SPL Series Source-Load Integrated User Manual

For product support, visit www.owon.com.hk/download

※. The illustrations, interface, icons and characters in the user manual may be slightly different from the actual product. Please refer to the actual product.

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Fujian LILLIPUT Optoelectronics Technology Co., Ltd.

No. 19, Heming Road

Lantian Industrial Zone, Zhangzhou 363005 P.R. China

Tel: +86-596-2130430 **Fax:** +86-596-2109272

Web: www.owon.com.cn **E-mail:** info@owon.com.cn

General Warranty

We warrant that the product will be free from defects in materials and workmanship for a period of 2 years from the date of purchase of the product by the original purchaser from our company. The warranty period for accessories are 12 months. This warranty only applies to the original purchaser and is not transferable to a third party.

If the product proves defective during the warranty period, we will either repair the defective product without charge for parts and labour, or will provide a replacement in exchange for the defective product. Parts, modules and replacement products used by our company for warranty work may be new or reconditioned like new. All replaced parts, modules and products become the property of our company.

To obtain service under this warranty, the customer must notify our company of the defect before the expiration of the warranty period. Customer shall be responsible for packaging and shipping the defective product to our designated service centre, a copy of the customer's proof of purchase is also required.

This warranty shall not apply to any defect, failure or damage caused by improper use or improper or inadequate maintenance and care. We shall not be obligated to furnish service under this warranty a) to repair damage resulting from attempts by personnel other than our company representatives to install, repair or service the product; b) to repair damage resulting from improper use or connection to incompatible equipment; c) to repair any damage or malfunction caused by the use of not our supplies; or d) to service a product that has been modified or integrated with other products when the effect of such modification or integration increases the time or difficulty of servicing the product.

Please contact the nearest sales and service offices for services.

Excepting the after-sales services provided in this summary or the applicable warranty statements, we will not offer any guarantee for maintenance definitely declared or hinted, including but not limited to the implied guarantee for marketability and special-purpose acceptability. We should not take any responsibilities for any indirect, special or consequent damages.

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1. General Safety Requirements

Before use, please read the following safety precautions to avoid any possible bodily injury and to prevent this product or any other connected products from damage. In order to avoid any contingent danger, ensure this product is only used within the range specified.

Only the qualified technicians can implement the maintenance.

To avoid Fire or Personal Injury:

- **Use Proper Power Cord.** Use only the power cord supplied with the product and certified to use in your country.
- **Connect the probe correctly. The grounding end of the probe corresponds to the grounding phase. Please don't connect the grounding end to the positive phase.**
- **Check all Terminal Ratings.** To avoid fire or shock hazard, check all ratings and markers of this product. Refer to the user's manual for more information about ratings before connecting to the instrument.
- **Do not operate without covers**. Do not operate the instrument with covers or panels removed.
- **Use Proper Fuse.** Use only the specified type and rating fuse for this instrument.
- **Avoid exposed circuit**. Do not touch exposed junctions and components when the instrument is powered.
- **Do not operate if in any doubt.** If you suspect damage occurs to the instrument, have it inspected by qualified service personnel before further operations.
- **Use your instrument in a well-ventilated area.** Make sure the instrument installed with proper ventilation, refer to the user manual for more details.
- **Do not operate in wet conditions.T**o avoid the risk of internal circuit short circuits or electric shock, do not operate the instrument in a humid environment.
- **Do not operate in an explosive atmosphere.**To avoid damage to the instrument or personal injury, do not operate the instrument in flammable or explosive environments.
- **Keep product surfaces clean and dry.**To prevent dust or moisture in the air from affecting the instrument's performance, please keep the product's surface clean and dry.

2. Safety Terms And Symbols

Safety Terms

Terms in this manual. The following terms may appear in this manual:



Warning: Warning indicates the conditions or practices that could result in injury or loss of life.



Caution: Caution indicates the conditions or practices that could result in damage to this product or other property.

Terms on the product. The following terms may appear on this product:

Danger: It indicates an injury or hazard may immediately happen.

Warning: It indicates an injury or hazard may be accessible potentially.

Caution: It indicates a potential damage to the instrument or other property might occur.

Safety Symbols

Symbols on the product. The following symbol may appear on the product:

	Hazardous Voltage		Caution, risk of danger (refer to this manual for specific Warning or Caution information)
	Protective Earth Terminal		Chassis Ground
	Test Ground		

3. Quick Start

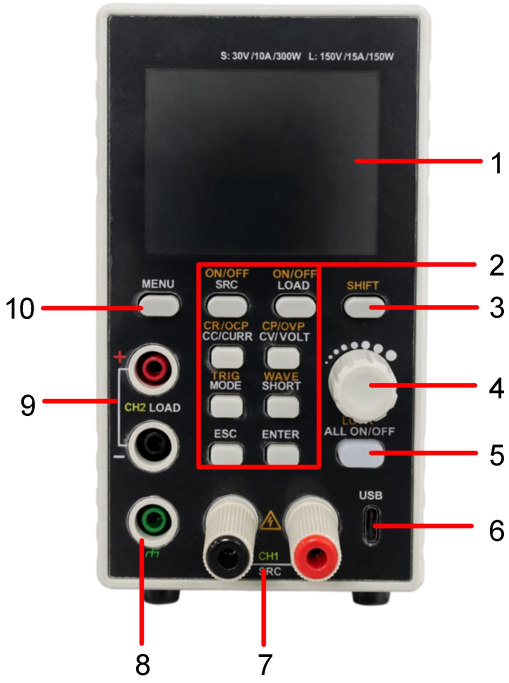
This chapter will introduce the power-on inspection steps for the instrument, ensuring that the instrument can be properly turned on and used in its initialized state. It will also cover the front panel, rear panel, button functions, and display functions of the load, ensuring that before operating the load, users can quickly understand the instrument appearance, structure, and button functionality, which will help you make better use of this series of instrument.

3.1 Product Introduction

The instrument integrates high-precision DC power supply and high-performance DC electronic load dual functions. It can work independently as a programmable DC power supply for output, or separately as a DC electronic load for load testing. It also supports combined dual-function operation to simulate the full charge and discharge process of batteries. It is mainly used for performance verification and life test of quick chargers, battery packs, energy storage devices, power modules and other products, providing an optimal one-stop solution for R&D design and production line testing.

3.2 Panel and User Interface

3.2.1 Front Panel

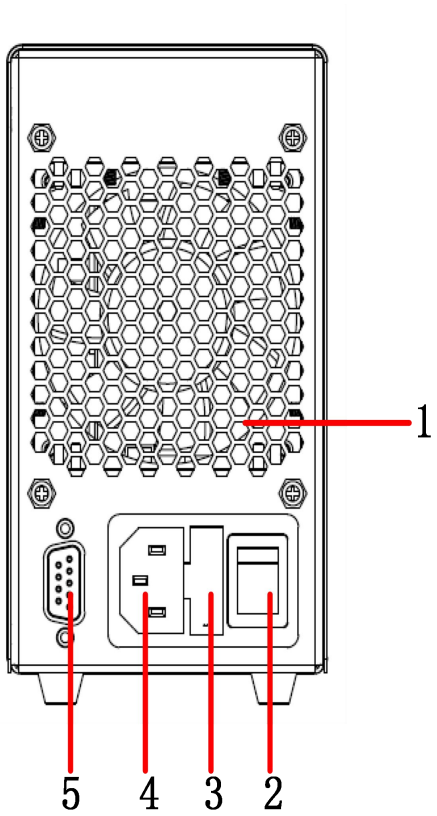


Num	Description		
1	**Display area**		Display interface.
2	**Function key**	**ON/OFF SRC**	SHIFT+: Control source output on/off independently. Select the power area; quickly return to SRC channel context on any page.
		ON/OFF LOAD	SHIFT+: Control source output on/off independently. Select the load area; quickly return to LOAD channel context on any page.

		CR/OCP **CC/CURR**	**Load mode:** ● CC/CURR: Press to enter constant current setting mode. ● SHIFT + this key serves as the shortcut for Constant Resistance mode to enter constant resistance setting interface. **Power supply mode:** ● Output current setting. ● SHIFT + this key is for OCP protection value setting.
		CP/OVP **CV/VOLT**	**Load mode:** ● CV/VOLT: Press to enter constant voltage setting mode. ● SHIFT + this key serves as the shortcut for Constant Power mode to enter constant power setting interface. **Power supply mode:** ● Output voltage setting. ● SHIFT + this key is for OVP protection value setting.
		TRIG **MODE**	Switch Load Mode: General Mode / OCP Test Mode / OPP Test Mode / Battery Test Mode / Dynamic Mode SHIFT+: Single trigger for electronic load.
		WAVE **SHORT**	**Load mode:** short circuit mode. **SHIFT+:** enter waveform interface.
		ESC	Edit Cancel or Menu Back function.
		ENTER	Confirm key.
3	**SHIFT**		Reuse function keys.
4	**Knob**		Users can turn the knob to enter programming information or options.

