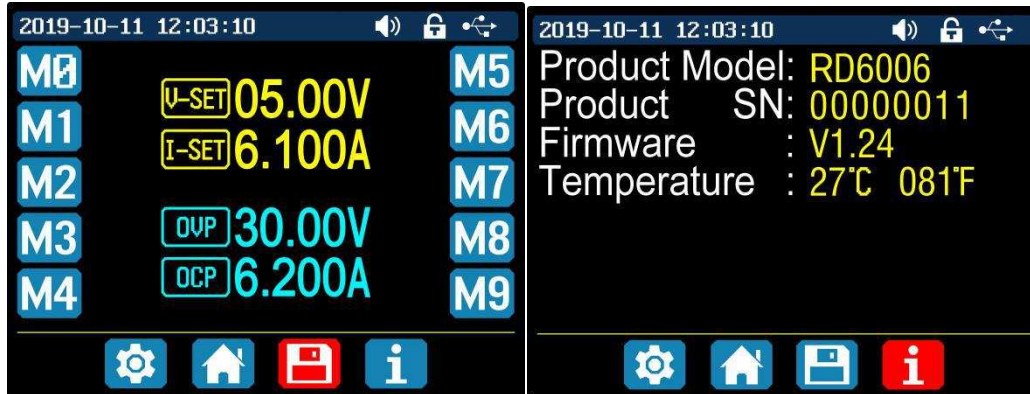
You can press SHIFT + MENU to enter the system setting menu, and then press the right button to enter the main page style setting menu as shown above. Press ENTER and then use direction button to set classic style or curve style. The pattern in red is the style be chosen. The classic style is the system default style, and the large font shows the voltage, current and power. The curve style is as shown above, the color of the three curves corresponds to the output voltage, current and power. D is the scale of the ordinate, Press “ENTER” to start or pause the curve, and the rotate encoder potentiometer to scale the ordinate of the curve.

1.4.2.7 Storage Data Setting

You can press SHIFT + MENU to enter the system setting menu, and then press the right button twice to enter the data storage setting menu as shown below, press ENTER to enter the setting menu, the icon in red is the chosen data group, press the direction button to select data group number. Press “I-SET” button to set the storage output current value, then rotate the encoder potentiometer the adjust the output value, press the direction button to move the cursor. You can also set the value with keypad, press ENTER to confirm. If you set the wrong value, you can press the encoder potentiometer to cancel. Press “V-SET” button to set the storage

output voltage value, the operation method is similar to storage output current setting.

Press “SHIFT”+ “I-SET” button or “SHIFT”+ “V-SET” button to set the storage over current protection/ storage over voltage protection value. The operation method is similar to storage output current value setting. Press encoder potentiometer to return, and the data will be automatically saved.



1.4.2.8 System Information

You can press SHIFT + MENU to enter the system setting menu, and then press the right button three times to enter the system information menu as shown above. You can view the SN number, firmware version and system temperature here.

Android APP Instruction

2.1 Mobile Phone APP installation

Note: This product mobile APP function only supports Android 5.0 system or above. During the APP installation process, it will apply for location service. Please agree and turn on the location service. After downloading the mobile APP zip-file, please install the APP in file manager.

Don't install or remove Wi-Fi module when the power is on, or else it will be damaged.

2.1.1 APP download:

You can download the RD6006 APP zip-file in this URL:

https://drive.google.com/open?id=17V-JWHvqMF-NuWSznEij4RKrn_Pkt5v

2.2 Installation Introduction

After the installation, you can see the icon as shown below:

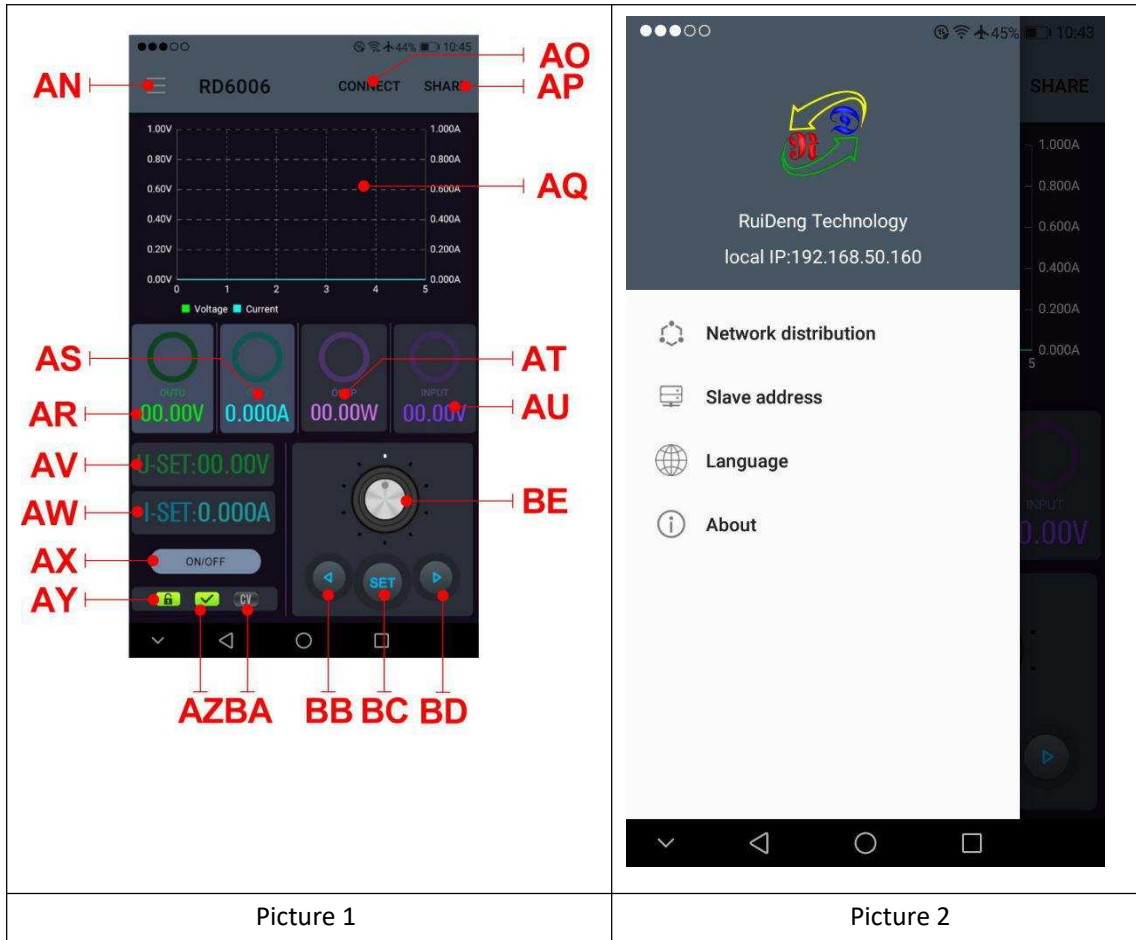


2.2.1 APP Start-up

Click the APP icon, After the APP starts, it will automatically detect whether there is a updated version, and it will remind you by popping the window.

