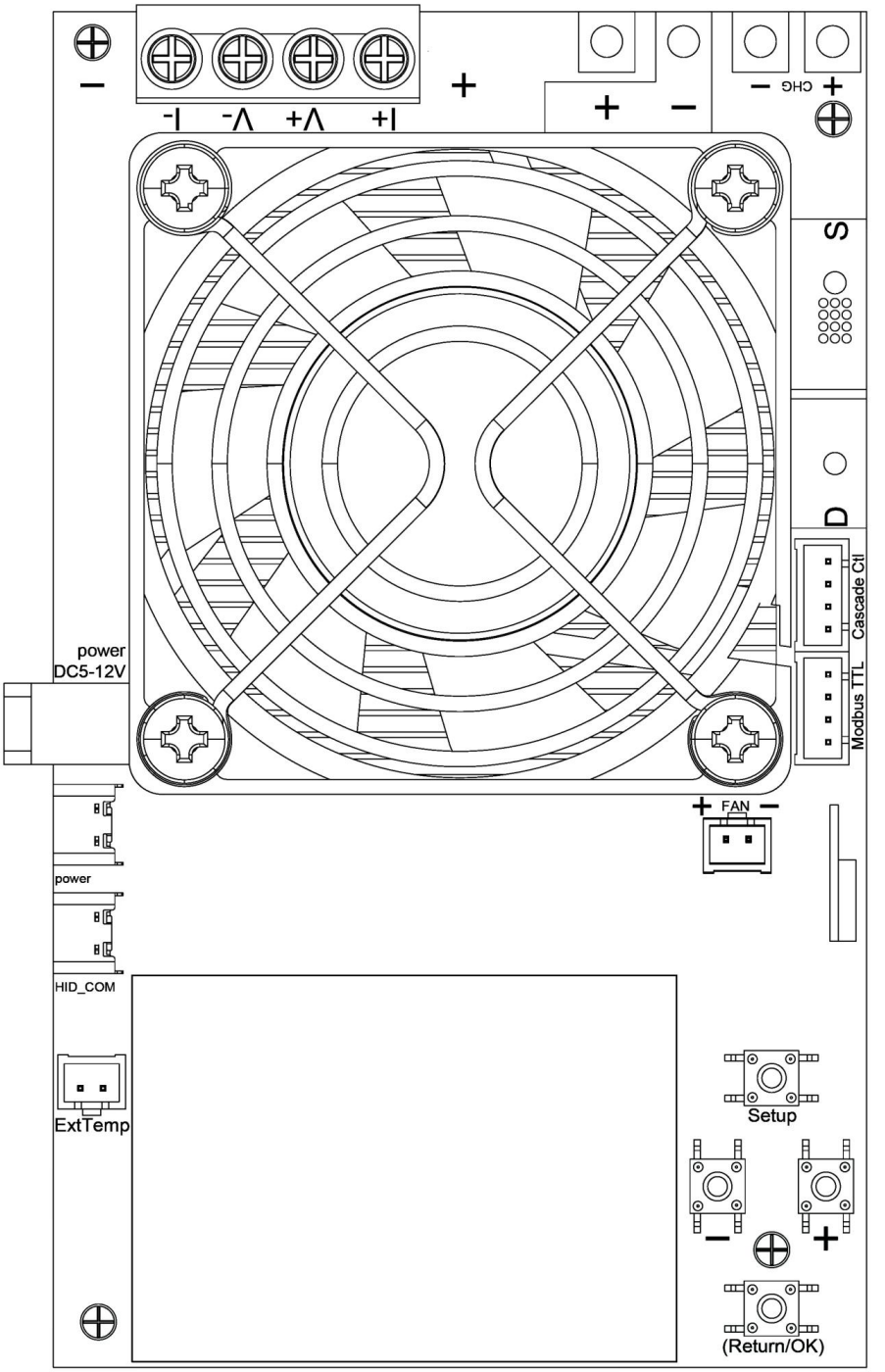
同门科技
eTOMMENS

IOT SMART ELECTRONIC LOAD TESTER



IOT Smart Electronic Load Tester User Manual

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Chapter I Product Overview

This product is a multi-function, high-precision DC electronic load designed for testing various batteries, power adapters, chargers, mobile power banks, and more. It features a dual-MOSFET current-sharing design with hardware reverse-polarity protection for stable, safe, and reliable performance.

1.1 Product Features

- Dual-MOSFET Design: Uses dual-MOSFET current-sharing synchronous discharge technology for extended service life and enhanced stability.
- Stable long-term loading up to 150W is achievable across the entire 0-150V voltage range.By optionally equipping a 150W cascading expansion module, long-term stable load operation of 300W can be achieved.
- Hardware Reverse-Polarity Protection: Rigorous hardware reverse-polarity protection prevents

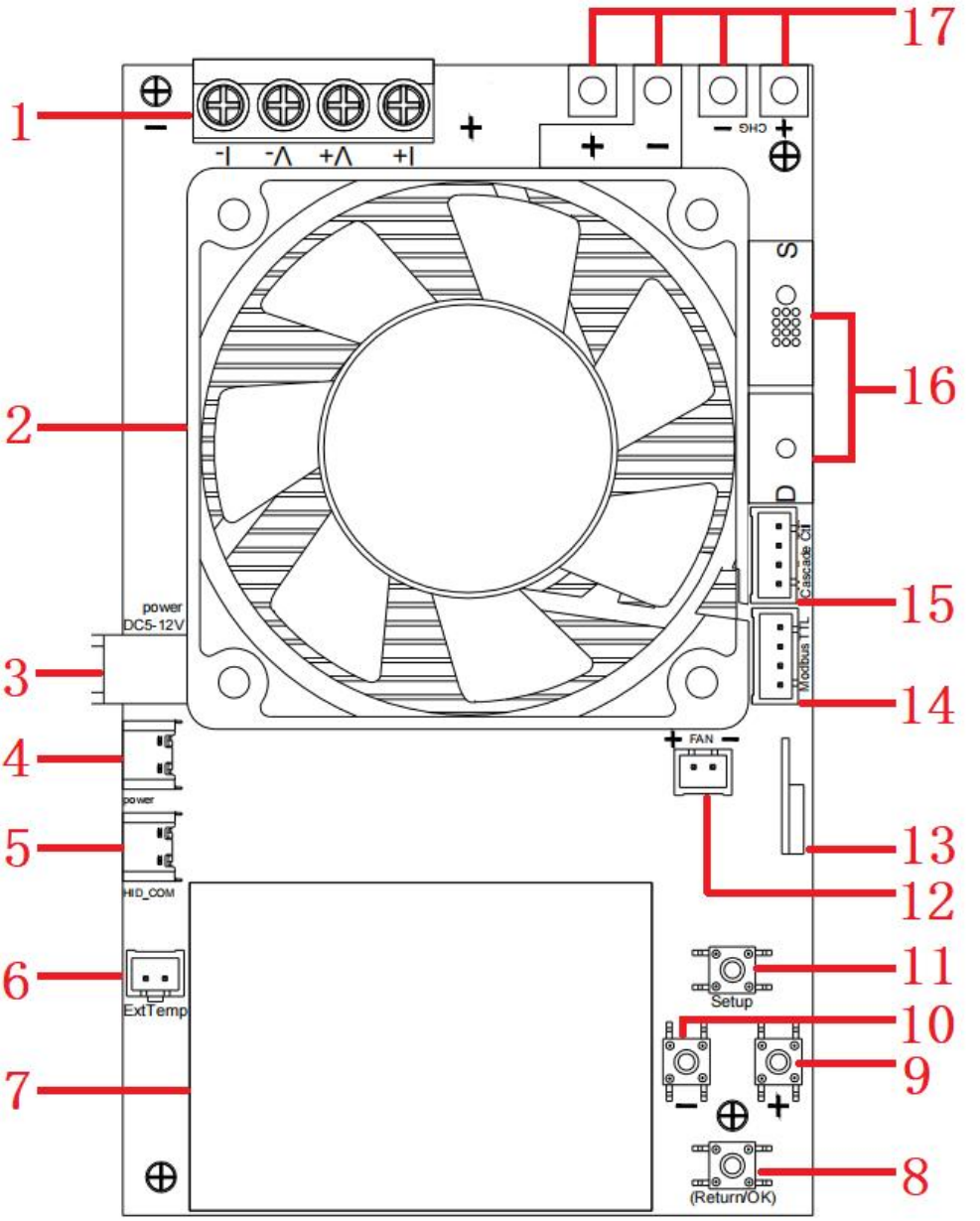
damage from incorrect wiring.