5	**ALL ON/OFF**	Control output status of both channels simultaneously: ON or OFF. SHIFT + this key has secondary function for LOCK.
6	**USB**	Type C USB data interface.
7	**Load +/- terminal**	DC electronic load input positive and negative terminals.
8	**PE**	Ground terminal.
9	**Power supply +/- terminal**	DC power supply output positive and negative terminals.
10	**MENU**	Enter system menu page.

3.2.2 Rear Panel



1	**Fan**	Do not block the outlet of the fan, otherwise the internal heat dissipation of the machine will lead to excessive internal temperature.

2	**Power Button**	Turn on/off the instrument.
3	**Fuse**	Power fuse.
4	**AC Power terminal**	The power supply line inputs AC power, from this connection terminal to the input terminal.
5	**DB9 terminal**	Including: RS232, RS485 and Trig In/Out; communication control can be implemented via RS232 and RS485. (Note: Different models are equipped with different optional communication interfaces.)

3.2.3 User Interface



Status Icon

Icon	Description
SHIFT	Shortcut icon
SHORT	Load short-circuit icon
	Key beep status: On (white), Off (black)
	Alarm icon: Warning active (red), Off (black)
	Key lock: On (yellow), Off (black)

3.3 General Inspection

When you receive a new instrument, it is recommended that you follow the

steps below to inspect the instrument.

1. **Check whether there is any damage caused by transportation.**
   If it is found that the packaging carton or the foamed plastic protection cushion has suffered serious damage, do not throw it away first till the complete device and its accessories succeed in the electrical and mechanical property tests.
2. **Check the Accessories.**
   The supplied accessories have been already described in Appendix A: Accessories of this manual. You can check whether there is any loss of accessories with reference to this description. If it is found that there is any accessory lost or damaged, please get in touch with our distributor responsible for this service or our local offices.
3. **Check the Complete Instrument.**
   If it is found that there is damage on the first appearance of the instrument, or the instrument cannot work normally, or fails in the performance test, please get in touch with our distributor responsible for this business or our local offices. If there is damage to the instrument caused by the transportation, please keep the package. With the transportation department or our distributor responsible for this business informed about it, a repairing or replacement of the instrument will be arranged by us.

3.4 Power-on Inspection

(1) Connect the instrument to an AC power source using the power cord supplied with the accessory.



Warning:

To prevent electric shock, make sure the instrument is properly grounded.

(2) Press the **power button** on the rear panel and the screen will be displayed .

4. Functional features and Panel operation

This chapter will provide a detailed description of the features and functions of the instrument, as well as the panel menu operations. It will be divided into the following sections:

- System menu Operation
- Source-Load Channel Selection and Operation
- Turn on/off channel output
- Local/Remote mode operation switch
- Keyboard lock function
- DC power supply output voltage/current setting
- DC power supply overvoltage/overcurrent/overpower setting
- Electronic load constant mode function operation
- Electronic load short-circuit simulation function
- Electronic load dynamic test function
- Protection Functions and Fault Information
- Test function

4.1 System Menu Operation

Press MENU to enter system function settings.

Detailed operation steps:

Press the **MENU** key to enter the setting of "Function Menu".

1. Rotate the knob to select the item to be set.
2. Press the **Enter** key to confirm.
3. Press the **Esc** key or **MENU** to return to the function menu page.

Descriptions:

1. Press the Esc key to cancel setting and return to the function menu page.
2. On any setting page, press the **CC/CURR** key, **CV/VOLT** key or **ALL ON/OFF** to quickly return to the home page.

4.1.1 System Menu

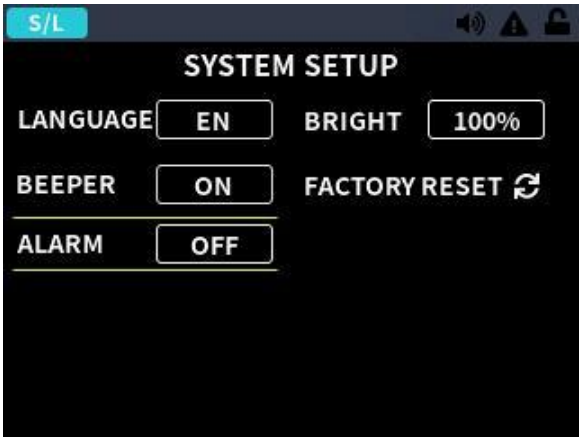


The menu of the instrument is as follows:

Menu	Description	
System Setup	Language	
	Button voice: On / Off	
	Alarm voice: On / Off	
	Brightness: 10%-100%	
	Restore factory set	
Parameter Setup	Source parameter setting	OVP/OCP
	Load parameter setting	OVP/OCP/OPP/Von/Voff/Rise slope/Fall slope/Voltage range/Current range Trigger set: Manual / Auto trigger
Mode Select	Function select: Source Load independently/Battery mode	
	Load Modes: General Mode / OCP Test Mode / OPP Test Mode / Battery Test Mode / Dynamic Mode	
Waveform Interface	Switch to waveform interface	
Remote Setup	Communication select: RS232/RS485/USB Baud: 2400-115200 Communication protocol: SCPI/MODBUS	
System Information	Device version etc.	

4.1.2 System Setting

Select System Settings to configure items including device language, beeper, alarm sound, brightness and factory reset, as shown in the figure below.



4.1.3 Parameter Setting

Select Parameter Settings to configure power supply and load parameters. Press the **Enter** key to access specific options, as shown in the figure below.

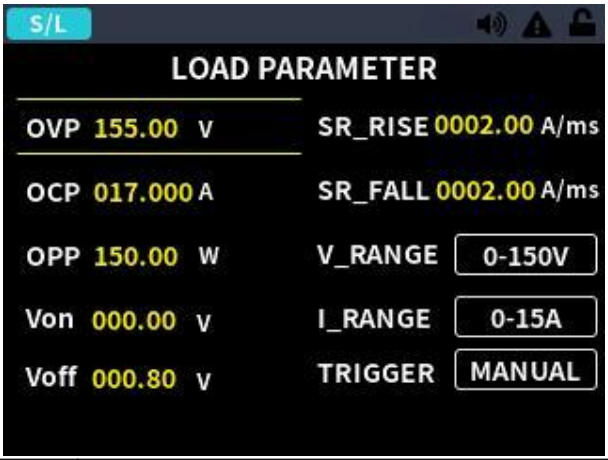


Power parameter settings are as follows:



Menu	Setting	Description
Power supply parameter setting	OVP	OVP protection is triggered when the input voltage exceeds the set OVP safety threshold.
	OCP	OCP protection is triggered when the input current exceeds the set OCP safety threshold.
	OPP	OPP protection is triggered when the input power exceeds the set OPP safety threshold.

Load parameter settings are as follows:

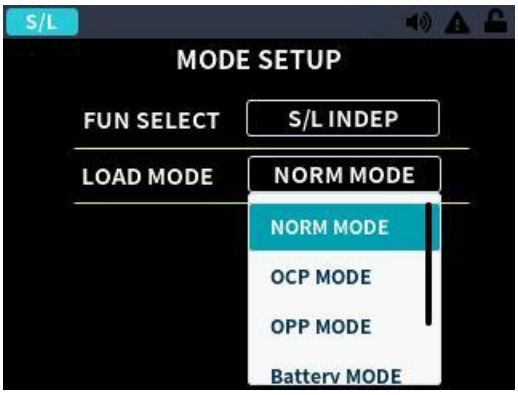


Menu	Setting	Description
Parameter setting	OVP	OVP protection is triggered when the input voltage exceeds the set OVP safety threshold.
	OCP	OCP protection is triggered when the input current exceeds the set OCP safety threshold.
	OPP	OPP protection is triggered when the input power exceeds the set OPP safety threshold.
	Load-on Voltage	The electronic load starts working normally when the input voltage reaches the set load-on voltage after connection.
	Load-off Voltage	The electronic load stops sinking current when the input voltage drops below the set load-off voltage after connection.
	Rising Slope	Set value of the rising rate of input voltage or current when the load sinks current.
	Falling Slope	Set value of the falling rate of input voltage or current when the load sinks current.
	Voltage	The supported input voltage range of the electronic

	Range	load, including high and low ranges.
	Current Range	The supported input current range of the electronic load, including high and low ranges.
	Trigger setting	Manual trigger / Auto trigger

4.1.4 Mode Setting

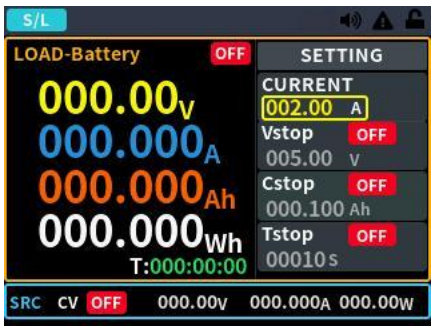
This device has two functions: separate source and load, and battery charge & discharge. For the separate source-load function, the load mode can be further configured as General Mode, OCP Test Mode, OPP Test Mode, Dynamic Test Mode and Battery Test Mode, while the source mode can work normally. The load mode can be switched via the **MODE** shortcut key when in stop status. If the electronic load is running, stop the electronic load channel first.