2.2.2 APP Interface Display

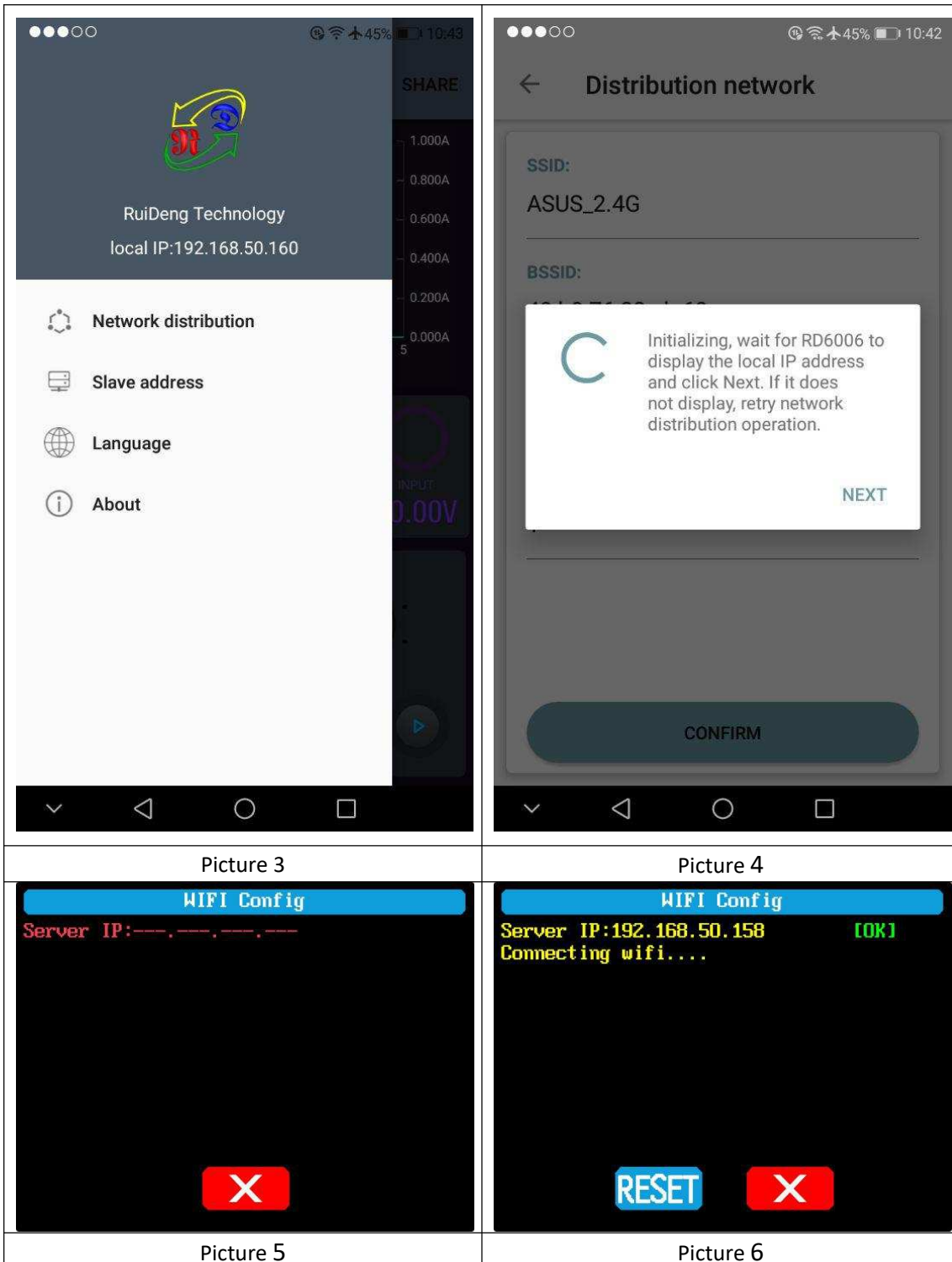
When updated to the latest version, the main interface of APP as shown below in Picture 1:

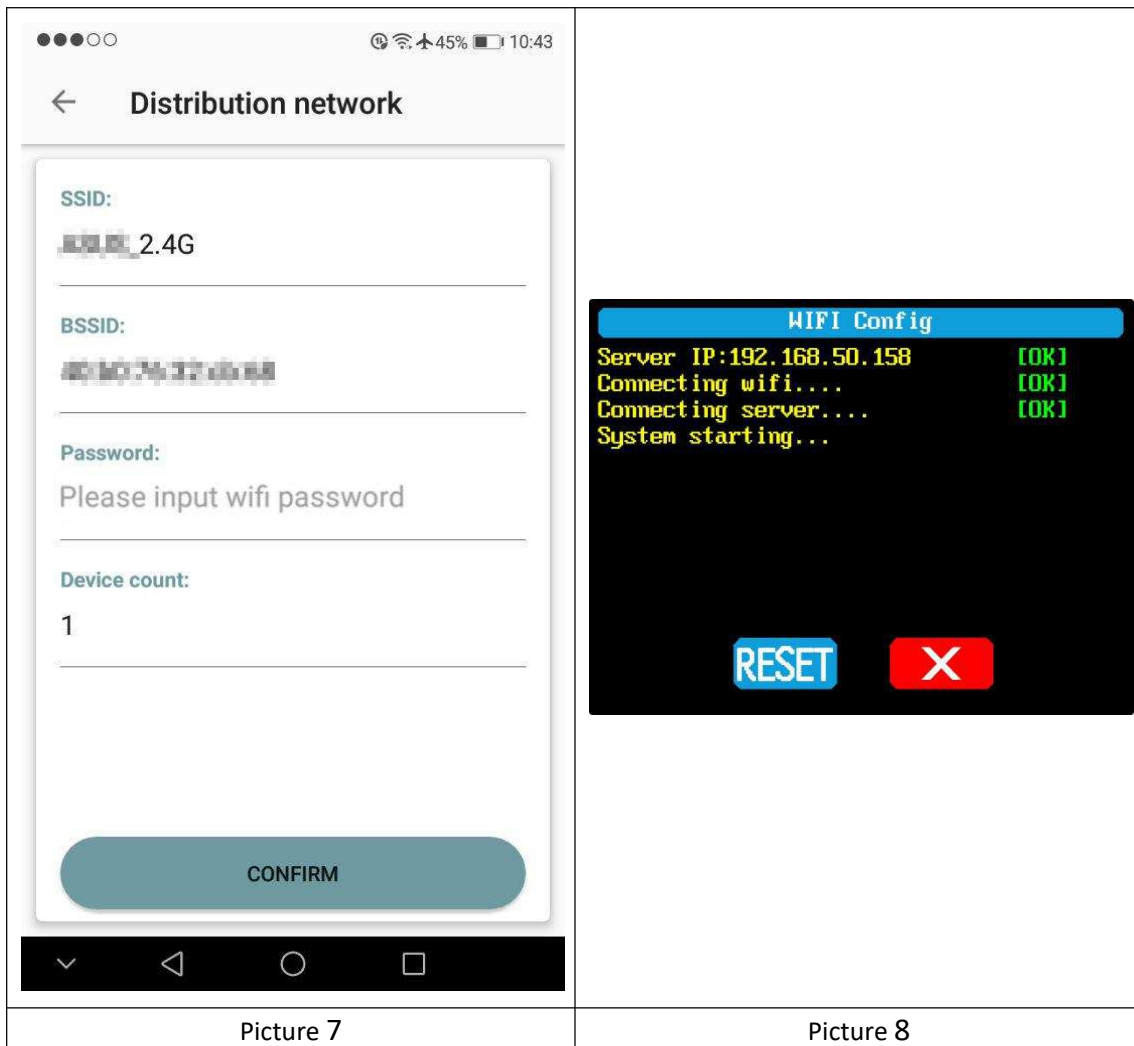


- AN: call out/ shut down sidebar
- AO: connection button
- AP: export data to mobile phone folder (Mobile phone memory or SD card root directory, repeated writing, can directly generate graphs in Excel), and can share files to other APP.
- AQ: voltage and current curve
- AR: actual output voltage
- AS: actual output current
- AT: output power
- AU: input voltage
- AV: preset voltage value
- AW: preset current value
- AX: ON/OFF switch
- AY: keypad lock indication
- AZ: protection status indication
- BA: constant voltage/ constant current status
- BB: move the cursor to the left
- BC: settings
- BD: move the cursor to the right
- BE: setting wheel

2.2.3 APP Connection and Operation

2.2.3.1 Network Distribution





Connect Wi-Fi for the first time, the RD6006 and the mobile phone are placed close to the 2.4G router (the mobile phone must also be under the same 2.4G network, and the router must disable the AP isolation function).

Set the communication interface to WIFI, restart, RD6006 will wait for the phone to connect as shown in Picture 5. Presses **“AN”** to call out the sidebar, clicks on the **“Network distribution”** as shown in Picture 3. There will be “Initializing...” displayed on the screen as shown in Picture 4.

