User Manual

DP100 Digital Power User Manual

High Performance Digital Power

User Manual

ALIENTEK

Revision history

Version	Date	Modify
V1.0	2022/06/11	First release
V1.1	2022/07/10	Modify some details，Summary of common problems, etc
V1.2	2023/08/01	Add instructions for reverse protection and startup output settings

Contents

Thank you for purchasing this product. We recommend that you spend some time reading this user manual in order that you fully understand all the operational features it offers.

Safety Instructions

1， The Type-C power supply range of DP100 is DC4.8V~36V. It will enter under voltage lockout status and disable output when below 4.8V, and may be damaged when exceeds 36V ! It is recommended to use 5V~32V power supply.
2， Ensure the input voltage is higher than output voltage, because DP100 working in Buck mode.
3， DC-TypeC cable is needed when use DC adapter for DP100. It is strongly recommended to connect DC-TypeC cable to the DP100 first, then connect the DC adapter to DC-TypeC cable, which can protect the Type-C interface and extend the service life of the interface.
4， When supplies power to inductive and capacitive loads, it is recommended to connect the load first, and then turn on the DP100 output!
5， When the output is greater than 20V, please do not perform short-circuit test repeatedly, otherwise the device may be damaged!
6， The negative terminal of the USB-A interface is GND, but the 4.0 banana plug output negative terminal is not GND, so do not use it short-together.
7， When the output at high power mode, there will be a certain degree of heat, which is a normal phenomenon. It is recommended to use it in a well-ventilated environment.
8， The Type-C power supply interface supports PD/QC protocol, and the default power supply voltage is the highest voltage that the fast charger can supports.
9， Some PD fast charging heads have stricter requirements. If the input capacitor of DP100 is not empty, it will causes a failure of protocol detection. In this case, unplug the power supply and wait 3~5 min until the input capacitor of DP100 is fully discharged, then connecting it again.
10， When DP100 is used to charge batteries, it is strongly recommended to add an anti-backflow module(eg. Schottky diode) at the output end to protect the device from damage!

1， Product Introduction

DP100 is a high-performance digitally controlled DC step-down regulated power supply，The product mainly has the following characteristics:

- Type-C supports DC5~32V power supply, supports PD/QC charger and power bank
- Support output voltage 0~30.00V, resolution 0.01V, accuracy 0.1%
- Support output current 0~5.000A, resolution 0.001A, accuracy 0.1%
- High conversion efficiency up to 97% at 100W(30V, 3.334A) , low calorific value
- Low ripple output, full load ripple <10mVp-p, smooth power-on curve, no overshoot
- 10 groups of preset outputs, which can be called out directly, convenient and quick
- Hardware constant voltage and constant current circuit, intelligent anti-burning

- Various complete protection circuit, safer to use
- Support multiple (≤3) devices in series to achieve higher voltage output or positive-negative voltage output
- USB-A interface host mode (USBH) supports output 5V/1A, supports wired/wireless mouse driver
- USB-A interface slave mode (USBD) supports communication with the PC and supports firmware upgrade
- Rich display, using 0.96-inch 160*80 high-definition IPS screen, the display content is more delicate
- Customized mold, humanized angle design of display and control panel, convenient for users to operate and observe. Small size, easy to carry

2，Technical Parameter

Items	Description
Input parametres	Input voltage range：DC5.0~32V，100mA~5A Supports PD/QC charger and power bank
Output parametres	4.0mm banana plug interface: 0~30V，0~5A，100W(Max) USB-A interface (USBH): 5V/1A(Input>5.5V/1A)
Setting resolution	Output voltage: 10mV Output current: 1mA
Setting accuracy	Output voltage: ≤ 0.1% ± 5mV Output current: ≤ 0.1% ± 3mA
Readback resolution	Input voltage: 0.01V Output voltage: 0.01V Output current: 0.001A
Readback accuracy	Input voltage: ≤ 0.2% ± 10mV Output voltage: ≤ 0.1% ± 10mV Output current: ≤ 0.1% ± 5mA
Load regulation	Voltage: ≤ 0.05% ± 5mV Current: ≤ 0.1% ± 3mA
Power regulation	Voltage: ≤ 0.05% ± 5mV Current: ≤ 0.1% ± 3mA
Ripple and Noise	Output voltage: ≤ 2mVrms, 10mVp-p Output current: ≤ 1mArms, 3mAp-p
Temperature coefficient of output	Output voltage: ≤ 200ppm Output current: ≤ 200ppm
Full load efficiency	≤97% @100W(30V, 3.334A)
Working environment	0℃~40℃，0~75%RH
Size and weight	100.4mm*62.2mm*17.2mm / 95g