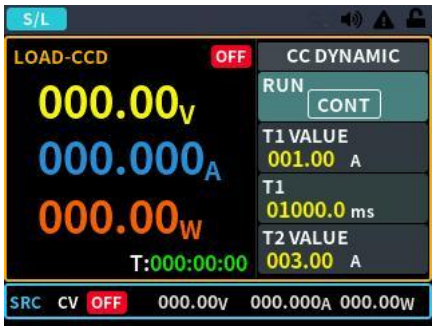


For battery charge and discharge test, the electronic load channel and source channel shall be connected in parallel.

- In charge mode, only the source terminals are connected, and the electronic load mode is unavailable.
- In discharge mode, only the electronic load mode is used, and the source mode is unavailable.



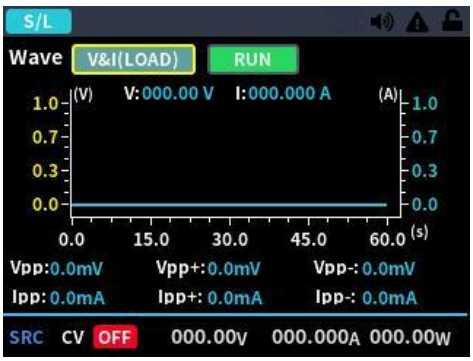




4.1.5 Waveform Display

In General Mode, the device can display the output voltage and current waveforms of the source and electronic load. The electronic load ripple measurement function is optional. Users can enter the waveform interface via the **SHIFT**+ **SHORT** shortcut key, select the waveform to be displayed in the option box, and start or stop waveform acquisition with the RUN/STOP key. The source and electronic load maintain normal output while the waveform interface is active.







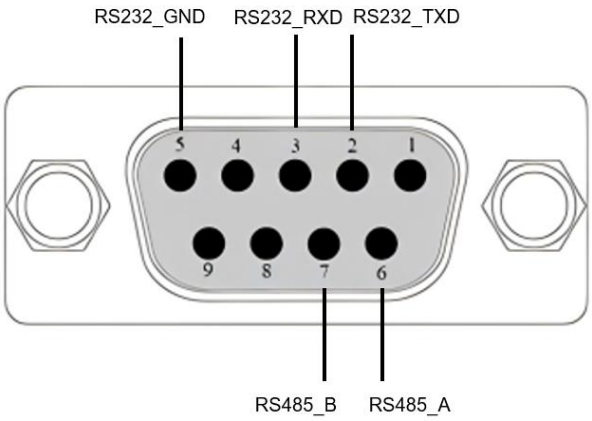


4.1.6 Communication Port and Remote Control Setting

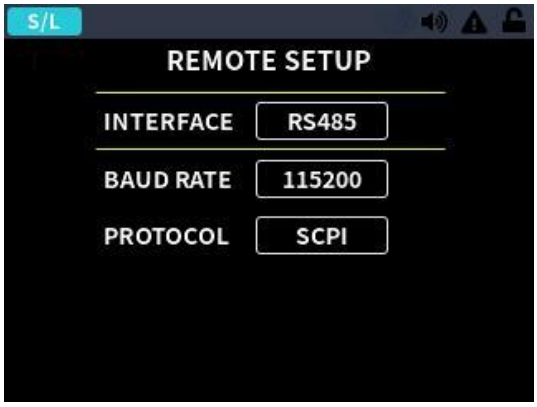
This series of equipment is equipped with USB, RS232, RS485 (optional) communication interfaces and Trig in/out signals. The front panel comes with a standard USB serial port. After connecting to the PC, ensure the serial port parameters in the PC software match those of the load device (default serial parameters: 115200, 8-n-1). Use a USB cable with USB Type-C on one end and USB Type-A on the other to connect the load and computer. All electronic load functions can be programmed via USB. After connecting the load to the PC via USB, the CH340 USB driver must be installed (available for download on the official website or from our technical support); otherwise communication will fail. The rear panel DB9 connector supports RS232 and RS485 communication.

The table below lists the corresponding pin definitions (DB9 terminal for output):

<table>
<tr><th>Pin</th><th>Function Define</th><th>Approve Protocol</th><th>Description</th></tr>
<tr><td>Pin 2</td><td rowspan="3">RS232</td><td>TXD</td><td rowspan="3">Supports typical protocols: SCPI and Modbus RTU</td></tr>
<tr><td>Pin 3</td><td>RXD</td></tr>
<tr><td>Pin 5</td><td>GND</td></tr>
<tr><td>Pin 4</td><td rowspan="2">External trigger for transient commands</td><td>TRIG IN+</td><td rowspan="2">3.3V TTL signal</td></tr>
<tr><td>Pin 9</td><td>TRIG IN-</td></tr>
<tr><td>Pin 1</td><td rowspan="2">External trigger output of power switch signal indicator</td><td>TRIGOUT+</td><td rowspan="2">Floating; an external 1kΩ pull-up resistor to external 5V or 3.3V power supply is required.</td></tr>
<tr><td>Pin 8</td><td>TRIGOUT-</td></tr>
<tr><td>Pin 6</td><td rowspan="2">RS485</td><td>RS485_A</td><td rowspan="2">Optional feature for models with R4 suffix. Ensure this pin is floating with no signal when RS232 communication is in use.</td></tr>
<tr><td>Pin 7</td><td>RS485_B</td></tr>
</table>

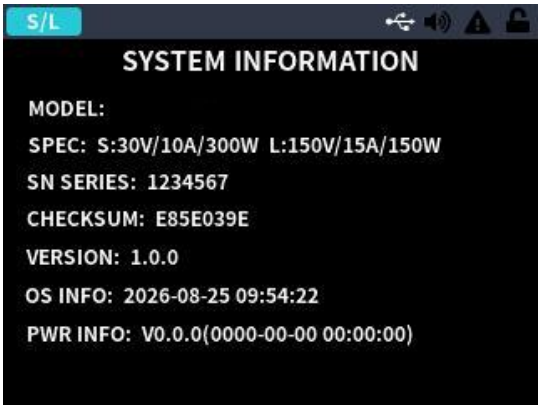


After entering Remote Settings, you can configure the communication interface, baud rate and communication protocol.



4.1.7 System Information

Enter System Information from the system menu to view version information, voltage and current ranges of the device, etc.



4.2 Source and Load Channel Selection and Operation

The device displays the main interface of dual source-load channels by default. The interface synchronously shows the channel information of the source and load sides, and the corresponding parameters can be viewed and configured.



Operation is as follows:

Region Switch and Zoom

Press the **SRC** or **LOAD** key to select the corresponding region. When the load region parameters are selected, press the **SRC** key to switch to the source region parameters automatically. When the source region parameters are selected, press the **SRC** key to enter the zoomed-in source region interface. When the source region parameters are selected, press the **LOAD** key to switch to the load region parameters automatically. When the load region parameters are selected, press the **LOAD** key to enter the zoomed-in load region interface.



Parameter Edit Operation

Rotate the knob to navigate and select parameters, press the **ENTER** key to enter the edit mode. Press **ENTER** or **ESC** to exit editing after configuration. When editing values, press the knob to move the edit cursor and switch digits.

Quick Operations

In the source area, press the **CC/CURR** or **CV/VOLT** key to directly enter current/voltage parameter editing. In the load area, press the **CC/CURR** or **CV/VOLT** key to switch the load operating mode.

4.3 Turn on/off Channel Output

You can use the **ALL ON/OFF** key on the front panel to turn on or off both the source and electronic load simultaneously. When the **ALL ON/OFF** key is lit, the outputs are enabled, and the status of the source and electronic load on the panel changes to ON. When the **ALL ON/OFF** key is off, both the source and electronic load outputs are disabled. When the device is powered on, the default main interface displays all current statuses. To turn the source or load on/off individually, use the shortcut keys **SHIFT**+**SRC** or **SHIFT**+**LOAD**.