After waiting for a while, the RD6006 will obtain the IP address of the mobile phone as shown in Picture 6. Then click “Next”, fill in the WIFI password as shown in Picture 7, click "CONFIRM" below, wait for a while RD6006 will automatically restart, the distribution network is successful, return to the main interface and click **“AO”**(Connection). If the distribution network fails, please power off the module and re-operate in the same way (multiple networking failures you can try to replace the router or use the hotspot of the mobile phone to test).

2.2.3.2 Proper Wi-Fi Connection

When power on RD6006, it will connect Wi-Fi first, and then detect if it can be connected to APP as shown in Picture 8(the APP must already be running). If the IP address of the phone has changed, you need to press the “left direction” button and then press “ENTER” button to reset the net, repeat 2.2.3.1 operation.

2.2.3.3 APP Functions

Click **"AV"** to set the output voltage, and use the wheel **"BE"** to adjust the value, the **"BB"**, **"BD"** to change the position of cursor, click **"BC"** to set the parameter. Click **"AP"** to exports the voltage-current curve to excel file, up to 24 hours document can be recorded.

NOTE:

1. There are many kinds of Android phone, so the user interface maybe different on some brand phones or different scales of the same brand.

2. Application permission requirements, allow the necessary permissions when the APP is installed (allow background running, using Bluetooth, operation on the folder, reading the application list, etc.) and also set the permissions of the APP after installation: Allow background running, never shut down when lock screen, allow self-starting(it is used to prevent the system from forcibly exiting the APP when recording data), etc.

PC Software Installation and Operation Instruction

Requirement: the PC system must be Win 7 or above, and the computer has Internet connection.

This PC software is designed by Hangzhou Ruideng technology CO., LTD, it has no virus, if your anti-virus software prompts for a virus warning, please allow all its features, otherwise it will affect the normal operation of the software.

RD6006 digital power supply file download link:

https://drive.google.com/open?id=17V-JWHvqMF-NuWSznEiJ4RKrnn_Pkt5v

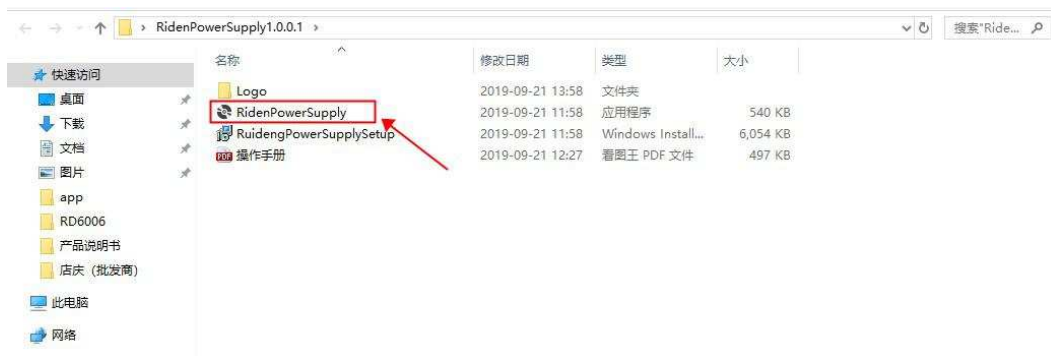
3.1 Software Installation

3.1.1 Unzip Files

Unzip files and double-click **CH341SER.EXE** first to install the driver, operate according to the installation, click [Next] until succeed.

3.1.2 Software Installation

Double click RidenPowerSupply.EXE to install the PC software, and it will automatically detect if **.NET Framework 4.7.2** is installed, if not, **.NET Framework 4.7.2** will be installed automatically.



3.2 Software Operation

3.2.1 Installation Succeed

Double click **Riden Power Supply** on the desktop to enter the PC software.



3.2.2 PC Software Operation Instruction

Choose the right communication port, baud rate, slave address(default 001), click

“CONNECT” to start communication. If the communication succeeds, the power supply button will be locked automatically, the buttons will automatically unlock after 3 seconds of accidental disconnection, and the “CONNECT” turns to “DISCONNECT”; Click “ON” to turn on the output of the power supply, and it will turn to “OFF”.



3.3 Functions Introduction

The PC software interface mainly has basic functions, firmware upgrade, Logo upgrade, version update detection and language setting...