- Intelligent Temperature-Controlled Cooling: When load power exceeds 75W or current exceeds 10A, the fan runs at full speed. In all other conditions,fan speed is intelligently adjusted based on heatsink temperature, balancing quiet operation with effective cooling.
- External Temperature Monitoring: Supports an external temperature probe for real-time surface temperature monitoring of the device under test (DUT).
- 4-Wire Measurement: Provides 4-wire Kelvin connection terminals that eliminate lead resistance voltage drop for more accurate measurements.
- High-Resolution Color Display: 2.4-inch TFT color screen clearly presents operating status, parameter configuration, and measurement data, with Chinese/English bilingual interface switching.
- Dual-Mode Networking: By optionally equipping

Bluetooth pairing + WiFi networking dual-mode design enables remote control and data viewing via mobile app.

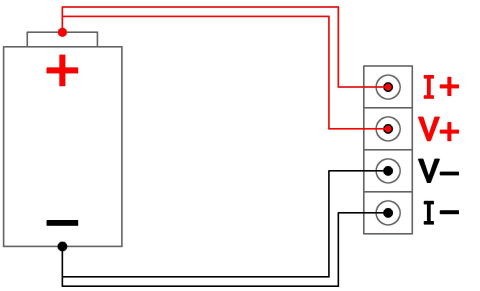
- Dual Upgrade Channels: Supports both HID and WiFi firmware upgrade channels.
- Dual Control Interfaces: Provides an HID host computer control interface and a Modbus-TTL communication interface for convenient integration and remote control.
- Powerful Expansion Capability: Reserved 300W cascade expansion interface for connecting external power expansion modules to increase load capacity.

1.2 Panel Description



1. Load Input Terminals: 4-wire Kelvin connection port for connecting the device under test.

4-Wire Connection Diagram:



2. Intelligent Cooling Fan: Temperature-based smart speed control balancing cooling performance with quiet design. Operating logic:

(1) After power-on, the fan briefly spins, then stops when the device enters standby mode.

(2) The fan stops after 10 - 60 seconds of inactivity and resumes immediately when discharge begins.

(3) The fan automatically runs at full speed when load current exceeds 10A or power exceeds 75W.

(4) After discharge stops, if the temperature remains elevated, the fan continues running at high speed and gradually slows to a stop as the temperature drops.

3. Main Power Port 1 (Power DC 5-12V): DC 5.5×2.1

interface, supports DC 5–12V power input.

4. Main Power Port 2 (Power): Type-C interface, compatible with standard 5V/2A chargers and QC/PD 12V chargers.
5. HID Communication Interface (HID COM): Type-C interface for PC host computer control or HID firmware upgrade.
6. External Temperature Interface (Ext Temp): XH2.54-2P connector for connecting an external temperature probe to monitor DUT temperature.
7. 2.4-inch TFT Color Display: Clearly presents system operating status, function menus, parameter configuration, and real-time measurement data, with Chinese/English bilingual interface switching.
8. [Return/OK] Button:

(1) Short press: Start/Stop load.

(2) When not discharging: short press to confirm, long press to return to the previous screen.

9. [+] Button:

(1) Short press: Increase value by 1. Long press: Continuous increase.

(2) When navigating menus: short press to move down or right through options.

(3) Long press at power-on: enters HID firmware upgrade mode.

10. [-] Button:

(1) Short press: Decrease value by 1. Long press: Continuous decrease.

(2) When navigating menus: short press to move up or left through options.

(3) Long press at power-on: enters WiFi firmware upgrade mode.

11. [Setup] Button: Long press to enter parameter settings; short press again to jump to the digit to be adjusted.

12. Fan Interface (FAN): XH2.54-2P connector for connecting the cooling fan.

13. WiFi + Bluetooth Module**(Optional accessories)**:

Connects to the smart platform for remote control and data viewing via mobile app.

14. Modbus Interface (Modbus TTL): XH2.54-4P connector providing Modbus-TTL communication for easy integration into automation systems.
15. 300W Cascade Control Port (Cascade Ctl): XH2.54-4P connector for connecting and controlling external power expansion modules.
16. 300W Cascade Output Port: Connects to the 300W power expansion module.
17. Charger Input Port: Connect an external charger to charge the device battery. Supports CDC, CDCDC, and CDxN operating modes.

Note: When inserting the power cord or HID communication cable, keep it vertically aligned it . Do not shake it side to side to avoid damaging the connector.

1.3 Accessories Description

1. Standard accessories :

   Electronic load main unit*1

   User Manual*1

   External temperature probe*1

   A pair of 10A Alligator Clip Wire

   HID communication cable*1

   M3*10 copper column*4

   screw*4

2. Optional accessories :

   10A Charging Switch Control Board*1

   4-wire output fast charging protocol high-voltage trigger board*1

   20A High-Current Universal Battery Test Fixture*1

   WiFi + Bluetooth Module*1

   150W Cascading Expansion Module*1

   Cascade control connecting wire*1

Chapter II Function Operations

This chapter provides detailed descriptions of the electronic load's main functions to help users clearly understand each operation.

2.1 Startup Instructions

After power-on, the device defaults to the startup information screen. This sequence can be disabled in system settings or the Language Selection interface, allowing direct boot into the main menu screen.

The startup information screens automatically scroll in the following sequence. Each page has a countdown timer and auto-advances to the next page, continuing until the main menu screen is reached. Each page is described below:

1. Language Selection:

On this screen, short press the [+] or [-] button to select the desired system display language

(Chinese/ENGLISH), or close the startup information screen.

2. Document Access:

A QR code is displayed on the screen. Scan it with your mobile phone to download the detailed user manual and companion software.

3. Safety Warnings:

Displays important safety reminders and warning information. Please read carefully before operating the device.