4.4 Local / Remote Mode Switch Operation

The instrument supports local and remote operation modes, which can be switched via communication commands. The instrument defaults to local operation after initialization.

- Local Operation Mode: Perform operations using keys on the front panel.
- Remote Operation Mode: The instrument connects to a PC, and the instrument is controlled by the PC. In remote mode, all front panel keys are disabled except **SHIFT**+**ALL ON/OFF**. Press **SHIFT**+**ALL ON/OFF** to switch back to local operation mode.

4.5 Lock Function

Press **SHIFT**+ **ALL ON/OFF** on the front panel of the electronic load to lock front panel keys, and LOCK status will be displayed on the screen. Under this function, all keys are disabled except unlocking via **SHIFT**+ **ALL ON/OFF**.

4.6 DC Power Supply Output Voltage / Current Setting

In the source area, press the **CC/CURR** or **CV/VOLT** key to quickly enter current or voltage parameter editing. Alternatively, rotate the knob to navigate and select parameters, then press **ENTER** to enter edit mode. Press **ENTER** or **ESC** to exit editing after setup. When editing values, press the knob to move the edit cursor and switch digits.

4.7 DC Power Supply Overvoltage / Overcurrent Setting

Overvoltage Protection (OVP), Overcurrent Protection (OCP): After the output is enabled, once the output voltage, current or power reaches the set value of OVP or OCP, the instrument will cut off the output and display an over-limit warning on the screen.

Note:
When the output is automatically cut off due to protection trigger, after making proper adjustments, the user must turn off and re-enable the channel to restore normal output.

This function prevents the power supply output from exceeding the rated value of the load to protect the load.

In the source area, press **SHIFT**+**CC/CURR** or **SHIFT**+**CV/VOLT** to quickly access the OCP and OVP setting pages. Alternatively, enter the power parameter setting page via MENU to configure OCP and OVP. After selecting the OVP, OCP threshold, rotate the knob to modify the digit at the cursor position. Press the knob to move the cursor, and press **ENTER** or **ESC** to exit editing.

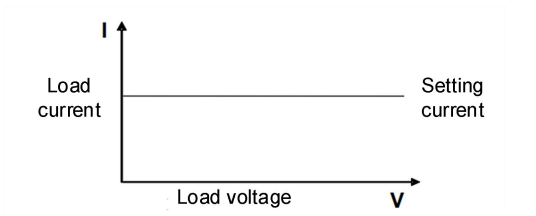
4.8 Electronic Load Constant Operation Mode Function

The electronic load can operate in the following four constant modes:

- Constant Current Mode (CC)
- Constant Voltage Mode (CV)
- Constant Resistance Mode (CR)
- Constant Power Mode (CP)

4.8.1 Constant Current Mode Operation (CC)

In the electric load setting area, select the **CC/CURR** function key to set the load to constant current mode. In constant current mode, the electric load draws a constant current regardless of variations in the Input Voltage. The relationship between voltage and current is shown in the figure below.

Voltage-Current Relationship Diagram	CC mode operation interface
	

There are two ways to set the output current (CC mode):

Mode one:

1. In the electric load setting area, press the **CC/CURR** key, and the user interface switches to Constant Current mode (CC).
2. Press the **ENTER** key to select the current setting edit box. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set current.

Mode two:

1. Press the **MODE** key to select the source-load mode. Use the knob to

select the electric load mode setting, open the drop-down option box, choose CC mode, and press **ENTER** to confirm.

2. Use the knob to select the current setting edit box, press **ENTER** to enter the edit mode. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set current.

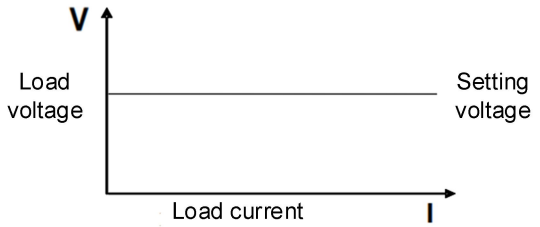
In Constant Current mode, users may configure the following parameters:

Operating procedures:

1. Press the MENU key to enter the Load parameter setup page within the parameter setting interface.
2. Set voltage, current range
3. Set rise slope of current
4. Set fall slope of current
5. Set OCP, OVP, OPP

4.8.2 Constant Voltage Mode Operation (CV)

In the electric load setting area, select the **CV/VOLT** function key to switch the load to Constant Voltage mode. In constant voltage operating mode, the electric load draws sufficient current to keep the Input Voltage at the set voltage. The relationship between voltage and current is shown in the figure below.

Voltage-Current Relationship Diagram	CV mode operation interface
	

There are two ways to set the output voltage (CV mode):

Mode one:

1. In the electric load setting area, press the **CV/VOLT** key, and the user interface switches to Constant Voltage mode (CV).
2. Press the **ENTER** key to select the voltage setting edit box. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set voltage.

Mode two:

1. Press the **MODE** key to select the source-load mode. Use the knob to select the electric load mode setting, open the drop-down option box, choose CV mode, and press **ENTER** to confirm.
2. Use the knob to select the voltage setting edit box, press **ENTER** to enter the edit mode. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set voltage.

In Constant Voltage mode, users may configure the following parameters:

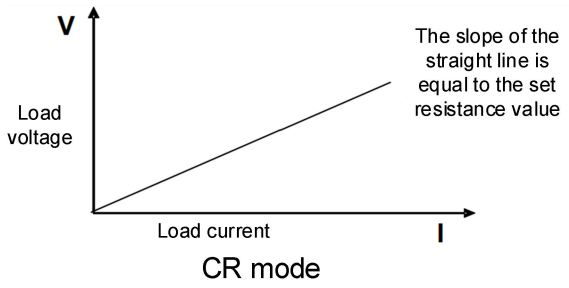
Operating procedures:

1. Press the MENU key to enter the Load parameter setup page within the parameter setting interface.
2. Set voltage range, current range
3. Set rise/fall slope of voltage
   a) Fast b) Medium c) Slow
4. Set OCP, OVP, OPP

4.8.3 Constant Resistance Mode Operation (CR)

In the electric load setting area, press the **SHIFT**+ **CC/CURR** function key to set the load to Constant Resistance (CR) mode. In constant resistance

operating mode, the electric load acts as an equivalent fixed resistance. The Load linearly adjusts its current as the Input Voltage changes. The relationship between voltage and current is shown in the figure below.

Voltage-Current Relationship Diagram	CR mode operation interface
 CR mode	

There are two ways to set the output resistance (CR mode):

Mode one:

1. In the electric load setting area, press the **SHIFT**+**CC/CURR** key, and the user interface switches to Constant Resistance mode (CR).
2. Press the **ENTER** key to select the resistance setting edit box. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set resistance.

Mode two:

1. Press the **MODE** key to select the source-load mode. Use the knob to select the electric load mode setting, open the drop-down option box, choose CR mode, and press **ENTER** to confirm.
2. Use the knob to select the resistance setting edit box, press **ENTER** to enter the edit mode. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set resistance.

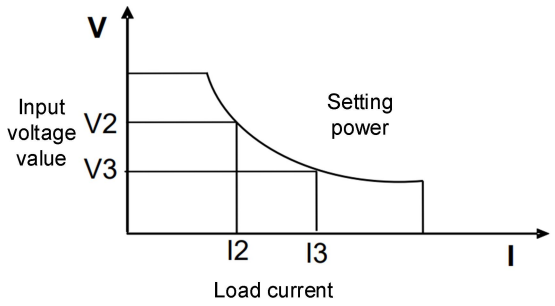
In Constant Resistance mode, users may configure the following parameters:

Operating procedures:

1. Press the MENU key to enter the Load parameter setup page within the parameter setting interface.
2. Set voltage range, current range
3. Set rise/fall slope of resistance value
   a) Fast b) Medium c) Slow
4. Set OCP, OVP, OPP

4.8.4 Constant Power Mode Operation (CP)

In the electric load setting area, press the **SHIFT**+ **CV/VOLT** function key to switch the load to constant power mode. the electric load draws constant power as displayed in the figure below. If the input voltage rises, the input current will decrease. The relationship between voltage and current is shown in the figure below.

Voltage-Current Relationship Diagram	CP mode operation interface
	

There are two ways to set the output power (CP mode):

Mode one:

1. In the electric load setting area, press the **SHIFT**+**CV/VOLT** key, and the user interface switches to Constant Power mode (CP).
2. Press the **ENTER** key to select the power setting edit box. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set power.

