User Manual

N35500 Series High Performance High Power Bidirectional Programmable DC Power Supply

Version: V20250206

Contents

1. Preface

Dear Customers,

First of all, we greatly appreciate your choice of N35500 series high performance high power bidirectional programming DC power supply (N35500 for short). We are also honored to introduce our company, Hunan Next Generation Instrumental T&C Tech. Co., Ltd.(NGI for short).

About Company

NGI is a professional manufacturer of intelligent equipment and test & control instruments, committed to developing, manufacturing battery simulators, power supplies, electronic loads, and many more instruments. The products can be widely used in the industries of battery, power supply, fuel cell, consumer electronics, new energy vehicle, semiconductor, etc.

NGI maintains close cooperation with many universities and scientific research institutions, and maintains close ties with many industry leaders. We strive to develop high-quality, technology-leading products, provide high-end technologies, and continue to explore new industry measurement and control solutions.

About User Manual

This manual is applied to N35500 series high performance high power bidirectional programming DC power supply, including installation, operation, specifications and other detailed information. The copyright of the manual is owned by NGI. Due to the upgrade of instrument, this manual may be revised without notice in future versions.

This manual has been reviewed carefully by NGI for the technical accuracy. The manufacturer declines all responsibility for possible errors in this operation manual, if due to misprints or errors in copying.The manufacturer is not liable for malfunctioning if the product has not correctly been operated.

To ensure the safety and correct use of N35500, please read this manual carefully, especially the safety instructions.

Please keep this manual for future use.

Thanks for your trust and support.

2. Safety Instructions

2.1. Safety Symbols

Please refer to the following table for definitions of international symbols used on the instrument or in the user manual.

Table 1

Symbol	Definition	Symbol	Definition
⎓	DC (direct current)	N	Null line or neutral line
~	AC (alternating current)	L	Live line
≂	AC and DC	I	Power-on
3~	Three-phase current	O	Power-off
⏚	Ground	⏻	Back-up power
⏚	Protective ground	⏻	Power-on state
⏚	Chassis ground	⏻	Power-off state
⏚	Signal ground	⚠	Risk of electric shock
WARNING	Hazardous sign	⚠	High temperature warning
Caution	Be careful	⚠	Warning

2.2. Safety Notes

In the operation and maintenance of the instrument, please strictly comply with the following safety instructions. Any performance regardless of attentions or specific warnings in other chapters of the manual may impair the protective functions provided by the instrument.
NGI shall not be liable for the results caused by the neglect of those instructions.

- **Confirm the AC input voltage before supplying power**.
- **Reliable grounding**: Before operation, the instrument must be reliably grounded to avoid the electric shock.
- **Confirm the fuse**: Ensure to have installed the fuse correctly.
- **Do not open the chassis**: The operator cannot open the instrument chassis. Non-professional operators are not allowed to maintain or adjust it.
- **Do not operate under hazardous conditions**: Do not operate the instrument under flammable or explosive conditions.
- **Confirm the working range**: Make sure the DUT is within N35500's rated range.

2.2.1. Personal Safety

- All connections must be made with the device power turned off to prevent personal injury or property damage due to improper operation.
- All operations must be performed by qualified personnel who are familiar with the associated risks, including professionals and trained personnel, as improper operation may result in fatal injury or equipment damage.
- Wearing conductive objects is strictly prohibited during the operation process to avoid electric shock burns.
- Special insulated tools must be used during the operation process to prevent electric shock injuries, and the insulation withstand voltage level must meet local laws, regulations, standards, and specifications.
- Special protective equipment must be used during the operation process, such as wearing protective clothing, insulated shoes, and insulating gloves.

2.2.2. Electrical Safety

- Do not use damaged equipment. Ensure that the equipment is free from damage before use, as damaged equipment may cause electric shock or fires.
- Before operating the equipment, make sure that the equipment's grounding terminal is properly grounded!
- The power cord is provided with the equipment upon shipment, and your equipment should be connected to a socket, junction box, or three-phase distribution box with protective grounding.
- During operation, prevent foreign objects from entering the interior of the equipment, as this may lead to equipment short-circuit failures, damage, and personal injury.
- Improper or incorrect operation may cause accidents such as fires or electric shocks.
- After using the equipment, turn off the power switch of the equipment before unplugging the power cord or disconnecting the terminal connectors, ensuring there is no dangerous voltage before touching the cables or terminal connectors.
- Cables are not allowed to pass through the equipment's intake or exhaust vents.

2.2.3. Environmental Safety

- Do not operate this equipment in environments containing explosive gases, vapors, or dust.
- Strictly prohibit the storage of flammable or explosive materials in the area where the equipment is located.

- Never place the equipment near heat sources or open flames, as exposure to heat may cause equipment damage or fires.
- During equipment operation, do not block the ventilation or cooling systems of the equipment, as this may damage the equipment or cause fires.
- Do not install the equipment near water pipes, air vents, air conditioning outlets, or other locations that are prone to condensation, to prevent liquid from entering the interior of the equipment and causing damage.

2.2.4. Mechanical Safety

- Do not use tools that are damaged, have failed inspection, or are beyond the inspection validity period to ensure tool reliability.
- When handling heavy objects, be prepared to bear the weight to avoid being crushed or injured by the heavy objects.
- Before installing equipment into a cabinet, first ensure that the cabinet is securely fastened to prevent the cabinet from tilting or collapsing due to instability, which could result in equipment damage or injury to the installer.
- Please do not install substitute parts on the instrument or make any unauthorized modifications.