Table1.1 Characteristic

3，Packing list

- DP100 host 1pcs
- A-A USB cable 1pcs
- DC-TypeC cable 1pcs
- Alligator clip power cord(Black) 1pcs
- Alligator clip power cord(Red) 1pcs
- Simple paper manual 1pcs
- zipper bag 1pcs
- 32V 3A Power Adapter (Optional)
- GaN Charger 65W (Optional)
- C2C cable 100W (Optional)

4，Quick Start

4.1 Appearance description

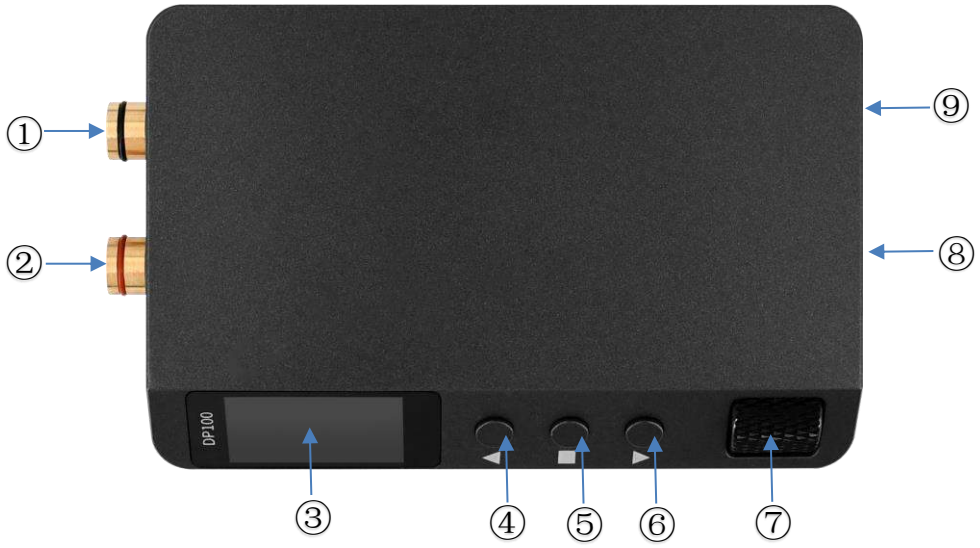

Figure 4.1.1 DP100 Appearance

Description

① 4.0mm banana plug interface Negative
② 4.0mm banana plug interface Positive
③ 0.96-inch high-definition IPS screen
④ Left button◀
⑤ Middle button■
⑥ Right button▶
⑦ Adjustment wheel
⑧ USB-A interface
⑨ Type-C power supply interface

4.2 Main Interface

4.2.1 Main interface

The main interface is used to display the main parameters, including: input voltage, output voltage setting, output constant current setting, real-time voltage output, current output, power output, output mode, working status, lock status, USB-A mode, preset group information and device temperature.

The information of the main interface is shown in Figure 4.2.1:

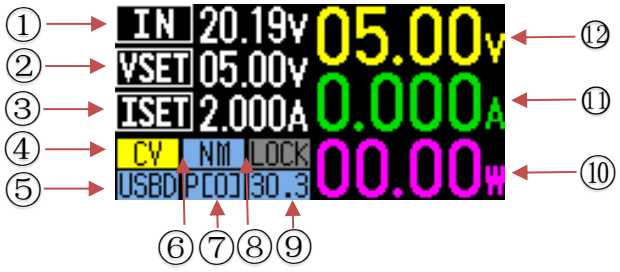

Figure 4.2.1 Main interface

① Read back voltage of input, which is power supply voltage, the unit is V.

② Output voltage setting, 00.00~30.00V, resolution 0.01V, unit V.

③ Output constant current setting, 0.000~5.000A, resolution 0.001A, unit A.

④ Output mode, including OFF mode, constant voltage output mode CV, constant current output mode CC, in CV mode, the brightness of output LED automatically changes with the voltage, and CC mode automatically changes with the current.

⑤ USB-A mode, including host mode USBH and slave mode USBD. In host mode, it can output 5V/1A , which can supply power to 5V devices, such as a USB mouse; in slave mode, it is used for communication with the PC and firmware upgrading.。

⑥ Working state, including seven kinds: normal state NM, overvoltage protection OVP, overcurrent protection OCP, overpower protection OPP, overheat protection OTP, reverse connection protection REP(can be set through menu items), undervoltage protection UVP. When it detects other states than the normal state, the device automatically turns off the output and alarms with a buzzer, and it is forbidden to turn on the output in the UVP state.

⑦ The preset output group currently used, the device supports 10 preset groups (0~9), P[0] represents preset group 0, each preset group includes output voltage setting, output constant current setting, overvoltage protection setting, overcurrent protection setting.

⑧ Panel lock state, gray means not locked, it turns orange after locking and operation is invalid, it is automatically locked after connecting to the PC, and can't be unlocked through panel.