Mode two:

1. Press the **MODE** key to select the source-load mode. Use the knob to select the electric load mode setting, open the drop-down option box, choose CP mode, and press **ENTER** to confirm.
2. Use the knob to select the power setting edit box, press **ENTER** to enter the edit mode. Turn the knob to adjust to the target value directly. While inputting values, press the knob to shift the digit selection to the right. When reaching the most significant digit, pressing the knob again returns to the least significant digit, and this cycles repeatedly.
3. Press **SHIFT**+**LOAD** key to output the set power.

Operating procedures:

1. Press the MENU key to enter the Load parameter setup page within the parameter setting interface.
2. Set voltage range, current range
3. Set Power Rise/Fall slope
   a) Fast b) Medium c) Slow
4. Set OCP, OVP, OPP

4.9 Electric Load Short Circuit Stimulate Function

The Electric Load can simulate a short circuit at the Input terminal to verify whether the DUT's protection function works properly when a short circuit occurs at the DUT output terminals.

Press **SHORT** on the front panel of the Electric Load to toggle the short circuit state. The short circuit operation will not alter the existing settings. Press **SHORT** again, and the Electric Load reverts to its previous configuration. The actual current drawn by the Electric Load during short circuit depends on the current operating mode and current range of the Load. In CC, CP and CR modes: if the current stays within the maximum range, the short-circuit current equals the input current. If the current exceeds the maximum range, the maximum short-circuit current is 110% of the selected range. In CP mode, short circuit is equivalent to setting the Load's constant voltage value to 0V.



4.10 Electric Load Dynamic Test Function

In the dynamic mode of the Electric Load, users can set two Load Current parameters corresponding to the constant mode. The load toggles between these two values according to the configured operation method.

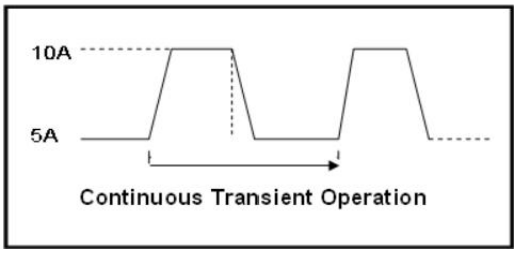


Dynamic Mode Setting Parameters

Dynamic Test	Parameter Description
Running mode	Select running mode: continuous/single
T1 value	Set T1 Load Current parameter
T1 time	Set T1 Load Current running time
T2 value	Set T2 Load Current parameter
T2 time	Set T2 Load Current running time
Rise slope	Set rise slope
Fall slope	Set fall slope

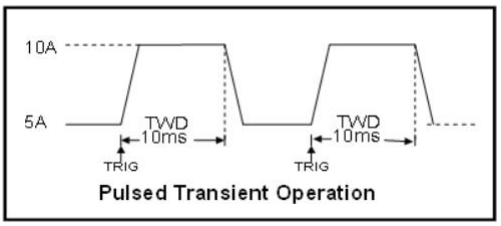
Continuous Mode

In continuous mode, after dynamic test operation is enabled, the Load continuously switches between the T1 value and T2 value.



Single Pulse Mode (Pulse)

In single pulse mode, once the dynamic test operation is enabled, the Load switches between T1 and T2 values for one cycle. Each time the Load receives a trigger command from the front panel key or an external TRIG-IN signal, it performs one transition. The figure below shows the operation interface diagram of this mode.



4.11 Electric Load Von/Voff Function

The Electric Load of this instrument also provides Von/Voff function. When testing some power supplies with slow voltage rise speed, if the Electric Load Input is turned on first and then the test power supply is enabled, the test power supply may be pulled into protection. To solve this issue, users can set the Von value. The Electric Load starts sinking current only when the voltage of the test power supply exceeds this value. When the test power supply voltage drops below Voff, the Electric Load stops sinking current. It resumes loading once the terminal voltage recovers above Von.

Note:

Please confirm whether the load voltage needs to be set. The load voltage is set to allow users to limit the operating voltage value. If no limit is required, do not set it arbitrarily, to avoid the problem of failing to load. If the instrument cannot be loaded, first check the set values of Von/Voff, and reset Von/Voff to the minimum values.

4.12 Protect function and Fault information

The product monitors the internal operation of the device in real time, including OVP, OCP, OPP, OTP fault protections. If any of the above protections is triggered, the device enters the corresponding self-protection mode. For example, upon Load OTP activation, the electronic load will alarm and automatically switch to OFF state, and the main unit displays OTP. The protection mode can be cleared via the power button or ENTER key on the front panel.

Electric Load Error Code

Fault Type	ERROR CODE	Descriptions
Internal Fault	0x0004	OTP
	0x0010	Internal Parameter Storage Error
	0x0020	Model Firmware Mismatch
Output Fault	0x0002	Output OVP
	0x0008	Output OCP
	0x0010	Output OPP
	0x0004	Local Input Reverse Polarity Protection

Power Supply Error Code

Fault Type	ERROR CODE	Descriptions
Main Fault	0x0001	Mains Power Failure Abnormality
Internal Fault 2	0x0004	Heatsink Over-temperature Abnormality
	0x0020	Model Firmware Mismatch
Output Fault	0x0002	Output OVP
	0x0008	Output OCP

4.13 Test Function

4.13.1 Battery Charge-Discharge Test Function (T Models Only)

The device can perform battery charge-discharge tests in battery mode. This operating mode requires Channel 1 and Channel 2 to be connected in

parallel. Users may select charge, discharge or charge-discharge cycle modes.



Battery Charge-Discharge Test Main Screen, the main screen of battery charge-discharge test consists of five functional areas:

Top Status Bar: Displays volume, alarm prompts and other status information.

Global Basic Parameter Area:

- Mode: Select one of four test sequence modes: Charge, Discharge, Charge-then-Discharge, Discharge-then-Charge
- Cycle Count: Set the number of charge-discharge cycles to run
- Nominal Capacity (Ah): Set the nominal capacity of the battery under test (0.001–999.999)

Charge Setting Area:

Used to configure operating parameters and termination conditions for the charge phase, including Charge Voltage, Charge Current, Trickle Voltage, Trickle Current, Charge Soak, Cut-off Current, Charge Time and other parameters.

Discharge Setting Area:

Used to configure operating parameters and termination conditions for the discharge phase, including discharge modes (Constant Current Discharge, Constant Power Discharge), Discharge Current / Discharge Power, Discharge Soak, Cut-off Voltage, Cut-off Capacity, Discharge Time and other parameters.

Bottom Real-Time Monitoring Area:

Displays live test data: State of Health (SOH), real-time Voltage, real-time Current, real-time Power, accumulated capacity, current cycle index and total elapsed test time.

Operating Procedure Step 1:

Select Test Mode Choose the test sequence mode in the Mode menu. Four modes are available, and editable parameter areas vary for each mode:

Charge Mode: Only parameters in the charge setting area are editable; the discharge setting area is locked. The unit executes only the charge sequence.

Discharge Mode: Only parameters in the discharge setting area are editable; the charge setting area is locked. The unit executes only the discharge sequence.

Charge-then-Discharge Mode: Both charge and discharge setting areas are editable. The test runs a single cycle in the sequence Charge → Discharge, and multiple cycles can be configured.

Discharge-then-Charge Mode: Both charge and discharge setting areas are editable. The test runs a single cycle in the sequence Discharge → Charge, and multiple cycles can be configured.

Step 2: Set Global Basic Parameters

Cycle Count: Set the total number of charge-discharge cycles to run. Setting range: 1 ~ 999 cycles.

Nominal Capacity: Input the nominal capacity of the battery under test. Setting range: 0.001Ah ~ 999.999Ah.

Step 3: Charge Parameter Setup

The charge setting area is available for configuration only when Charge, Charge-then-Discharge, or Discharge-then-Charge mode is selected.

Charge Voltage: Sets the target voltage for the charge phase, unit: V. Charge Current: Sets the current value for constant-current charging, unit: A. Trickle Voltage: Sets the voltage threshold for switching to trickle charge, unit: V. Trickle Current: Sets the sustaining current during trickle charge phase, unit: A. Charge Soak: Sets the soak duration after charge phase completion, unit: second (s).

Charge Termination Configuration: Two independent termination conditions are supported for the charge phase and can be enabled or disabled as required. The two conditions operate in OR logic; the charge phase terminates once either condition is satisfied. Cut-off Current: Charge terminates when the charge current drops to the set value. Set the option to Current OFF to disable this condition. Charge Time: Charge terminates when

the accumulated charge duration reaches the set value. Set the option to Time OFF to disable this condition.