1) Warning: High voltage inside. Do not disassemble -risk of electric shock!
2) The startup information screen can be disabled via system settings.
3) Ensure device pairing is performed in a 2.4G WiFi environment.
4) Ensure mobile phone Bluetooth is enabled during network pairing.

5) Ensure mobile phone location permission is enabled during network pairing.

6) Connect positive and load wires according to the terminal markings shown in this manual.

4. Button Functions Overview:

A brief introduction to basic button functions to help you get started quickly.

(1) Startup Information Screen

① Short press the [Return/OK] button to proceed directly to the next step.

② Short press the [+]/[-] buttons to switch between left/right selection options on the current page (e.g., language selection).

(2) Measurement Screen

① After selecting the mode in the main menu, Short press the [Return/OK] to enter the measurement interface. Long press the [Setup] to access parameter- then short press [Setup] to

jump to the digit to be adjusted, and short press [+]/[-] to adjust the value.

② On the measurement screen Short press [Return/OK] to start or stop discharge.

③ Long press [Return/OK] to return to the main menu screen. Then short press [+]/[-] to switch operating modes (CC/CV/CR, etc.).

(3) Settings Screen

① Short press the [+]/[-] buttons to scroll up and down through menu options.

② Short press [Return/OK] to enter the selected menu item or confirm parameters. To adjust parameters, short press [Setup] to jump to the digit to be adjusted, then short press [+]/[-] to adjust the value or switch options.

③ Long press the [OK] button to return to the previous screen.

5. Network Connection Instructions:

Displays the communication connection methods supported by the load (WiFi/Bluetooth, etc.) and brief descriptions.

(1) Open the installed app and tap the "Add Device" button in the top-right corner of the home screen.

(2) With the app's permission, it scans for nearby devices. Once the load device is discovered, tap "Add".

(3) Follow the prompts to enter your 2.4G WiFi network name and password, then wait for the device to complete connection and pairing.

NOTE: Only 2.4G WiFi is supported (5G is not currently supported). Ensure mobile phone Bluetooth and location permissions are enabled when adding the device.

6. AP Network Pairing Guide:

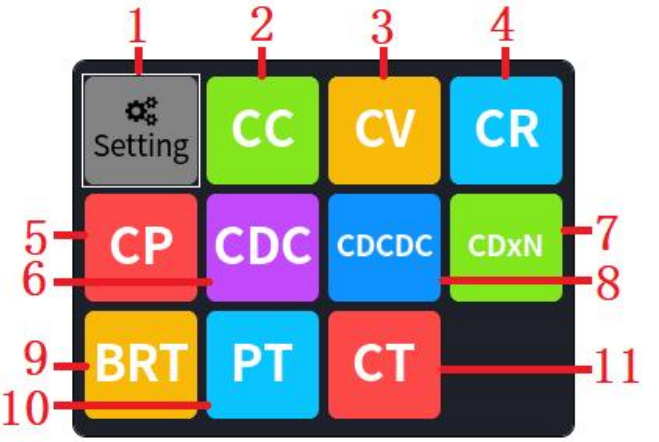
Guides you through completing the network pairing setup in the mobile app (Smart Life). Refer to Section 2.4.3 for detailed steps.

After all pages have been displayed, the system defaults to Constant Current (CC) mode and is ready for use.

2.2 Operating Modes

This electronic load provides ten operating modes: Constant Current (CC), Constant Voltage (CV), Constant Resistance (CR), Constant Power (CP), Charge-Discharge (CDC),Charge-Discharge-Charge-Discharge(CDCDC), Charge/Discharge Cycling (CDxN), Battery Resistance Test (BRT), Power Supply Test (PT), and Conductor Resistance Test (CT). At the main menu screen, short press [+]/[-] to scroll left/right through modes, short press [Return/OK] to enter the selected mode, and long press [Return/OK] to return to the main menu.

Main menu screen shown below:



1. Settings: Enter system menu settings.
2. CC Mode: Constant current - regardless of voltage changes, the load always draws the set current value. The system defaults to this mode.
3. CV Mode: Constant voltage - suitable for testing constant current sources. The load regulates the current to maintain the set voltage.
4. CR Mode: The load acts as an adjustable resistor, suitable for variable resistance discharge testing of batteries or DC power supplies. The load automatically calculates and adjusts the discharge current based on the set resistance value to achieve

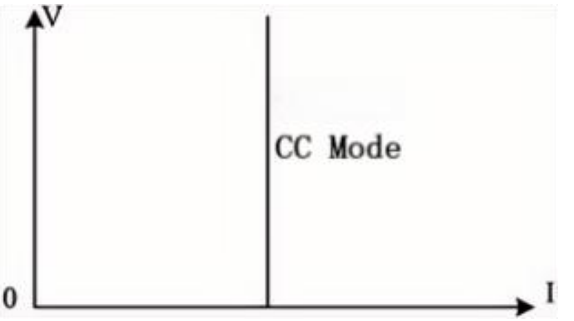
constant resistance discharge.

5. CP Mode: The load draws adjustable constant power, suitable for variable power discharge testing of batteries or DC power supplies. As voltage rises, current decreases to maintain constant power.
6. CDC Mode: Fully automatic single-cycle charge/discharge for battery capacity testing.
7. CDxN Mode: Customized charge-discharge cycle testing, supporting up to 99 cycles.
8. CDCDC Mode: Fully automatic dual-cycle charge/discharge for more comprehensive battery capacity testing.
9. BRT Mode: One-touch automatic battery internal resistance test.
10. PT Mode: Automatic charger current/power performance test.
11. CT Mode: One-touch automatic cable/conductor resistance test.

NOTE: The CDC, CDxN, and CDCDC modes require a constant-current power supply/charger/dedicated charger for automatic charging and discharging.

2.2.1 CC Mode Operation

In CC mode, the electronic load always draws a constant current regardless of the input voltage.



CC Mode Voltage-Current Relationship Diagram

Short press [Return/OK] to enter the CC mode screen. For button operations on this screen, refer to "2.1 Startup Instructions-4-(2) Button Functions Overview".

CC Mode Test Interface:



1. Set Discharge Current: Displays the currently set target constant discharge current. Please set this value appropriately according to the actual battery or power supply parameters.

2. Voltage Display: Real-time display of the actual voltage of the device under test.

3. Power Display: Real-time display of the actual discharge power.

4. Energy Display: Displays the energy value of the current discharge session.

5. Set Protection Parameters: Configure discharge stop voltage (discharge cutoff voltage, must be set to prevent

battery over-discharge), as well as over-power and over-temperature protection (optional, default values apply).

6. External Temp / MOSFET Temp / Fan Speed: Displays from left to right: external probe temperature, internal MOSFET temperature, and current cooling fan speed (shown as duty cycle).

7. Mode Display: Shows the currently active operating mode displays "CC mode" here.

8. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

9. Current Display: Real-time display of the set constant current value. A minus sign "−" in the upper-right corner indicates discharging.

10. Resistance Display: Real-time display of the equivalent load resistance calculated from the current voltage and current values.