⑨ Device temperature, unit: Celsius (°C).

⑩ Device output power, real-time display of the power value of the device, unit: watt (W).

⑪ Device output current, real-time display the output current value, unit: ampere (A).

⑫ Device output voltage, real-time display the output voltage value, unit: Volt (V).

Note: ① When disconnecting the PC, you can lock and unlock by long pressing the middle button ■; after connecting to the PC, the middle button is invalid and cannot be unlocked through the control panel.

② When communicating with the PC or upgrading the firmware, please set the USB-A interface to slave mode(USBD) first, then use the A-A USB cable to connect PC and DP100.

③ When we need output 5V from USB-A interface, or use a mouse (wired and wireless) to control the device, please set the USB-A interface to the host mode (USBH), then connect the mouse/mouse wireless receiver. First do not move the mouse, then roll the mouse wheel until the device emits a beeping sound (when the mouse wheel is detected), the left, middle, right buttons and the scroll wheel of the mouse correspond to the 3 buttons and scroll wheel of DP100 one-to-one, and the functions are the same (after shutdown or switching to slave mode, the mouse control is invalid).

4.2.2 Operation instructions

Click the middle button ■ to enter the parameter setting state, click ■ again to switch the output voltage setting and constant current setting cyclically，After the parameter bit is highlighted, click the ◀ or ▶ to move the parameter highlight position left or right, and then adjust the highlighted value by scroll wheel, as shown in Figure 4.2.2:

Figure 4.2.2 Parameter setting

After the parameter adjustment is completed, you can long press any key to exit the parameter setting. Timeout (8Sec) automatically exited parameter setting.

In the parameter setting state, the functions of the buttons and the scroll wheel are shown in Table 4.2.1:

Buttons	Click	Double-Click	Long-Press
Left◀	Shift left the highlighted bit	None	Exit parameter setting
Middle■	Switch voltage and current parameter	None	Exit parameter setting
Right▶	Shift right the highlighted bit	None	Exit parameter setting
Wheel	Adjust the highlighted value		

Table 4.2.1 Button and Wheel function

After exit parameter setting， buttons function are shown in Table 4.2.1:

Buttons	Click	Double-Click	Long-Press
Left◀	Power on while off	Change USB-A interface mode	Power off while on
Middle■	Enter parameter setting	Switch to Menu Interface	Lock/Unlock panel
Right▶	Enable/Disable output	Change supply voltage(PD/QC mode)	Switch to Preset Interface

Table 4.2.2 Button function

Change output mode, including OFF mode, constant voltage mode CV and constant current mode CC, as shown in Figure 4.2.3:

Figure 4.2.3 Output mode

Red indicates abnormal working status, including overvoltage protection, overcurrent protection, overpower protection, overheating protection, undervoltage protection, reverse connection protection, and turn off the output, as shown in Figure 4.2.4:

Figure 4.2.4 Abnormal working status

USB-A mode switching, including USBD mode and USBH mode, as shown in Figure 4.2.5:

Figure 4.2.5 USB-A mode

Changing preset groups (P[0]~P[9]), as shown in Figure 4.2.6:

Figure 4.2.6 Change Preset group

Temperature and panel lock status, as shown in Figure 4.2.7:

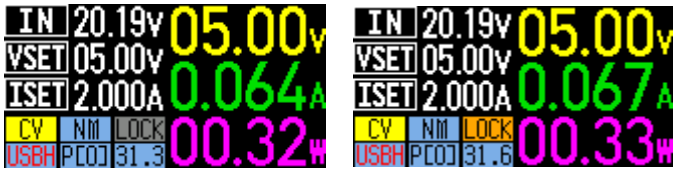

Figure 4.2.7 Temperature and panel lock status

4.3 Preset Interface

4.3.1 Preset interface

The preset group is used to set output parameters in advance, including output voltage parameters, constant current parameters, overvoltage protection parameters, and overcurrent protection parameters. DP100 supports 10 preset groups (0~9), each preset group can be set, saved, and recalled independently. Users can set output parameters (1.8V, 3.3V, 5.0V, etc.) according to their own needs. After setting, preset groups can be directly called out and used, and there is no need to set voltage and current every time, which is convenient and quick.