BF: Voltage-Current Curve

BG: Battery information/Data Group Quick Call Out

- BH: Calibration
- BI: Input Voltage
- BJ: Actual Output Voltage
- BK: Actual Output Current
- BL: Actual Output Power
- BM: System Temperature(°C)
- BN: System Temperature(°F)
- BO: Constant Voltage/ Constant Current Status
- BP: Protection Status Indication
- BQ: Screen Brightness Setting
- BR: Synchronize System Time
- BS: Output Current Preset value
- BT: Output Voltage Preset value
- BU: Firmware Version
- BV: Serial Number
- BW: Product Model

3.3.1 Basic Functions

The basic functions of PC software: voltage/current preset, data group quick call out, calibration fine tuning, brightness setting, voltage and current curve exporting. You can rotate the wheel or type numbers to set the voltage and current, the graph above the button shows the real-time voltage and current curve.



3.3.2 Firmware Upgrade

Press and hold “ENTER” and power on RD6006, enter the boot mode, then connect it to computer, there will be “boot mode” in the mode information text box, then click “FirmUp”, a firmware upgrade prompt will pop up on the interface, and click “Upgrade Now” to upgrade. (You

can upgrade the firmware under the APP mode, if it can not be started up normally, you should press and hold the “ENTER” button and power on, upgrade it under boot mode.)



During the firmware upgrade process, the interface is displayed as follows:



3.3.3 Calibration Fine Tuning

The calibration fine-tuning function needs to be operated by a professional electronic person who has more than five and a half multimeters. It will change the system setting, incorrect operation may exceed the hardware limit and cause damage, and the resulting damage is not covered by the warranty! The limit error of the product is generally much smaller than the nominal error, when the error is close to or even higher than the nominal error, you need to check if the measuring instrument is accurate.

Click “Calibration Fine Tuning” and enter the password “168168”, you can enter the

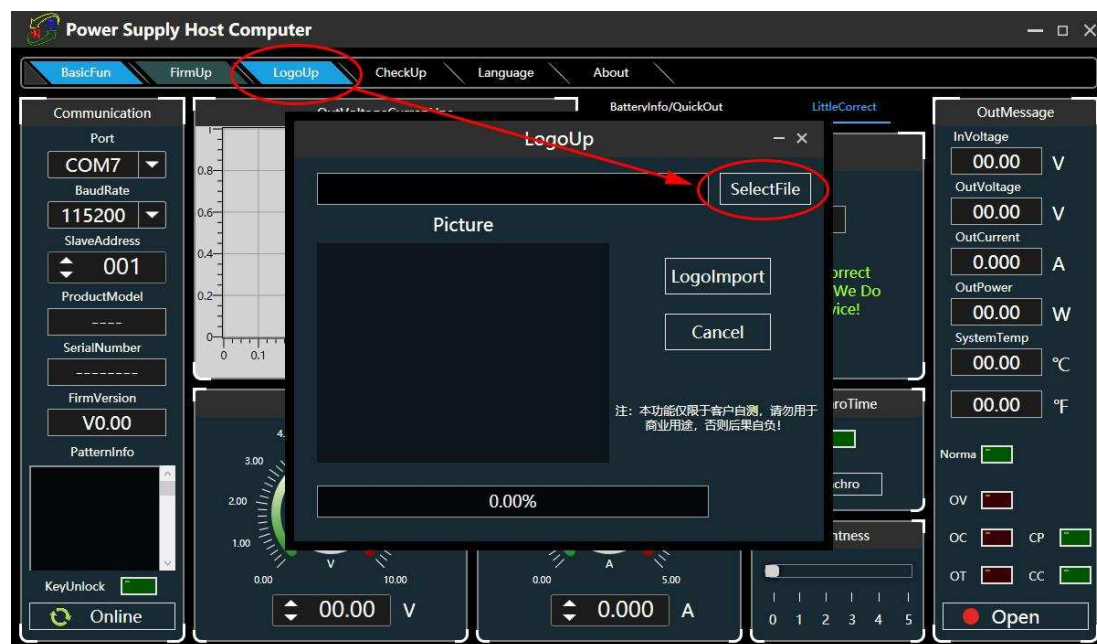
Calibration Fine Tuning page(if you enter the password, By default you have accepted the above red letter agreement). It can read the calibration data after connection, click the arrow to fine tuning the data. According to the linear function $y=kx+b$, the constant b is equivalent to the zero value, the slope k is equivalent to the proportional value, adjust this two values so that the the data will be close to the real value.