11. Capacity Display: Displays the capacity value of the

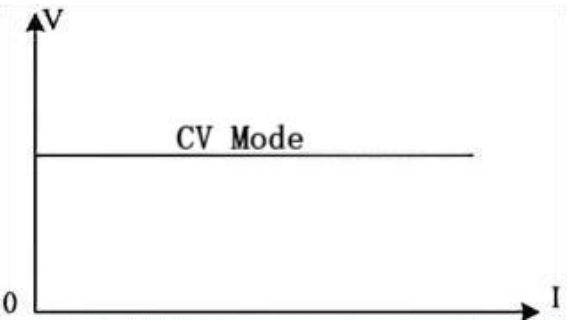
current discharge session.

12. Timed Discharge Countdown: Set discharge countdown time ranging from 0-99 hours, with a synchronized countdown display (set according to individual requirements).

13. Load Status: Displays "ON" or "OFF".

2.2.2 CV Mode Operation

In CV mode, the load adjusts the current draw to maintain the input voltage at the set value.



CV Mode Voltage-Current Relationship Diagram

NOTE: CV mode must NOT be used for battery testing! Forced use will burn out the MOSFETs!

Short press [Return/OK] to enter the CV mode screen. For button operations on this screen, refer to

"2.1 Startup Instructions-4-(2) Button Functions Overview".

CV Mode Test Interface:



1. Set Constant Voltage: Displays the currently set target constant voltage value.

2. Voltage Display: Display the current actual voltage value of the device in real time.

3. Power Display: Real-time display of the actual discharge power.

4. Energy Display: Displays the energy value of the current discharge session.

5. Set Protection Parameters: Configure discharge stop voltage (discharge cutoff voltage must be set to prevent

battery over-discharge), as well as over-power and over-temperature protection (optional, default values apply).

6. External Temp / MOSFET Temp / Fan Speed: Displays from left to right: external probe temperature, internal MOSFET temperature, and current cooling fan speed (shown as duty cycle).

7. Mode Display: Shows the currently active operating mode displays "CV mode" here.

8. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

9. Current Display: Real-time display of the actual current being drawn by the load. A minus sign "-" in the upper-right corner indicates discharging.

10. Resistance Display: Real-time display of the equivalent load resistance calculated from the current voltage and current values.

11. Capacity Display: Displays the capacity value of the

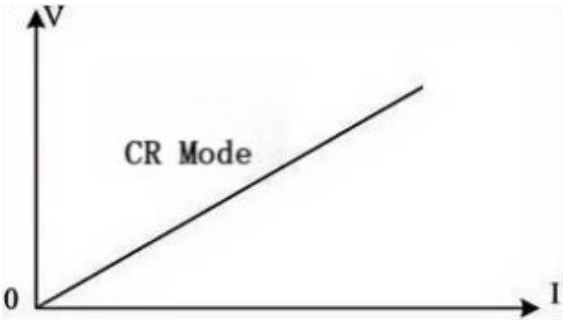
current discharge session.

12. Timed Discharge Countdown: Set discharge countdown time ranging from 0-99 hours, with a synchronized countdown display (set according to individual requirements).

13. Load Status: Displays "ON" or "OFF".

2.2.3 CR Mode Operation

In CR mode, the electronic load is equivalent to a resistor. The load adjusts the input current as voltage changes to maintain a constant resistance under load.

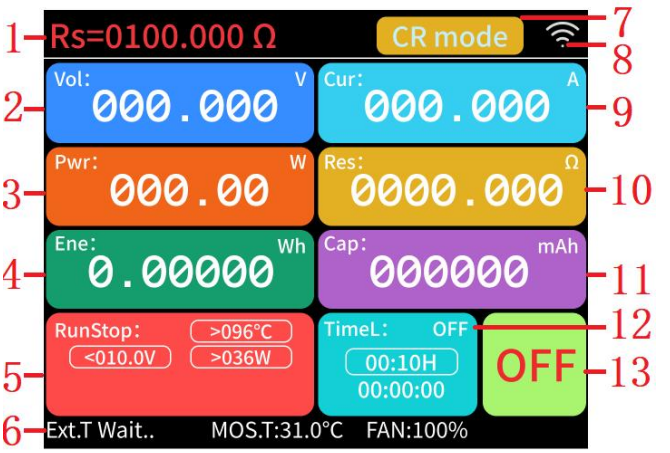


CR Mode Voltage-Current Relationship Diagram

Short press [Return/OK] to enter the CR mode screen. For button operations on this screen, refer to "2.1 Startup Instructions-4-(2) Button Functions

Overview".

CR Mode Test Interface:



1. Set Constant Resistance: Displays the currently set target resistance value. Please set this appropriately according to your test requirements.

2. Voltage Display: Real-time display of the actual voltage of the device under test.

3. Power Display: Real-time display of the actual discharge power.

4. Energy Display: Displays the energy value of the current discharge session.

5. Set Protection Parameters: Configure discharge stop voltage (discharge cutoff voltage-must be set to prevent

battery over-discharge), as well as over-power and over-temperature protection (optional, default values apply).

6. External Temp / MOSFET Temp / Fan Speed: Displays from left to right: external probe temperature, internal MOSFET temperature, and current cooling fan speed (shown as duty cycle).

7. Mode Display: Shows the currently active operating mode-displays "CR mode" here.

8. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

9. Current Display: Real-time display of the actual current automatically calculated and drawn by the load based on the set resistance. A minus sign " – " in the upper-right corner indicates discharging.

10. Resistance Display: Display the equivalent load resistance value calculated from the current voltage and current in real time.

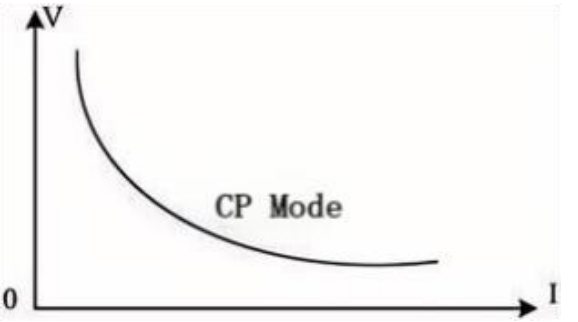
11. Capacity Display: Displays the capacity value of the current discharge session.

12. Timed Discharge Countdown: Set discharge countdown time ranging from 0-99 hours, with a synchronized countdown display (set according to individual requirements).

13. Load Status: Displays "ON" or "OFF".

2.2.4 CP Mode Operation

In CP mode, the electronic load draws a fixed power. The device adjusts the current as voltage changes to maintain the set power value.