Long press the right button ▶ and enter the Preset interface, the information of the preset interface is shown in Figure 4.3.1:

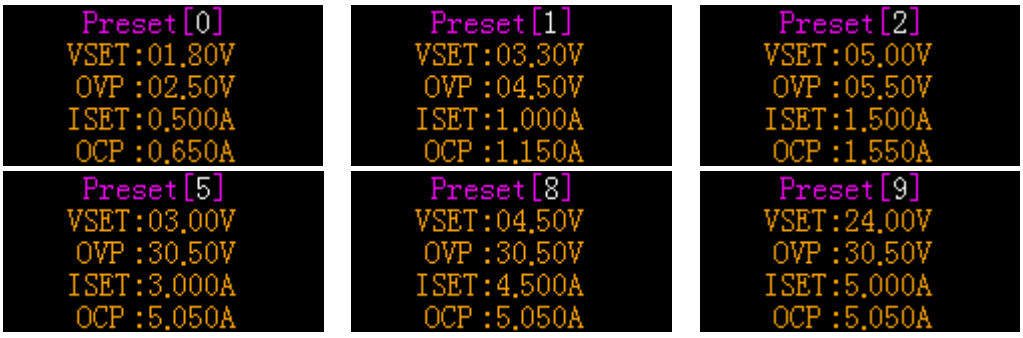

Figure 4.3.1 Preset interface

① Preset[x] : Current preset group, x=0~9;
② VSET: Output voltage setting, range 00.00V~30.00V;
③ OVP: Overvoltage protection setting, range 00.00V~30.50V;
④ ISET: Output constant current setting, range 0.000A~5.000A;
⑤ OCP: Overcurrent protection setting, range 0.000A~5.050A;

4.3.2 Operation instructions

Long press the right button ▶ and enter the preset interface, then click the middle button ■ to switch 5 parameters cyclically，After the parameter bit is highlighted, click the ◀ or ▶ to move the parameter highlight position left or right, then adjust the highlighted value by scroll wheel, as shown in Figure 4.3.2:

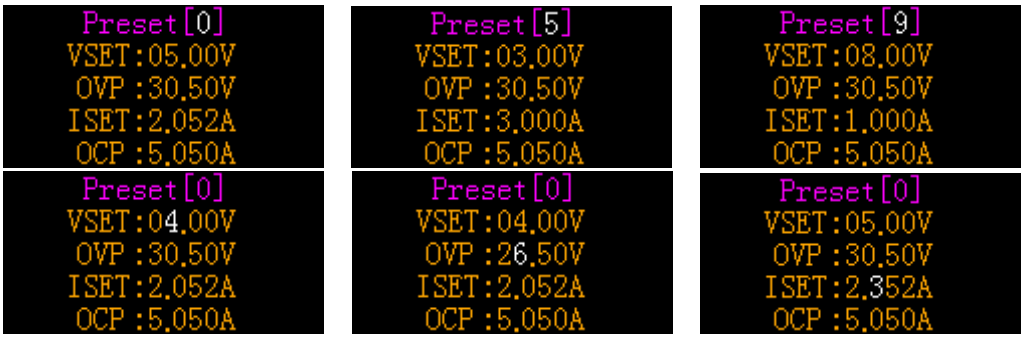

Figure 4.3.2 Parameter adjustment

After the parameters are adjusted, long press the middle button ■ to save the current preset group parameters, long press the left button ◀ to cancel preset group parameters saving and return to the main interface, long press the right button ▶ to recall current preset group parameters and return to the main interface. Timeout (6Sec) doesn't save the current preset group parameters and returns to the main interface.

Buttons and Wheel function of preset interface as shown in table 4.3.1:

Buttons	Click	Double-Click	Long-Press
Left◀	Shift left the highlighted bit	None	Cancel saving and return to main interface
Middle■	Circular switch 5 parameters	None	Saving current group parameters
Right▶	Shift right the highlighted bit	None	Recall current group and return to main interface
Wheel	Change Preset group / Adjust the highlighted value		

Table 4.3.1 Buttons and Wheel function

4.4 Menu Interface

4.4.1 Menu interface

The menu has a total of 15 items, including some common setting items. Double-click the middle button ■ to enter menu interface. The menu interface is shown in Figure 4.4.1:

Figure 4.4.1 Menu interface

The explanation of menu items, the adjustable range and factory settings are shown in Table 4.4.1:

Items	Paraphrase	Factory settings	Range
1. Exit	Exit menu setting		
2. OVP Setting	Setting current group OVP	30.50V	00.00V~30.50V
3. OCP Setting	Setting current group OCP	5.050A	0.000A~5.050A
4. OPP Setting	Setting all group OPP	105.0W	000.0W~105.0W
5. OTP Setting	Setting all group OTP	80℃	50℃~80℃ Step 5℃
6. REP Setting	Turn on/off reverse protection function	ON	● ON ● OFF
7. AUTO_Out	Turn on/off automatic output function upon startup	OFF	● ON ● OFF
8. Working voltage	Setting the working voltage when use PD/QC adapter	The highest voltage the adapter can output	● 9V ● 12V ● 15V ● 20V
9. Backlight setting	Setting backlight brightness	Level 2	Level 0~4
10. Volume setting	Setting the buzzer volume	Level 2	Level 0~4
11. USB mode	Setting USB-A mode	Slave mode USBD	● Slave USBD ● Host USBH
12. Language setting	Setting menu language	简体中文	● 简体中文 ● English ● 繁体中文
13. Theme color	Setting theme color	WHITE	● WHITE ● BLACK