Step 4: Discharge Parameter Setup

The discharge setting area is available for configuration only when Discharge, Charge-then-Discharge, or Discharge-then-Charge mode is selected.

Select the discharge control mode.

Two modes are supported:

Constant Current Discharge: Maintains constant current during discharge. Discharge Current and Discharge Soak parameters need to be configured.

Constant Power Discharge: Maintains constant power during discharge. Discharge Power and Discharge Soak parameters need to be configured.

Basic Discharge Parameters

Discharge Current / Discharge Power: Set the constant current or constant power value according to the selected discharge mode.

Discharge Soak: Sets the soak duration after the discharge phase completes, unit: second (s).

Discharge Termination Configuration

Three independent termination conditions are available for the discharge phase and can be enabled or disabled as required. The three conditions follow OR logic; the discharge phase terminates once any condition is met.

Cut-off Voltage: Discharge terminates when the battery terminal voltage drops to the set value. Set the option to Voltage OFF to disable this condition.

Cut-off Capacity: Discharge terminates when the accumulated discharged capacity reaches the set value. Set the option to Capacity OFF to disable this condition.

Discharge Time: Discharge terminates when the accumulated discharge time reaches the set value. Set the option to Time OFF to disable this condition.

Step 5: Start Test

After all parameters are configured and verified, press the **ALL ON/OFF** key. The instrument will start the test immediately with the preset mode and parameters.

During the test, the bottom real-time monitoring area continuously refreshes readings of Voltage, Current, Power, accumulated capacity, cycle progress and elapsed test time.

Step 6: Pause and Stop Test

While the test is running, press the **ALL ON/OFF** key again. An operation selection menu pops up on the screen:

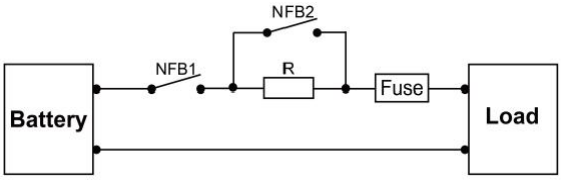
Pause Test: The test is suspended temporarily while preserving current test data. The test can be resumed later.

Stop Test: The entire test sequence is terminated, run status is cleared, and the screen returns to the parameter setting interface.

Note: To avoid electric shock, verify correct wiring between the battery and electronic load terminals before enabling the channel Input.

Battery Connection Precautions:

If a switching device is used to connect the DUT directly to the electronic load, voltage overshoot will occur at the instant the switch closes. Excessive voltage overshoot may damage the electronic load. To prevent equipment damage, adopt the wiring method described below for battery discharge tests to ensure safe operation of the test instrument.



- NFB: No-Fuse Breaker. It cuts off the circuit promptly when aging short-circuit occurs inside the load. The rated current of the no-fuse breaker must be less than the maximum current of the battery.
- R: Current-limiting resistor. It prevents excessive battery inrush current caused by the RC network at the load port upon NFB1 closure to protect the DUT battery. It also avoids resonance between the parasitic inductance of test wires and the RC network at the load port when the relay closes, which would otherwise induce excessive voltage at the load terminal and damage the electronic load. The resistance of the current-limiting resistor is recommended to be greater than 100 kΩ.
- Fuse: Fuse. When the current rises abnormally to a certain level with high temperature, the fuse melts and opens the circuit to protect the circuit.
- To start discharge: Connect the instrument and battery as shown in the figure. Close NFB1 first, wait for a 5-second delay, then close NFB2 to start the battery discharge test.

- To stop discharge: Press the power key on the load front panel to turn off the instrument first. Then open NFB2, and finally open NFB1 to terminate the battery charge-discharge test.

4.13.2 OCP Test Function (T Models Only)

This electronic load is equipped with Over Current Protection (OCP) test function. In OCP test mode, after the input voltage reaches the Von value and a preset delay elapses, the electronic load starts sinking current. The current increases stepwise at fixed intervals. Meanwhile, the load continuously monitors its input voltage to check whether it is higher than the OCP voltage threshold. If the voltage is higher, OCP is not triggered, and the current stepping continues until the cut-off current is reached. If the voltage drops below the threshold, OCP is deemed triggered. The system then verifies whether the present current falls within the target range. A Pass result is returned if within range; otherwise, a Fault is reported.



OCP test operations:

1. Select OCP mode under the programming mode to enter the OCP test function setting screen and edit OCP parameters.
2. Press the On/Off key to start the OCP test. If the result is within the acceptable range, the test shows PASS with corresponding indication on the panel. If out of range, the test fails and the panel displays the corresponding message.
3. After the test finishes, return to the setting screen to reconfigure parameters.



4.13.3 OPP Test Function (T Models Only)

This electronic load is equipped with Over Power Protection (OPP) test function. In OPP test mode, after the input voltage reaches the Von value and a preset delay elapses, the electronic load starts sinking power. The power increases stepwise at fixed intervals. Meanwhile, the load continuously monitors its input voltage to check whether it is higher than the OPP voltage threshold. If the voltage is higher, OPP is not triggered, and the power stepping continues until the cut-off power is reached. If the voltage drops below the threshold, OPP is deemed triggered. The system then verifies whether the present power falls within the target range. A Pass result is returned if within range; otherwise, a Fault is reported.



OCP test operation:

1. Select OPP mode under the programming mode to enter the OPP test function setting screen and edit OPP parameters.
2. Press the On/Off key to start the OPP test. If the result is within the acceptable range, the test shows PASS with corresponding indication on the panel. If out of range, the test fails and the panel displays the corresponding message.

3. After the test finishes, return to the setting screen to reconfigure parameters.





4.13.4 Ripple Test Function (V Models Only)

This series of electronic loads has an optional ripple test function to perform ripple measurement for switching power supplies or chargers. Users may connect the power supply directly to the load without an external oscilloscope, and read voltage ripple values (Vpp / Vpp+ / Vpp−) and current ripple values (Ipp / Ipp+ / Ipp−) directly. This greatly simplifies wiring and operation for tests. The system supports ripple display, screen capture and automatic statistical analysis, making it ideal for fast and batch ripple inspection, especially for R&D debugging and production line quality verification.

Ripple sampling time can be set to 0.5ms, 1ms, 2ms, 5ms, 10ms, 20ms, 50ms, 100ms, 200ms, 500ms, 1000ms. The sampling rate and bandwidth corresponding to each sampling time are shown in the table below.

Sample Time	Sample Rate	Bandwidth
0.5ms	1MSPS	100kHz
1ms	1MSPS	100kHz
2ms	1MSPS	100kHz
5ms	1MSPS	100kHz
10ms	500kSPS	50kHz
20ms	250kSPS	25kHz
50ms	100kSPS	10kHz
100ms	50kSPS	5kHz
200ms	25kSPS	2.5kHz
500ms	10kSPS	1kHz
1000ms	5kSPS	500Hz

When entering the ripple interface, if the user does not know the ripple frequency of the DUT, select the maximum sampling time of 1000 ms to ensure that a complete AC cycle can be captured on the screen. Then adjust the sampling time according to the density of the ripple waveform to clearly view the actual ripple waveform.



Ripple test operation:

(1) On the home page, press **SHIFT**+**SHORT** shortcut to quickly enter the ripple test function interface.

(2) Use the knob to select the ripple voltage or ripple current to be measured. After confirmation, select the sampling rate. For unknown ripple signals, select the lowest sampling rate first to capture a complete ripple cycle on the screen, then zoom in for detailed observation.

(3) After configuration, press the RUN key on the interface to start the ripple test. The ripple waveform and ripple values of voltage and current will be displayed during measurement. To stop and check the ripple magnitude, press RUN again to enter HOLD mode, and the screen will freeze without further updates.

4.13.5 Battery Capacity Detection Function (T Models Only)

The Electronic Load is used independently for battery capacity measurement. In this mode, the battery operates in discharge mode. The test termination conditions can be configured: Stop Voltage (Vstop), Battery Capacity (Cstop) and Discharge Time (Tstop). Discharge stops and the Electronic Load automatically switches to OFF state once any of the three

conditions is met.

If only one or two termination conditions are enabled for the test, set the unused condition(s) to OFF.

After the channel is turned ON, the main screen displays real-time readings during testing: actual current, battery discharge voltage, elapsed discharge time and discharged capacity. This test evaluates battery reliability and remaining service life, and is recommended prior to battery replacement.

When a battery discharge termination condition is met and the test finishes, a pop-up message Battery Discharge Test Completed! appears on the load screen. Press the Enter key to close the pop-up window.