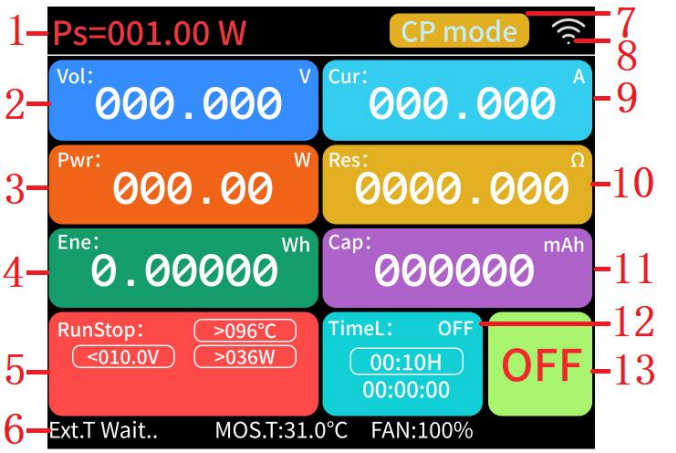


CP Mode Voltage-Current Relationship Diagram

Short press [Return/OK] to enter the CP mode screen. For button operations on this screen, refer to

"2.1 Startup Instructions-4-(2) Button Functions Overview".

CP Mode Test Interface:



1. Set Discharge Power: Displays the currently set target discharge power value. Please set this appropriately according to your test requirements.
2. Voltage Display:Real-time display of the actual voltage of the device under test.
3. Power Display:Real-time display of the actual discharge power.
4. Energy Display: Displays the energy value of the current discharge session.
5. Set Protection Parameters: Configure discharge stop

voltage (discharge cutoff voltage-must be set to prevent battery over-discharge), as well as over-power and over-temperature protection (optional, default values apply).

6. External Temp / MOSFET Temp / Fan Speed: Displays from left to right: external probe temperature, internal MOSFET temperature, and current cooling fan speed (shown as duty cycle).

7. Mode Display: Shows the currently active operating mode-displays "CP mode" here.

8. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

9. Current Display: Real-time display of the actual current automatically calculated and drawn by the load based on the set constant power value. A minus sign "–" in the upper-right corner indicates discharging.

10. Resistance Display: Real-time display of the equivalent load resistance calculated from the current

voltage and current values.

11. Capacity Display: Displays the capacity value of the current discharge session.

12. Timed Discharge Countdown: Set discharge countdown time ranging from 0-99 hours, with a synchronized countdown display (set according to individual requirements).

13. Load Status: Displays "ON" or "OFF".

2.2.5 CDC/CDCDC Mode Operation

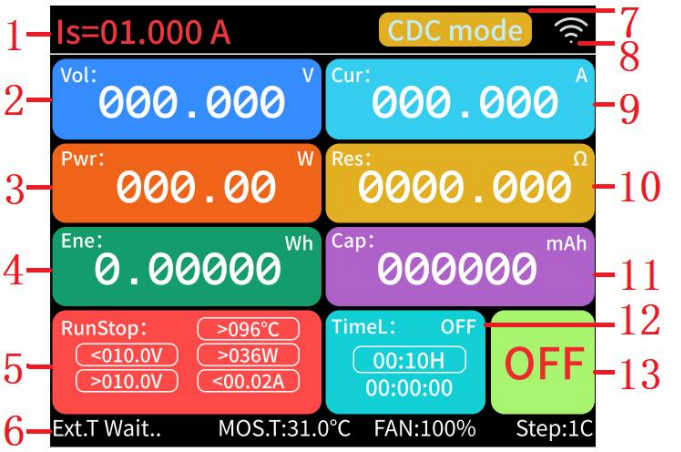
Before entering CDC/CDCDC mode, first connect the 10A Charging Switch Control Board (Optional accessory) and your constant current charger to the load's charger input port, then switch to the desired mode to easily perform battery capacity testing.

NOTE: Due to voltage drop in 10A Charging Switch Control Board, always set the constant current charger output voltage at least 3V above the nominal battery voltage to ensure normal charging. The charging

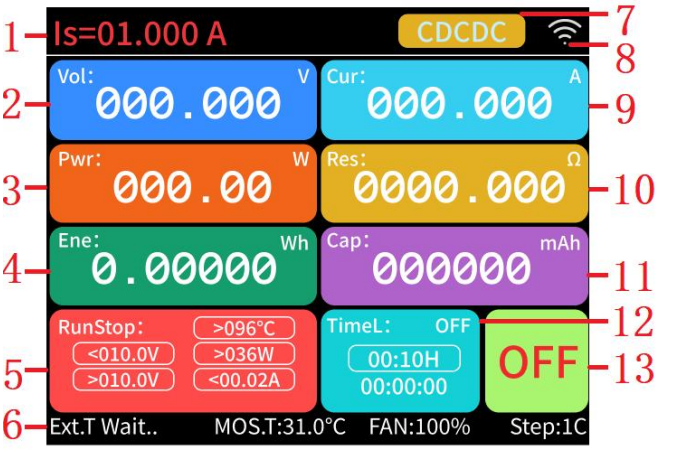
current is regulated by your own constant current charger.

Short press [Return/OK] to enter the CDC/CDCDC mode screen. For button operations on this screen, refer to "2.1 Startup Instructions-4-(2) Button Functions Overview".

CDC Mode Test Interface:



CDCDC Mode Test Interface:



1. Set Discharge Current: Displays the currently set target discharge current value. Please set this appropriately according to your test requirements.
2. Voltage Display: Real-time display of the actual battery voltage.
3. Power Display: Real-time display of the current charge/discharge power value.
4. Energy Display: Displays the current cumulative charge or discharge energy.
5. Set Protection Parameters: Configure discharge stop voltage (prevents over-discharge), full charge voltage (prevents over-charge), charge stop current, as well as over-power and over-temperature protection (optional, default values apply). Please set according to actual battery parameters.
6. External Temp/MOSFET Temp/Fan Speed/Stage: Displays from left to right: external probe temperature, internal MOSFET temperature, current fan speed (duty cycle), and current charge/discharge stage.

7. Mode Display: Shows the currently active operating mode displays "CDC mode" or "CDCDC".

8. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

9. Current Display: Real-time display of the current charge/discharge current. During operation, a plus sign "+" in the upper-right corner indicates charging; a minus sign "−" indicates discharging.

10. Resistance Display: Real-time display of the equivalent resistance calculated from the current voltage and current values.

11. Capacity Display: Displays the current cumulative charge or discharge capacity.

12. Timed Charge/Discharge Countdown: Set charge /discharge countdown time ranging from 0-99 hours, with a synchronized countdown display (set according to individual requirements).

13. Load Status: Displays "ON" or "OFF".

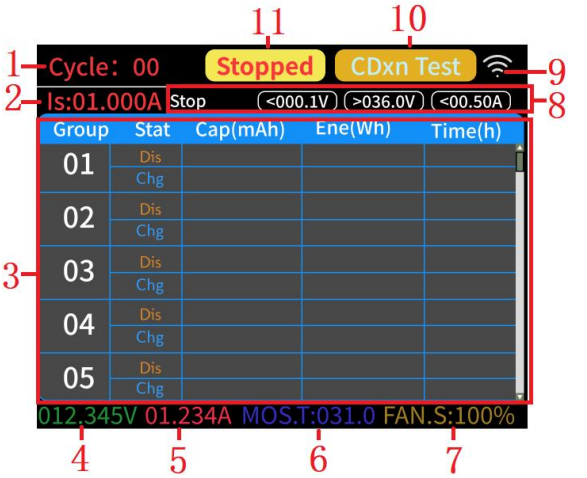
2.2.6 CDxN Mode Operation

In CDxN mode, users can set the number of charge/discharge cycles (up to 99 sets). The electronic load works with an external constant current charger to automatically repeat charge/discharge cycle testing, suitable for battery cycle life testing or durability evaluation.