14. Set default	Restore the configuration parameters to the factory state	NO	NO/YES
15. Version info	Show the software and hardware version	V1.0_1.1	

Table 4.4.1 Menu instructions

Notes:

① The working voltage is only valid when using the PD/QC power adapter. By default, using the highest voltage which the adapter can provide. If the adapter can only output a maximum voltage of 12V, even if setting working voltage to 20V, the actual working voltage can only be 12V.

② USB-A interface mode, in slave mode(USBD), the device can communicate with the PC, and used to firmware upgrade; Setting to host mode(USBH), it can output 5V/1A, which can be used to supply power to 5V devices, such as wired/wireless mouse, etc.

4.4.2 Operation instructions

On the main interface, double-click the middle button■to enter the menu interface, then scroll the wheel to select different menu items, click the ■ to set the parameters of the current menu item. If the adjustable bit of the parameter is greater than 1, you can click the ◀ or ▶ to move the parameter highlight position left or right , then adjust the highlighted value by scroll wheel. After the parameter is adjusted, click the ■ to exit the parameter setting. Timeout (6Sec) will also automatically Exit parameter setting.

After exiting the parameter setting, long press ■ or click ■ on the "Exit" menu item to exit the menu interface and return to the main interface . Timeout (6Sec) automatically return to the main interface.

After entering the parameter setting state, long-press and double-click operations of all buttons are invalid.

5，ATK-DP100 Instructions

5.1 Basic function interface

5.1.1 Basic function

The basic function interface is shown in Figure 5.1.1:

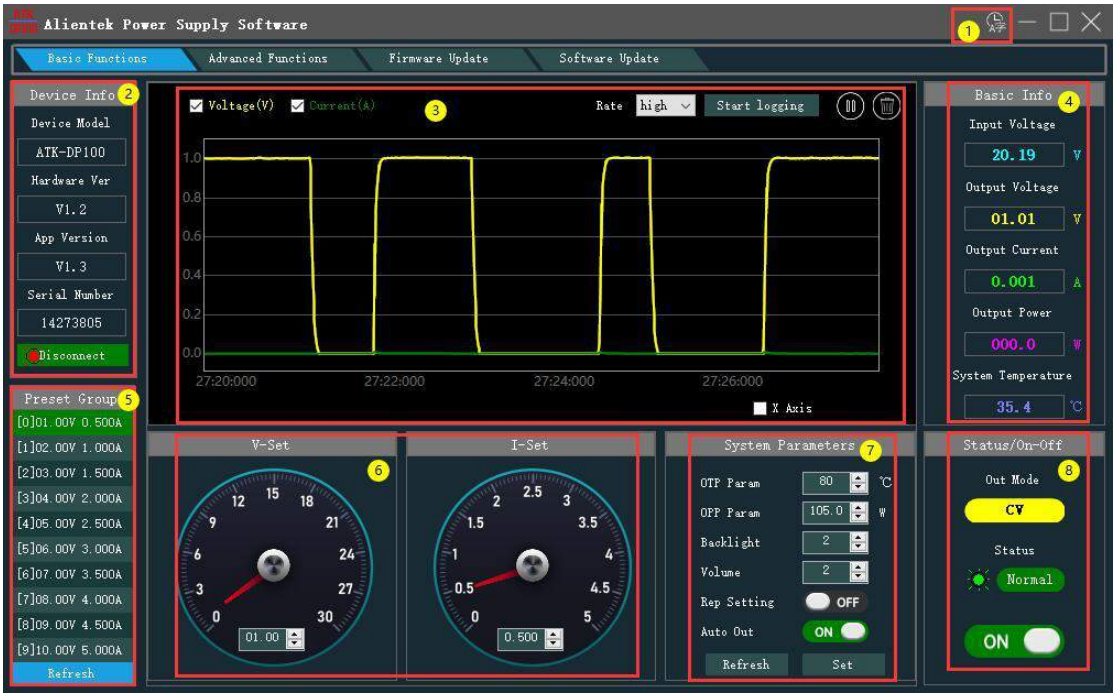

Figure 5.1.1 Basic function interface

① Language setting: Supports English, Simplified Chinese, and Traditional Chinese

② Device information column: including device type, version information and serial number

③ Waveform display area: including voltage and current waveforms. When one of the waveforms is checked separately, the waveform will be automatically zoomed and displayed. You can also zoom and drag the mouse to view it. Press and hold the right mouse button to view the voltage, current, and time of the current point.