Note: If Cut-off Voltage is selected as the termination condition, once the battery voltage drops below the Cut-off Voltage threshold and the system confirms the set value is reached, the unit will mark the test as complete and abort the test automatically. If the Cut-off Voltage condition is set to OFF and the terminal voltage is detected as 0V, the electronic load will trigger a discharge fault alarm, terminate discharge automatically and shut down the output.



During discharge, to pause or stop the battery discharge test, press **SHIFT**+**LOAD**. Select Pause Discharge or Stop Discharge in the pop-up

prompt on the load screen; Input OFF will be activated after confirmation.

If the test is paused, press **SHIFT**+**LOAD** again to resume discharge logging. If the test is stopped, press **SHIFT**+**LOAD** again to start a new discharge logging cycle.

To exit the battery test mode, press the **MODE** key to switch to another mode.



5. Troubleshooting

1. **The instrument is powered on but no display. Please following the steps:**

   - Check if the power is connected properly.
   - Check if the fuse which is below the AC Power socket is used appropriately and in good condition (the cover can be pried open with a straight screwdriver).
   - Restart the instrument after the steps above.
   - If the problem still exists, please contact our customer service.

6. Technical Specifications

The instrument must be operated continuously for more than 30 minutes at the specified operating temperature to achieve the following specifications:

6.1 SPL30000-1 Series Technical Specifications

Model		SPL30150-1 (TV)	SPL30300-1 (TV)	SPL30600-1 (TV)
Input	Voltage/Frequency/Current	100-120Vac；50Hz/60Hz；10Arms Max 200-240Vac；50Hz/60Hz；5Arms Max		
DC Power Supply				
Rated Output	Voltage	0-30V		
	Current	0-10A		
	Power	150W		
Voltage Regulation (CV)	Load	≤33mV		
	Mains	≤33mV		
Current Regulation (CC)	Load	≤30mA		
	Mains	≤20mA		
Ripple noise	Voltage (Rms)	≤40mVrms		
	Current (Rms)	≤40mA		
Set resolution	Voltage	10mV		
	Current	10mA		
Readback resolution	Voltage	10mV		
	Current	10mA		
Set Accuracy	Voltage	≤0.2%+0.2%FS		
	Current	≤0.2%+0.2%FS		
Readback Accuracy	Voltage	≤0.2%+0.2%FS		
	Current	≤0.2%+0.2%FS		
Response Time	Transient response (10%~90% rated load)	≤5.0ms		
Protect function	OVP	0~31V		
	OCP	0~11A		
	OTP	80℃		
Output Temperature coefficient	Voltage	100ppm/℃		
	Current	200ppm/℃		
Readback Value Temperature coefficient	Voltage	100ppm/℃		
	Current	200ppm/℃		
Electric Load				
Rated Input Input	Voltage	0-150V	0-300V	0-600V
	Current	0-10A		
	Power	150W		

Model		SPL30150-1 (TV)		SPL30300-1 (TV)		SPL30600-1 (TV)	
Minimum work voltage		0.8V@10A					
CV Mode	Range	0-15V	0-150V	0-30V	0-300V	0-60V	0-600V
	Set resolution	1mV	10mV	1mV	10mV	1mV	10mV
	Readback resolution	1mV	10mV	1mV	10mV	1mV	10mV
	Accuracy	0.05%+0.05%FS					
CC Mode	Range	0-10A		0-10A		0-10A	
	Set resolution	10mA		10mA		10mA	
	Readback resolution	1mA		1mA		1mA	
	Accuracy	0.05%+0.05%FS					
CR Mode	Range	0.05-7.5kΩ					
	Accuracy *1	0.1%+0.01%R					
CP Mode	Range	0-150W					
	Set resolution	10mW					
	Readback resolution	10mW					
	Accuracy *1	0.1%+0.1%FS					
Dynamic Mode (CCD)	T1&T2	0.1ms-50s					
	Rise/Fall slope	0.01A/ms-500A/ms					
	Minimum rise time	40us					
Protect function	OPP	>OPP value, 100 ms protection					
	OVP	>OVP value, 10 ms protection					
	OCP	>OCP value, 10 ms protection					
	OTP	85℃					
Short circuit	CC	>10A					
	CV	0					
	CR	50mΩ					
Test Function		Supports battery charge and discharge test, OCP test and OPP test. This is an optional feature available only for models with suffix T. The ripple test function is optional and available for models with suffix V.					
Temperature coefficient		±(0.04% per degree from 25℃)					
Others							
Communication Interface		Supports RS232, RS485 and USB serial ports, with SCPI / Modbus protocols available.					
Withstand Voltage (DC to Earth)		500VDC/1min		1000VDC/1min		1500VDC/1min	
Working Isolation Voltage		800VDC					
Heat Dissipation		Internal intelligent fan forced air cooling regulation					
Work Temperature		0-40℃					
Display		2.8-inch TFT LCD					
Dimension		82mm(W)× 142mm(H)×226mm(D)					
Weight		Approx. 2.5kg					

6.2 SPL30000-3 Series Technical Specifications

Model		SPL30150-3 (TV)		SPL30300-3 (TV)		SPL30600-3 (TV)	
Input	Voltage/Frequency/Current	100-120Vac；50Hz/60Hz；10Arms Max 200-240Vac；50Hz/60Hz；5Arms Max					
DC Power Supply							
Rated Output	Voltage	0-30V					
	Current	0-10A					
	Power	300W					
Voltage Regulation (CV)	Load	≤33mV					
	Mains	≤33mV					
Current Regulation (CC)	Load	≤30mA					
	Mains	≤20mA					
Ripple noise	Voltage (Rms)	≤40mVrms					
	Current (Rms)	≤40mA					
Set resolution	Voltage	10mV					
	Current	10mA					
Readback resolution	Voltage	10mV					
	Current	10mA					
Set Accuracy	Voltage	≤0.2%+0.2%FS					
	Current	≤0.2%+0.2%FS					
Readback Accuracy	Voltage	≤0.2%+0.2%FS					
	Current	≤0.2%+0.2%FS					
Response Time	Transient response (10%~90% rated load)	≤5.0ms					
Protect function	OVP	0~31V					
	OCP	0~11A					
	OTP	80℃					
Output Temperature coefficient	Voltage	100ppm/℃					
	Current	200ppm/℃					
Readback Value Temperature coefficient	Voltage	100ppm/℃					
	Current	200ppm/℃					
Electric Load							
Rated Input	Voltage	0-150V		0-300V		0-600V	
	Current	0-15A					
	Power	150W					
Minimum work voltage		0.8V@15A					
CV Mode	Range	0-15V	0-150V	0-30V	0-300V	0-60V	0-600V
	Set resolution	1mV	10mV	1mV	10mV	1mV	10mV
	Readback resolution	1mV	10mV	1mV	10mV	1mV	10mV

Model		SPL30150-3 (TV)	SPL30300-3 (TV)	SPL30600-3 (TV)
	Accuracy	0.05%+0.05%FS		
CC Mode	Range	0-15A	0-15A	0-15A
	Set resolution	10mA	10mA	10mA
	Readback resolution	1mA	1mA	1mA
	Accuracy	0.05%+0.05%FS		
CR Mode	Range	0.05-7.5kΩ		
	Accuracy *1	0.1%+0.01%R		
CP Mode	Range	0-150W		
	Set resolution	10mW		
	Readback resolution	10mW		
	Accuracy *1	0.1%+0.1%FS		
Dynamic Mode (CCD)	T1&T2	0.1ms-50s		
	Rise/Fall slope	0.01A/ms-500A/ms		
	Minimum rise time	40us		
Protect function	OPP	>OPP value, 100 ms protection		
	OVP	>OVP value, 10 ms protection		
	OCP	>OCP value, 10 ms protection		
	OTP	85℃		
Short circuit	CC	>15A		
	CV	0		
	CR	50mΩ		
Test Function		Supports battery charge and discharge test, OCP test and OPP test. This is an optional feature available only for models with suffix T. The ripple test function is optional and available for models with suffix V.		
Temperature coefficient		±(0.04% per degree from 25℃)		
Others				
Communication Interface		Supports RS232, RS485 and USB serial ports, with SCPI / Modbus protocols available.		
Withstand Voltage (DC to Earth)		500VDC/1min	1000VDC/1min	1500VDC/1min
Working Isolation Voltage		800VDC		
Heat Dissipation		Internal intelligent fan forced air cooling regulation		
Work Temperature		0-40℃		
Display		2.8-inch TFT LCD		
Dimension		82mm(W)× 142mm(H)×226mm(D)		
Weight		Approx. 2.5kg		

6.3 SPL60000-1 Series Technical Specifications

Model		SPL60150-1 (TV)	SPL60300-1 (TV)	SPL60600-1 (TV)
Input	Voltage/Frequency/Current	100-120Vac；50Hz/60Hz；10Arms Max 200-240Vac；50Hz/60Hz；5Arms Max		
DC Power Supply				