NOTE: Due to voltage drop in 10A Charging Switch Control Board, always set the constant current charger output voltage at least 3V above the nominal battery voltage to ensure normal charging. The charging current is regulated by your own constant current charger.

Short press [Return/OK] to enter the CDxN mode screen. For button operations on this screen, refer to "2.1 Startup Instructions-4-(2) Button Functions Overview".

CDxN Mode Test Interface:



1. Cycle Count: Displays the target total number of cycles set.

2. Set Discharge Current: Displays the currently set target discharge current value. Please set this appropriately according to your test requirements.

3. Cycle Progress Status Display: Comprehensively displays real-time progress of the current cycle for each set, including set number, charge/discharge stage (charging/discharging), cumulative capacity, cumulative energy, and elapsed time per set. Short press [+]/[-] to switch between set screens.

4. Voltage Display: Real-time display of the actual

battery voltage.

5. Current Display: Real-time display of the current charge/discharge current value.

6. MOSFET Temperature Display: Real-time display of the internal MOSFET temperature.

7. Fan Speed Display: Displays the current cooling fan speed (shown as duty cycle).

8. Set Protection Parameters: Configure discharge stop voltage (prevents over-discharge), full charge voltage (prevents over-charge), and charge stop current. Please set according to actual battery parameters.

9. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

10. Mode Display: Shows the currently active operating mode-displays "CDxn Test".

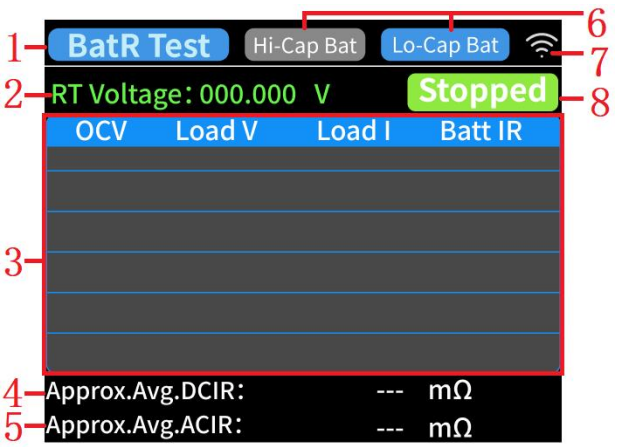
11. Load Status: Displays "Running" or "Stopped".

2.2.7 BRT Mode Operation

In BRT mode, the electronic load performs one-touch automatic battery internal resistance testing, suitable for quickly assessing battery health status.

Short press [Return/OK] to enter the BRT mode screen. Short press [Return/OK] again to start testing; the load automatically completes the measurement and displays the results.

BRT Mode Test Interface:



1. Mode Display: Shows the currently active operating mode-displays "BatR Test".

2. Current Voltage Display: Real-time display of the current output voltage of the power supply under test.

3. Measurement Display: Displays open-circuit voltage, loaded voltage, and loaded current, from which the battery internal resistance is automatically calculated.

4. Displays the DC voltage drop method comprehensive average internal resistance.

5. Displays the simulated AC comprehensive average internal resistance.

6. Battery Type Selection: Long-press the [Setup] key to enter parameter settings. Then, briefly press [Setup] to select the battery type (Hi-Cap Bat/Lo-Cap Bat). Finally, long-press [Setup] to confirm the battery type To optimize the test parameters.

7. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

8. Load Status: Displays "Running" or "Stopped".

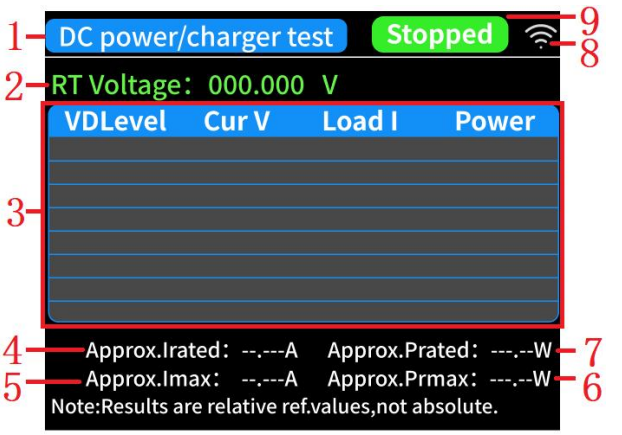
2.2.8 PT Mode Operation

In PT mode, the electronic load automatically tests

the maximum output current capability of power supplies or chargers, suitable for evaluating the load capacity of power adapters and chargers.

Short press [Return/OK] to enter the PT mode screen. After correctly connecting the power supply under test, short press [Return/OK] again to start testing. The load automatically increases current step by step until the power supply voltage drops significantly, thereby measuring the maximum output current and power.

PT Mode Test Interface:



1. Mode Display: Shows the currently active operating mode-displays "DC power /charger test".

2. Current Voltage Display: Real-time display of the

output voltage of the power supply under test.

3. Measurement Display: Displays the voltage drop threshold, current voltage, and load current, from which the output power is automatically calculated.

4. Displays rated output current.

5. Displays maximum output current.

6. Displays maximum output power.

7. Displays rated output power.

8. WiFi Status: Shows the current WiFi connection status icon. Gray = disconnected, blue = connected successfully.

9. Load Status: Displays "Running" or "Stopped".

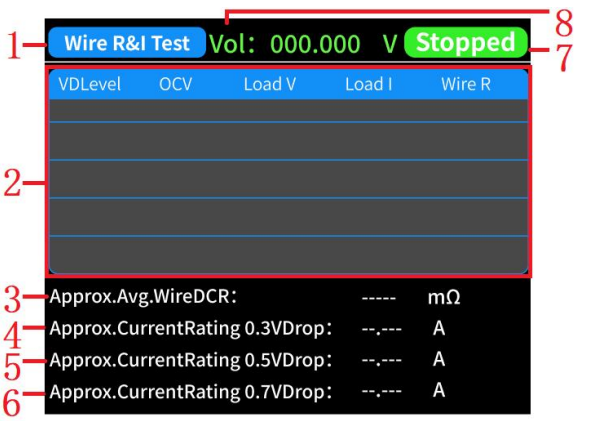
NOTE: Test results are relative values for reference only and should not be treated as absolute measurements.

2.2.9 CT Mode Operation

In CT mode, the electronic load automatically tests conductor resistance and current performance data. Short press [Return/OK] to enter the CT mode screen,

short press [Return/OK] again to start testing. The load automatically completes the measurement and displays the results.

CT Mode Test Interface:



1. Mode Display: Shows the current operating mode as "Wire R&I Test".

2. Measurement Display: Displays the voltage drop threshold, open-circuit voltage, loaded voltage, and load current, from which the conductor resistance is automatically calculated.

3. DC Conductor Resistance: Displays the DC voltage drop method comprehensive average conductor resistance.

4. 0.3V Drop Current: Displays the rated current value

at a 0.3V voltage drop.