There are 3 waveform rates: low, middle, fast

Optional display of X-axis and automatic data saving (csv format)

The waveform display can be refreshed and paused by pressing the Start/Pause button (the waveform will only be paused when the whole screen is covered); click the recycle button to clear the curve data and refresh the display. If the auto-save data is checked, the waveform data will be re-saved in segments.

④ Basic information column: including input voltage, output voltage, output current, output power and system temperature.

⑤ Preset group: The preset group is used to set output parameters in advance, including output voltage parameters, constant current parameters, overvoltage protection parameters, and overcurrent protection parameters. DP100 supports 10 preset groups (0~9, ATK-DP100 can only set the group 1 to group 9, the 0th group is reserved), each preset group can be set, saved, and

recalled separately, Users can set output parameters (1.8V, 3.3V, 5.0V, etc.) according to their own needs. After setting, preset groups can be directly called out and used, and there is no need to set voltage and current every time, which is convenient and quick.

⑥ Output voltage setting and constant current setting: Change the output voltage and constant current value of the current preset group (only change and not save, and the initial value is still the same after the DP100 is restarted).

⑦ System parameters: including overheat protection parameter setting (50~80℃), overpower protection parameter setting (≤105.0W), backlight brightness level (0~4), buzzer volume level (0~4), Rep setting(ON/OFF),Auto out setting(ON/OFF).

⑧ Status/On-Off column: There are three output modes: OFF, CV, CC; the working status includes normal status NM, overvoltage protection status OVP, overcurrent protection status OCP, overpower protection status OPP, overheat protection status OTP, undervoltage protection status UVP, reverse connection protection state REP; Output indication includes three states: open, close, and under-voltage lockout (when input voltage <4.8V).

Notes:

① After connecting to ATK-DP100, the control panel is automatically locked, and the device cannot be operated from the control panel.

② If auto-save is selected, a large csv file will be generated on disk at high refresh rate.

5.2 Advanced function interface

5.2.1 Advanced function

The advanced function is convenient for users to output the setting data according to the timing. The interface is shown in Figure 5.2.1:

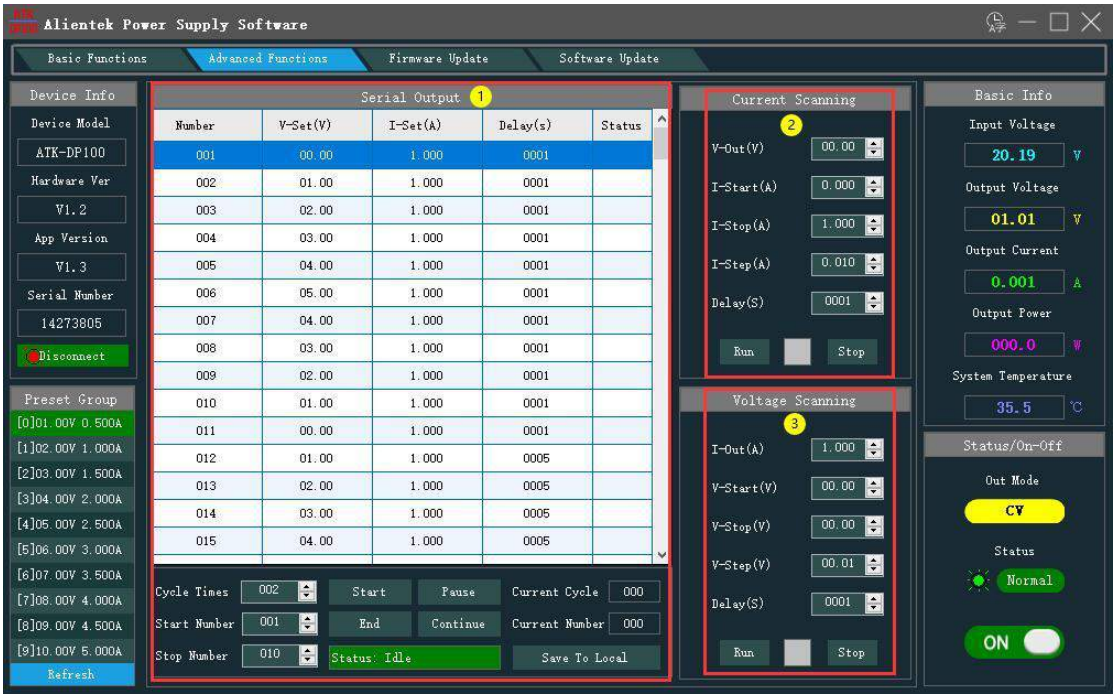

Figure 5.2.1 Advanced function Interface

① Sequence output: First set the output voltage, current and delay, select the serial number range and cycle times.