Set the output voltage at 1V, adjust the output voltage zero point to make the multimeter display close to 1V, then set the output voltage at 30V, adjust the output voltage proportional value to make the multimeter display close to 30V. In the same way you can set 0.1A and 3A output current to calibrate the the zero point and proportional value of the output current.

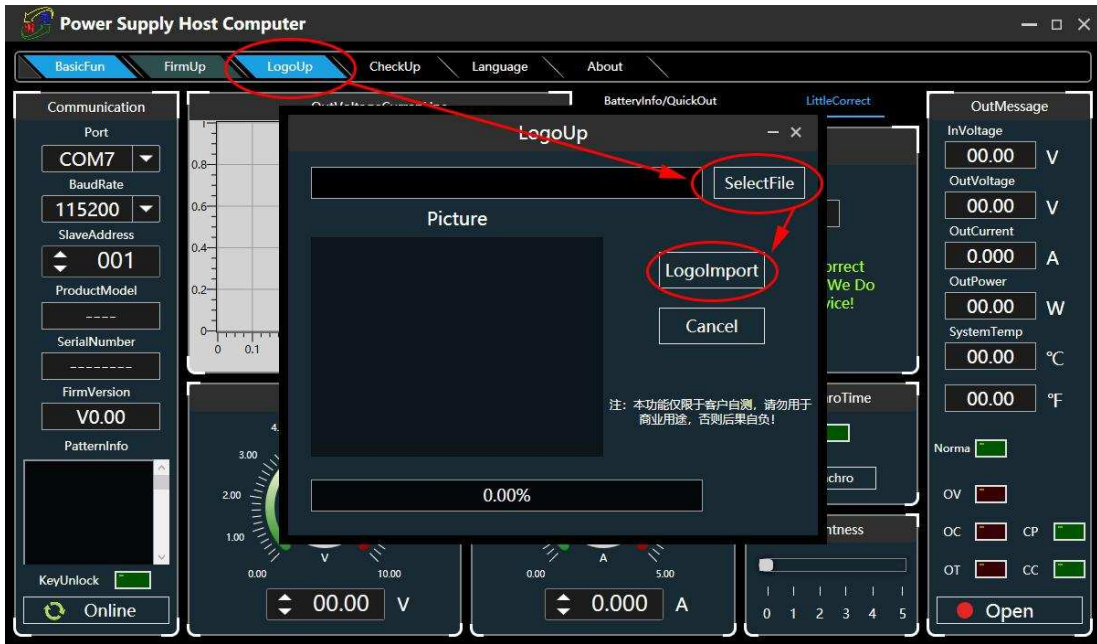
Set the output voltage at 1V and calibrate the actual output voltage zero point to make the actual output voltage displayed on RD6006 close to the value on multimeter. You can set 30V and calibrate the proportional value of actual output voltage. In the same way you can set 0.1A and 3A to calibrate the zero point and proportional value of the actual output current.(This section does not provide technical support. If you do not understand, please check the related information).

3.3.4 Logo Update

Click **“LogoUp”**, a Logo upgrade prompt will pop up on the page, please select a picture with a size of 320x240 and a resolution of 96dpi (At present, only fixed-size image updates can be used at the moment, and we will add new function that you can use any size image and the image will be cropped and imported later. Some logo samples can be tested in the installation package)



Click **“LogoImport”** and RD6006 will reboot automatically.



3.3.5 Version Update Detection

Click **“CheckUp”**, the software will automatically detect if there is a new version, if so, a update prompt will pop up on the interface.