5. 0.5V Drop Current: Displays the rated current value at a 0.5V voltage drop.

6. 0.7V Drop Current: Displays the rated current value at a 0.7V voltage drop.

7. Load Status: Displays "Running" or "Stopped".

8. Voltage Display: Real-time display of the output voltage of the power supply under test.

2.3 System Settings

On the main operating screen, short press [Return/OK] to enter the system settings screen. For button operations on this screen, refer to "2.1 Startup Instructions-4-(3) Button Functions Overview".

The following table lists the system settings menu items:

No.	Setting Item	Description
1	Language	Select system interface display language. Supports Chinese/ENGLISH switching
2	Screen Brightness	Set operating screen brightness

3	Standby Brightness	Set standby screen brightness
4	Standby Time	Time before screen automatically enters standby after inactivity
5	Discharge Time Limit	Set global discharge time limit (0-99 hours) Discharge,automatically stops when the set time is reached
6	Ext. Temp Calibration	Calibrate the external temperature probe when there is a deviation between displayed and actual temperature
7	Charge Stop Voltage	Set the maximum allowable battery voltage during charging to prevent over-charge damage
8	Discharge Stop Voltage	Set the minimum safe voltage drop during discharge to prevent battery over-discharge damage
9	Charge Stop Current	Set the charge termination current. Charging is considered complete when current falls below this value
10	Over Current Threshold	Set the overcurrent protection threshold for charge/discharge. Operation automatically stops and alarm triggers when exceeded

11	C/D Overpower Threshold	Set the overpower protection threshold for charge/discharge. Operation automatically stops and alarm triggers when exceeded
12	Probe Overtemp Threshold	Set the overtemp protection threshold for the external temperature probe. Operation automatically stops and alarm triggers when exceeded
13	MOSFET Overtemp Threshold	Set the overtemp protection threshold for internal MOSFETs. Operation automatically stops and alarm triggers when exceeded
14	C/D Transition Delay	Set the wait time interval between each charge/discharge phase
15	Zero Offset Current	Perform this operation to zero-calibrate when no-load current display is non-zero
16	Wi-Fi Reset	Clear current WiFi network information and restore the device to unpaired state
17	Clear Cumulative Data	Clear all cumulative charge/discharge data stored internally in the load
18	Factory ReSet	Restore all system parameters to factory defaults

19	Startup Info	Control whether the startup information screen is displayed (OFF/ON)
20	Minimum Discharge Current	The minimum discharge current value required for a load constant-current loop
21	Key Sound	Control whether a beep sound is emitted on button press (OFF/ON)
22	Alarm Sound	Control whether a beep sound is emitted on protection alarm (OFF/ON)

2.4 Communication Settings

This load supports three communication methods: USB HID, Modbus-TTL, and WiFi, enabling PC host computer control, automation system integration, and mobile app remote operation.

2.4.1 HID Communication

HID (Human Interface Device) communication connects to a computer via the HID interface on the load board. Combined with host computer software, it enables data monitoring and remote control, including

real-time test data viewing, curve recording, remote start/stop of discharge, and test report export.

1. Connection Steps:

(1) Use a Type-C data cable. Connect one end to the load board's HID communication interface and the other end to a computer USB port.

(2) Double-click to run "ELoad Electronic Load Control System.exe".

(3) Click the "CONNECT" button.

(4) After a successful connection, select the test mode (CC/CV/CR/CP, etc.) in the software and begin testing.

2. Driver Installation (Windows 7 Only):

Windows 10/11 systems are plug-and-play with no additional driver installation required. Windows 7 systems require manual installation of the CDC driver (USB serial device recognition driver).

Steps:

(1) Open the "drivers" folder in the software directory.

(2) Right-click on install_driver.bat.

(3) Select "Run as administrator".

(4) After installation is complete, reconnect the device and it will be recognized by the computer.

3. Firmware Upgrade:

At power-on, long press the [+] button to enter HID firmware upgrade mode.

Follow these steps in the host computer software to complete the upgrade:

(1) Click "Firmware" in the main software interface.

(2) Click "Enter Upgrade Mode" to enter upgrade mode.

(3) In the "Firmware File" field, select the firmware file to be updated.

(4) Click "Start Upgrade" to begin the upgrade.

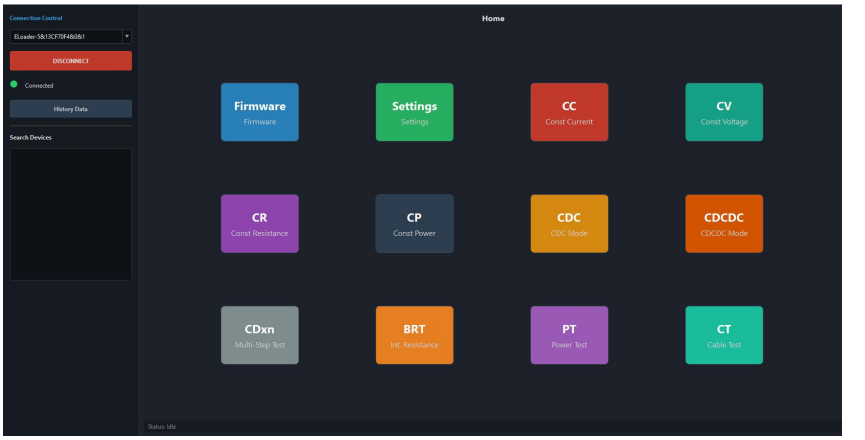
(5) Wait for the "Upgrade Progress" bar to reach 100% to complete the firmware update.

4. Host Computer Interface Description:

The host computer main interface serves as the operation entry point for each mode, providing core

functions such as device connection, mode selection, and data export.

Host computer main interface shown below:



The layout and operation logic of each mode screen is similar. CC (Constant Current) mode is used as an example below:



No.	Name	Function Description
1	Back	Return to Main Screen
2	E150AM	Device Name
3	Const Current	Current Operating Mode
4	VOLTAGE	Real-time display of current voltage (V)
5	CURRENT	Real-time display of current current (A)
6	POWER	Real-time display of current power (W)
7	RESIST	Real-time display of current load resistance (Ω)
8	CAPACITY	Capacity value of current discharge (mAh)
9	ENERGY	Energy value of current discharge (Wh)
10	EXT_T/ MOS_T / Fan	Displays from top to bottom: Real-time external ambient temperature, real-time MOSFET temperature, real-time fan speed duty cycle
11	RUN TIME	Current Test Elapsed Time
12	TOTAL TIME	Total Device Runtime This Session
13	Connected	Device status indicator
14	Current Is	In constant current mode, set discharge current value
15	<Discharge Cutoff V	Set discharge cutoff voltage
16	>Time Limit Stop	Set timed discharge countdown
17	>Stop Power	Set the over-power protection threshold for charge/discharge. Operation automatically stops and alarm triggers when exceeded

18	>Over Temp	Set over-temperature threshold. Operation automatically stops and alarm triggers when exceeded
19	START (Green) / STOP (Red)	Click to start/stop discharge test
20	Export	Export current test data (CSV/Excel format) and curve records
21	Rolling	Curve display mode: Rolling view-refreshes curves over time, showing only the most recent data segment
22	Accumulated	Curve display mode: Cumulative view-displays all curve data throughout the complete test process
23	VIP	Toggle curve/interface display of current voltage, current, and power data
24	MOS.T/Ext.T	Toggle curve/interface display of MOSFET temperature and external ambient temperature data
25	ELE/CAP	Toggle curve/interface display of energy and capacity data
26	Curve Settings	Curve parameter settings (e.g., axis range, sampling rate, curve color/display toggle, etc.)
27	Curve Display Area	Real-time display of current curve status

NOTE: Parameter changes must be confirmed by pressing the [Enter] key to take effect.