The serial number range is 001~200; the voltage setting (V-Set) range is 00.00V~30.00V; the constant current setting (I-Set) range is 0.000A~5.000A; the delay range is 0001S~9999S; the number of cycles and the current cycle range are 001~ 999; start serial number, end serial number, current serial number range 001~200;

Click to start button to execute the sequence output (other interfaces are locked and invalid), executed sequence numbers shows OK, and unexecuted sequence numbers show waiting. Click pause button to keep the current serial number output; click continue button to execute the following sequence according to the delay; click end button to end the sequence output and close the output.

② Current scan output: The voltage is fixed, the current is scanned and output according to the step current and delay, which is often used in the constant current mode. The voltage setting needs to be greater than 0V; the starting current and ending current range is 0.000A~5.000A (if the starting and ending values are the same, it is invalid); the step current range is 0.001A~5.000A; the output time is 0001S~9999S;

Click start button to execute scan output (other interfaces are locked and invalid), click stop button to stop the scan and turn off the output.

③ Voltage scan output: The current is fixed, the voltage is scanned and output according to the step voltage and delay, which is often used in the constant voltage mode. The current setting needs to be greater than 0A; the starting voltage and ending voltage range is 00.00V~30.00V (if the starting and ending values are the same, it is invalid); the step voltage range is 00.00V~30.00V; the output time is 0001S~9999S;

Click start button to execute scan output (other interfaces are locked and invalid), click stop button to stop the scan and turn off the output.

5.3 Firmware upgrade interface

5.3.1 Firmware upgrade

DP100 firmware update supports two upgrade modes: local mode and remote mode.

Local mode: Download the firmware you need (.atk file, the download address is in Chapter 7 of this document) from the download link we provided, and then upgrade according to the operation shown in Figure 5.3.2.

Remote mode: ATK-DP100 automatically obtains the latest firmware from the server and prompts the firmware version, without downloading the latest firmware by yourself. Other operations are the same as in local mode.

The remote mode upgrade process is shown in Figure 5.3.1 (requires networking):

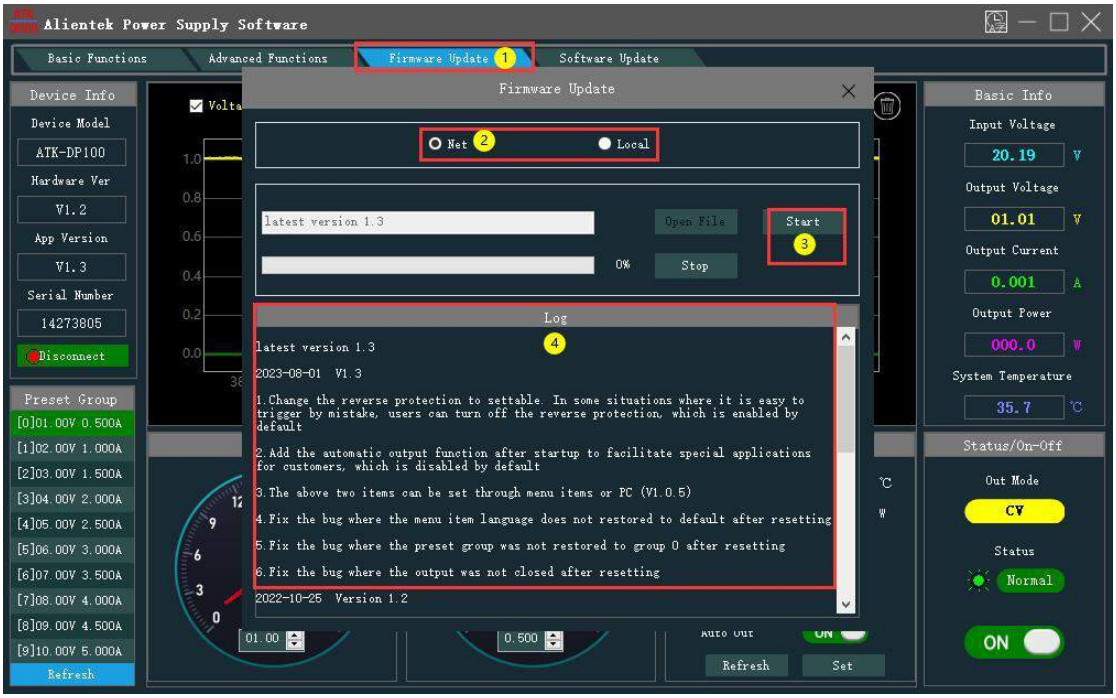

Figure 5.3.1 Remote firmware upgrade

5.3.2 Instructions

① Click Firmware Update options, the firmware update window will pop up;
② Select the remote mode, then ATK-DP100 will automatically load the latest firmware through the network;
③ Click to start the upgrade button. Start firmware upgrading when the firmware matches. If the current software version of the device is the same as the software to be upgraded, it will prompt to cancel or force upgrading, and you can choose one of them.
④ Firmware update log, detailing the updated content

Notes:

① If using the local mode, You needs to download the latest firmware (.atk file, the download address is in Chapter 7 of this document) from the download link we provided.