Model		SPL60150-1 (TV)	SPL60300-1 (TV)	SPL60600-1 (TV)
Rated Output	Voltage	0-60V		
	Current	0-10A		
	Power	150W		
Voltage Regulation (CV)	Load	≤33mV		
	Mains	≤33mV		
Current Regulation (CC)	Load	≤30mA		
	Mains	≤20mA		
Ripple noise	Voltage (Rms)	≤60mVrms		
	Current (Rms)	≤40mA		
Set resolution	Voltage	10mV		
	Current	10mA		
Readback resolution	Voltage	10mV		
	Current	10mA		
Set Accuracy	Voltage	≤0.2%+0.2%FS		
	Current	≤0.2%+0.2%FS		
Readback Accuracy	Voltage	≤0.2%+0.2%FS		
	Current	≤0.2%+0.2%FS		
Response Time	Transient response (10%~90% rated load)	≤5.0ms		
Protect function	OVP	0~61V		
	OCP	0~11A		
	OTP	80℃		
Output Temperature coefficient	Voltage	100ppm/℃		
	Current	200ppm/℃		
Readback Value Temperature coefficient	Voltage	100ppm/℃		
	Current	200ppm/℃		
Electric Load				
Rated Input	Voltage	0-150V	0-300V	0-600V
	Current	0-10A		
	Power	150W		
Minimum work voltage		0.8V@10A		
CV Mode	Range	0-15V / 0-150V	0-30V / 0-300V	0-60V / 0-600V
	Set resolution	1mV / 10mV	1mV / 10mV	1mV / 10mV
	Readback resolution	1mV / 10mV	1mV / 10mV	1mV / 10mV
	Accuracy	0.05%+0.05%FS		
CC Mode	Range	0-10A	0-10A	0-10A
	Set resolution	10mA	10mA	10mA
	Readback resolution	1mA	1mA	1mA

Model		SPL60150-1 (TV)	SPL60300-1 (TV)	SPL60600-1 (TV)
	Accuracy	0.05%+0.05%FS		
CR Mode	Range	0.05-7.5kΩ		
	Accuracy *1	0.1%+0.01%R		
CP Mode	Range	0-150W		
	Set resolution	10mW		
	Readback resolution	10mW		
	Accuracy *1	0.1%+0.1%FS		
Dynamic Mode (CCD)	T1&T2	0.1ms-50s		
	Rise/Fall slope	0.01A/ms-500A/ms		
	Minimum rise time	40us		
Protect function	OPP	>OPP value, 100 ms protection		
	OVP	>OVP value, 10 ms protection		
	OCP	>OCP value, 10 ms protection		
	OTP	85℃		
Short circuit	CC	>10A		
	CV	0		
	CR	50mΩ		
Test Function		Supports battery charge and discharge test, OCP test and OPP test. This is an optional feature available only for models with suffix T. The ripple test function is optional and available for models with suffix V.		
Temperature coefficient		±(0.04% per degree from 25℃)		
Others				
Communication Interface		Supports RS232, RS485 and USB serial ports, with SCPI / Modbus protocols available.		
Withstand Voltage (DC to Earth)		500VDC/1min	1000VDC/1min	1500VDC/1min
Working Isolation Voltage		800VDC		
Heat Dissipation		Internal intelligent fan forced air cooling regulation		
Work Temperature		0-40℃		
Display		2.8-inch TFT LCD		
Dimension		82mm(W)× 142mm(H)×226mm(D)		
Weight		Approx. 2.5kg		

6.4 SPL60000-3 Series Technical Specifications

Model		SPL60150-3 (TV)	SPL60300-3 (TV)	SPL60600-3 (TV)
Input	Voltage/Frequency/Current	100-120Vac；50Hz/60Hz；10Arms Max 200-240Vac；50Hz/60Hz；5Arms Max		
DC Power Supply				
Rated Output	Voltage	0-60V		
	Current	0-10A		
	Power	300W		

Model		SPL60150-3 (TV)		SPL60300-3 (TV)		SPL60600-3 (TV)	
Voltage Regulation (CV)	Load	≤33mV					
	Mains	≤33mV					
Current Regulation (CC)	Load	≤30mA					
	Mains	≤20mA					
Ripple noise	Voltage (Rms)	≤60mVrms					
	Current (Rms)	≤40mA					
Set resolution	Voltage	10mV					
	Current	10mA					
Readback resolution	Voltage	10mV					
	Current	10mA					
Set Accuracy	Voltage	≤0.2%+0.2%FS					
	Current	≤0.2%+0.2%FS					
Readback Accuracy	Voltage	≤0.2%+0.2%FS					
	Current	≤0.2%+0.2%FS					
Response Time	Transient response (10%~90% rated load)	≤5.0ms					
Protect function	OVP	0~61V					
	OCP	0~11A					
	OTP	80℃					
Output Temperature coefficient	Voltage	100ppm/℃					
	Current	200ppm/℃					
Readback Value Temperature coefficient	Voltage	100ppm/℃					
	Current	200ppm/℃					
Electric Load							
Rated Input	Voltage	0-150V		0-300V		0-600V	
	Current	0-15A					
	Power	150W					
Minimum work voltage		0.8V@15A					
CV Mode	Range	0-15V	0-150V	0-30V	0-300V	0-60V	0-600V
	Set resolution	1mV	10mV	1mV	10mV	1mV	10mV
	Readback resolution	1mV	10mV	1mV	10mV	1mV	10mV
	Accuracy	0.05%+0.05%FS					
CC Mode	Range	0-15A		0-15A		0-15A	
	Set resolution	10mA		10mA		10mA	
	Readback resolution	1mA		1mA		1mA	
	Accuracy	0.05%+0.05%FS					
CR Mode	Range	0.05-7.5kΩ					
	Accuracy *1	0.1%+0.01%R					

Model		SPL60150-3 (TV)	SPL60300-3 (TV)	SPL60600-3 (TV)
CP Mode	Range	0-150W		
	Set resolution	10mW		
	Readback resolution	10mW		
	Accuracy *1	0.1%+0.1%FS		
Dynamic Mode (CCD)	T1&T2	0.1ms-50s		
	Rise/Fall slope	0.01A/ms-500A/ms		
	Minimum rise time	40us		
Protect function	OPP	>OPP value, 100 ms protection		
	OVP	>OVP value, 10 ms protection		
	OCP	>OCP value, 10 ms protection		
	OTP	85℃		
Short circuit	CC	>15A		
	CV	0		
	CR	50mΩ		
Test Function		Supports battery charge and discharge test, OCP test and OPP test. This is an optional feature available only for models with suffix T. The ripple test function is optional and available for models with suffix V.		
Temperature coefficient		±(0.04% per degree from 25℃)		
Others				
Communication Interface		Supports RS232, RS485 and USB serial ports, with SCPI / Modbus protocols available.		
Withstand Voltage (DC to Earth)		500VDC/1min	1000VDC/1min	1500VDC/1min
Working Isolation Voltage		800VDC		
Heat Dissipation		Internal intelligent fan forced air cooling regulation		
Work Temperature		0-40℃		
Display		2.8-inch TFT LCD		
Dimension		82mm(W)× 142mm(H)×226mm(D)		
Weight		Approx. 2.5kg		

* 1 Accuracy: Voltage and current input value ≥10%FS

Specifications are subject to change without prior notice. Please refer to the latest update on the website.

Interval Period of Adjustment:

One year is recommended for the calibration interval period.

7. Appendix

7.1 Appendix A: Accessories

Standard Accessories:

- Power Cord
- Quick Guide
- Fuse
- Banana plug to alligator clip cable

Optional Accessories:

- USB Cable（Type A to Type C）
- RS232

7.2 Appendix B: General Care and Cleaning

General Care

Do not store or leave the instrument where the liquid crystal display could be exposed to direct sunlight for long periods of time.

Caution: To avoid any damage to the instrument, do not exposed it to any sprays, liquids, or solvents.

Cleaning

Inspect the instrument as often as operating conditions require. To clean the instrument exterior, perform the following steps:

1. Wipe the dust from the instrument surface with a soft cloth. Take care not to scratch the transparent LCD protection screen when cleaning.

2. Disconnect power before cleaning your instrument. Clean the instrument with a damp soft cloth (not dripping with water). It is recommended to clean with soft detergent or fresh water. To avoid damage to the instrument, do not use any corrosive chemical cleaning agents.



Warning:

Before re-applying power, ensure that the instrument is completely

dry, avoiding any electric shock or electrical short circuit resulting from moisture.