2.4.2 Modbus TTL Communication

Modbus TTL communication is used to integrate the electronic load into automated testing systems or industrial control environments. It supports the standard Modbus RTU protocol, allowing real-time data such as voltage, current, and power to be read via Modbus commands, as well as remote control of load start/stop and mode switching.

1. Interface Location: Modbus TTL interface on the load panel (XH2.54-4P connector).
2. Pin Definitions:

Pin	Signal	Description
G	GND	Power Ground
T	TX	Data Transmit
R	RX	Data Receive
3.3V	VCC	Power Positive (3.3V)

3. Communication Parameters: Default settings are 9600 baud rate, 8 data bits, 1 stop bit, no parity.
4. Please refer to the Modbus TTL communication documentation for details.

2.4.3 WiFi Communication

WiFi communication uses the built-in WiFi+ Bluetooth module**(Optional accessory)** to connect to a mobile app for remote control and data viewing. At power-on, long press the [-] button to enter WiFi firmware upgrade mode.

1. Pairing Preparation:

(1) Ensure the mobile phone is connected to a 2.4G WiFi network (5G is not currently supported).

(2) Enable mobile phone Bluetooth and location permissions.

(3) The electronic load must remain powered on.

2. Pairing Steps:

(1) Search for "Smart Life" in your mobile app store, then download and install the app.

(2) Open the app and tap "Add Device" in the top-right corner of the home screen.

(3) The app automatically searches for nearby devices. Once the load device is discovered, tap "Add".

(4) Enter the current WiFi network name and password, then wait for the connection to complete.

3. Reset WiFi:

To change networks, execute "WiFi Device Reset" in system settings. The device will return to its unpaired state, allowing you to redo network pairing.

2.5 150W Cascade Module Setup

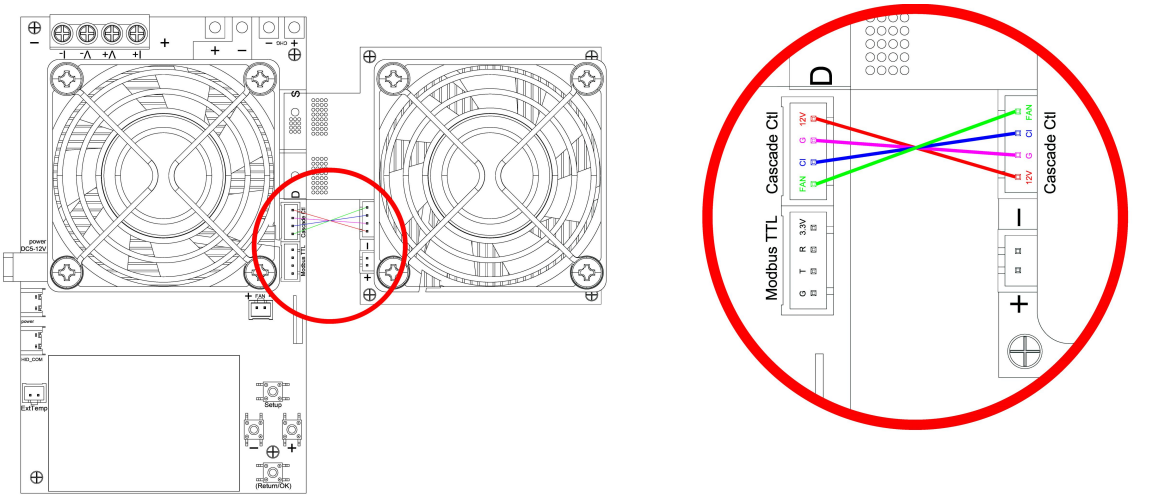
2.5.1 Connection Procedure

1. Securely fasten the input terminals of the expansion module to the cascade output port of the electronic load using screw-type connections.

2. Connect the control terminals of the expansion module to the cascade control port (Cascade Ctl) of the electronic load, following the pin-definition assignments to ensure correct wiring order, as shown in the figure below.

3. After confirming that all connections are secure, power on the electronic load.

The wiring diagram is shown below:



2.5.2 Setting the Overpower Threshold

1. Enter the Settings menu and select ”C/D Overpower Threshold” option.

2. Briefly press the [Setup] to enter value-editing mode:When an external expansion module is connected, the maximum allowable overpower threshold is 300 W. Without an expansion module, the ovepower threshold must be⩽155 W. Do not set a value exceeding this limit to avoid equipment damage.

Chapter III Technical Specifications

Load Model		eTM-E150AM	eTM-E300AM
Single Board or cascade		Single-motherboard (150W)	Single-motherboard (150W)+ Cascading Module (150W)
Number of Channels		Single Channel	
Rated Value	Voltage	0~150V	
	Current	0~25A	
	Power	0~150W	0~300W
CV Mode	Range	0~150V	
	Resolution	1mV	
	Accuracy	±(0.05%+0.025%FS)	
CC Mode	Range	0~25A	
	Resolution	1mA	
	Accuracy	±(0.05%+0.05%FS)	
CR Mode	Range	0.001Ω~9999.999Ω	
	Resolution	16Bit	
	Accuracy	±(0.1%+0.5%FS)	
CP Mode	Range	0~150W	0~300W

	Resolution	10mW	
	Accuracy	±(0.1%+0.5%FS)	
BRT Mode	Range	0~100 Ω	
PT Mode	Range	0~150W	0~25A
CT Mode	Range	0~100 Ω	
Product Size		eTM-E150AM:90(W) x 150(D) x 80(H) mm eTM-E300AM:185(W) x 150(D) x 80(H) mm	
Packaging Size		eTM-E150AM:165(W) x 185(D) x 110(H) mm eTM-E300AM:330(W) x 370(D) x 220(H) mm	
Product Net Weight		About 0.45 kg	About 0.7 kg
Weight With Package		About 0.6 kg	About 0.85 kg

Certificate of Conformity / Warranty Card

[After-Sales Service Details]

1. Software version updates are provided free of charge. Product quality issues arising from design, manufacturing/installation processes, or materials are covered by free replacement and repair.
2. Damage caused by force majeure events (such as floods, fires, earthquakes, war, etc.) or human factors (such as construction, cleaning, and other unintentional human factors) shall be resolved through mutual negotiation.
3. "One-year warranty, lifetime maintenance." After the warranty period ends, lifetime system maintenance is provided, with replacement parts charged at cost only.
4. The company assumes no liability for any other losses arising from product use.
5. Free warranty service is provided within 12 months (excluding accessories), with shipping costs borne by the sender (mainland China customers only).