② If the upgrade process crashes, first unplug the Type-C power supply and the A-A USB cable of DP100, then press and hold the left button, insert the A-A USB cable and then release the button, DP100 is forced Enter the BOOT mode, and finally connect to ATK-DP100 to perform the firmware upgrade operation.

5.4 Software update interface

5.4.1 Software update

ATK-DP100 software will also be updated from time to time. Click on the software update option to view the latest software version and software update content through the log.

If necessary, click "Download the latest version to the local" to download (requires internet connection), as shown in Figure 5.4.1:

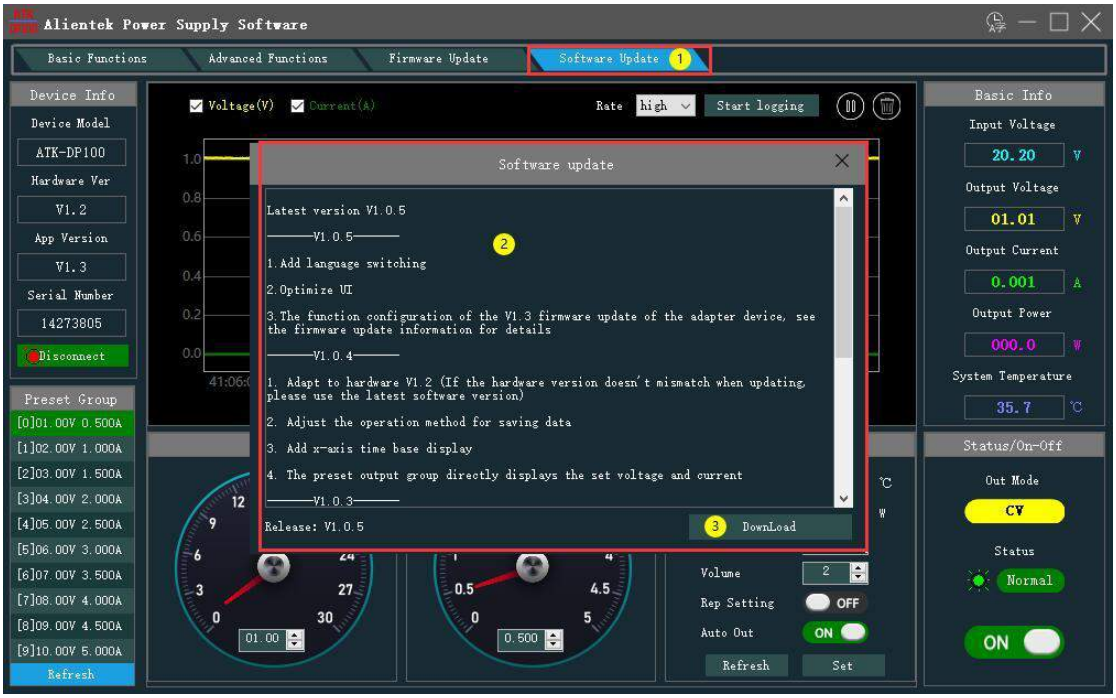

Figure 5.4.1 Software Update Interface

6，FAQ

The summary of common problems is shown in Table 6.1:

Problems and phenomena	Solution
OCP/OVP/OPP/OTP Promote	Check if the output parameters are higher than the set protection parameters, and set the protection parameters reasonably
REP/UVP Promote	REP: Check if the output terminal is reversed, UVP: Check if TypeC has correct power input
Connection failure of PC	Check if the USBA-A cable is used correctly and if the USB mode is USBD
Enter CC mode when output	Check if the ISET is set too small and increase the ISET value appropriately
No actual voltage output	1. Check if VSET is set to 0 2. Contact after-sales service
The device cannot be turned on	1. Check if the TypeC power supply is normal 2. Check if the device has been turned off, and short press the left button to turn it on 3. Contact after-sales service
Display current greater than 1mA after closing the output	Contact after-sales service
Display current greater than 1mA without load	Contact after-sales service

Table 6.1 Summary of issues

7，Serivices

1. After – sales Service:

DP100 host has a one-year free warranty service in the case of non-artificial damage. Please contact the dealer for warranty service.

2. Website

Download : www.alientek.com/download
Company : www.alientek.com
Aliexpress : www.aliexpress.com/store/1102909571

3. Contact US

E-mail : fae-smt@alientek.com