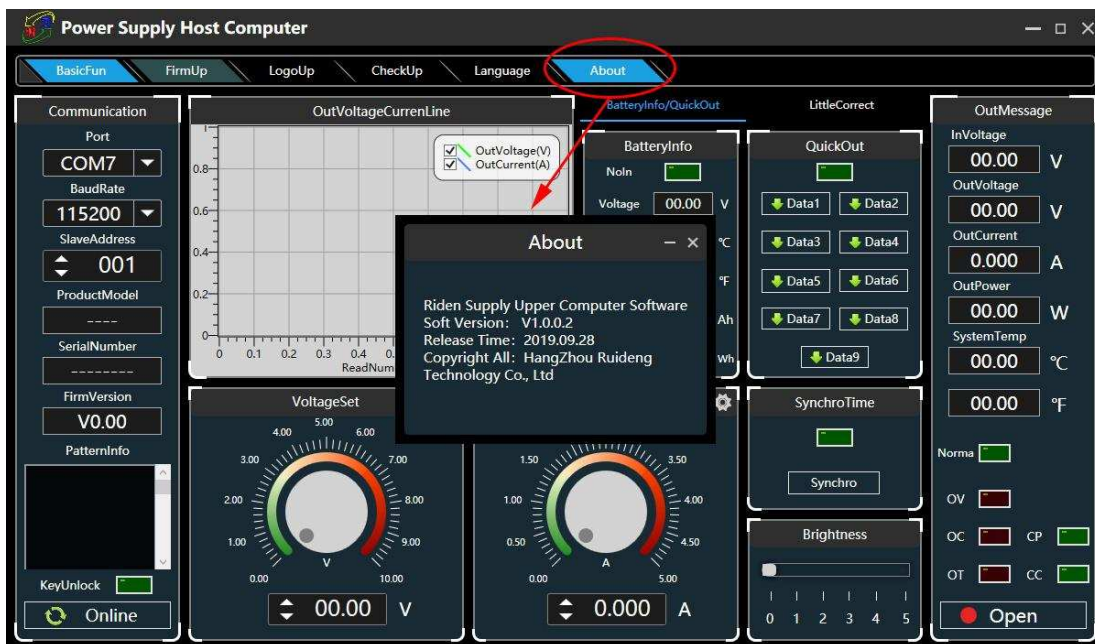
3.3.6 Language Setting

Click **“Language”**, a language setting prompt will pop up on the interface, you can choose Simplified Chinese or English.



3.3.7 About

Click "About", you can check the version number, publish time and copyright Information.



Appendix 1: Common Battery Voltage Comparison Table

Battery Type	Nominal Voltage (V)	Max Voltage (V)	Min Voltage (V)	Application	Characteristics
LiCoMnNiO ₂	3.7	4.2	3	Digital Device	High capacity, rechargeable
Lithium Phosphate Battery	3.2	3.65	2.5	Electric bike / electric tool	Large discharge current, rechargeable
Lead Storage Battery	2	2.4	1.75	Car / electric bike	Inexpensive rechargeable
Dry Battery	1.5	--	0.9	Widely used	Inexpensive widely used not rechargeable
NICD Battery	1.25	1.5	1.1	Toy	Rechargeable Inexpensive Memory effect
Ni-MH Battery	1.2	1.4	0.9	Toy/Shaver	Rechargeable No memory effect

Appendix 2: Common Electric Vehicle Voltage Comparison Table

Nominal Voltage	Battery Type	Number of batteries connected in series	Discharge termination voltage (V)	Charging limit voltage (V)
72V	LiCoMnNiO2	20	60	87
	Lithium Phosphate Battery	24	60	87.6
	Lead Storage Battery	6	63	86.4
64V	Lithium Phosphate Battery	21	52.5	76.6
60V	LiCoMnNiO2	17	51	71.4
	Lithium Phosphate Battery	20	50	73
	Lead Storage Battery	5	52.5	72
48V	LiCoMnNiO2	14	42	58.8
	Lithium Phosphate Battery	16	40	58.4
	Lead Storage Battery	4	42	57.6
36V	LiCoMnNiO2	10	30	37
	Lithium Phosphate Battery	12	30	43.8
	Lead Storage Battery	3	31.5	43.2
24V	LiCoMnNiO2	7	21	29.4
	Lithium Phosphate Battery	8	20	29.2
	Lead Storage Battery	2	21	28.8