3. Product

3.1. Brief Introduction

The N35500 series is a high power bidirectional programmable DC power supply with dual quadrant, integrating bidirectional power supply and regenerative load to supply and absorb current. With the design of wide range and high power density, voltage range 0~1500V, output power up to 42kW in 3U chassis, it covers a wide range of DUT test applications. N35500 series are equipped with fast dynamic response, high accuracy output and measurement functions, and can also be configured with photovoltaic simulation, battery simulation and other software to help users realize accurate and efficient testing in multiple scenarios.

3.1.1. Features

- High power density, up to 42kW output in 3U chassis
- Wide output range, one can be used as multiple
- High-speed dynamic response, voltage rise and fall time ≤ 5ms
- Voltage accuracy: 0.02%+0.02%F.S.; Current accuracy: 0.1%+0.1%F.S.
- CC&CV Priority suitable for all types of test item
- Battery simulation, charge/discharge test, sequence test, waveform function etc.
- PV array I-V curve simulation function (optional)
- 6.8 inch LDC screen for clear test information
- Standard with LAN/RS232/RS485/CAN communication
- Modbus-RTU, SCPI, CANopen protocol supportable
- High voltage slew rate ≥300V/ms
- Output function waveform can be customized

3.2. Appearance & Dimension

132.5mm(H)*428.0mm(W)*755.0mm(D)with output shield

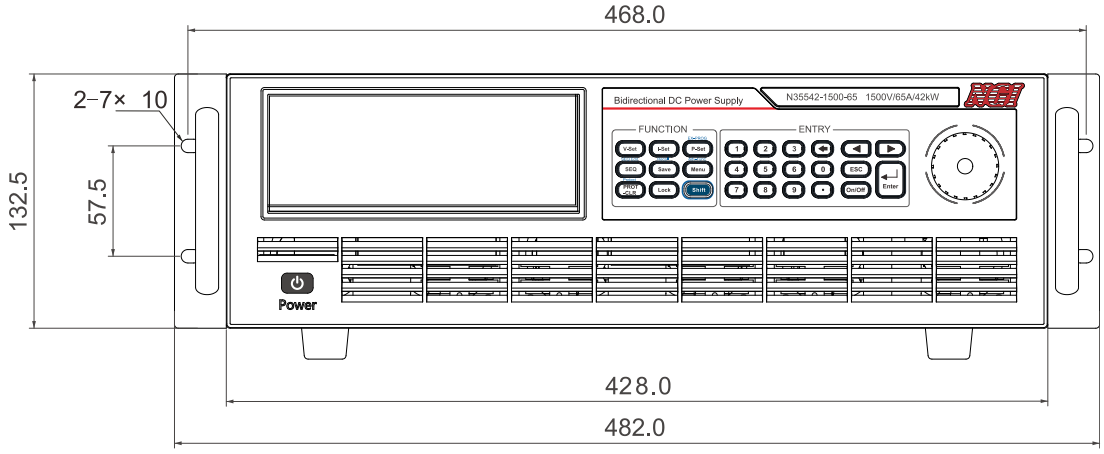


Figure 1 Front Panel Dimension(mm)

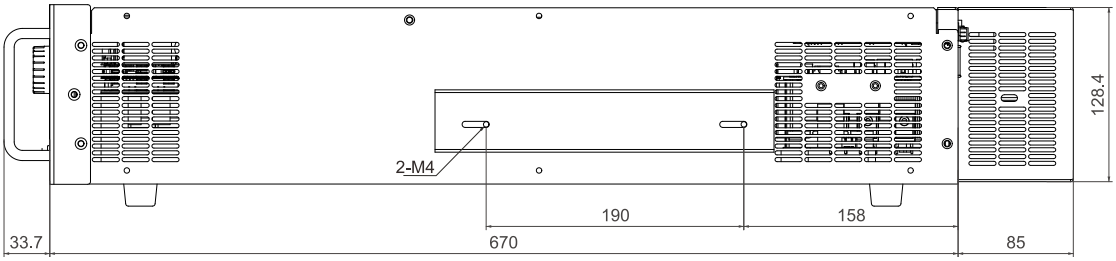


Figure 2 Side Dimension(mm)

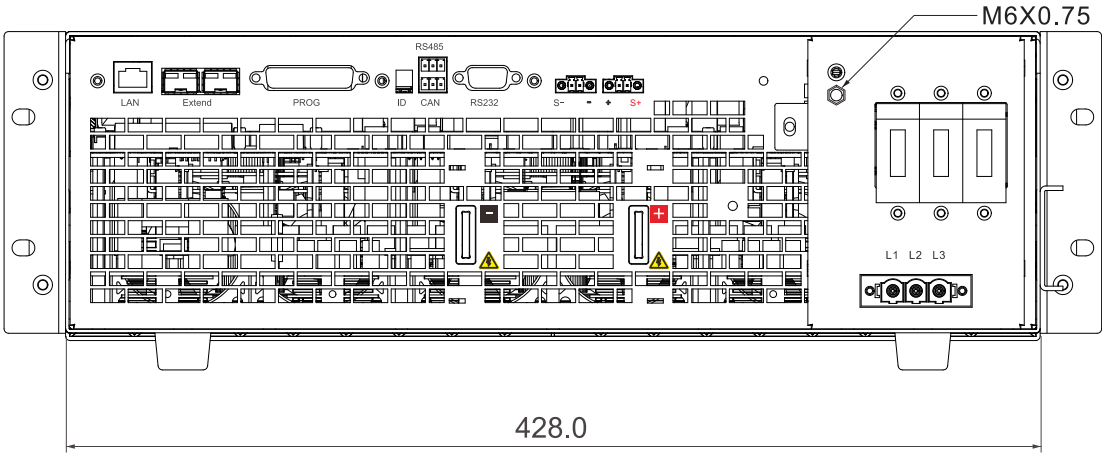


Figure 3 Rear Panel Dimension(mm)

3.3. Front Panel Introduction

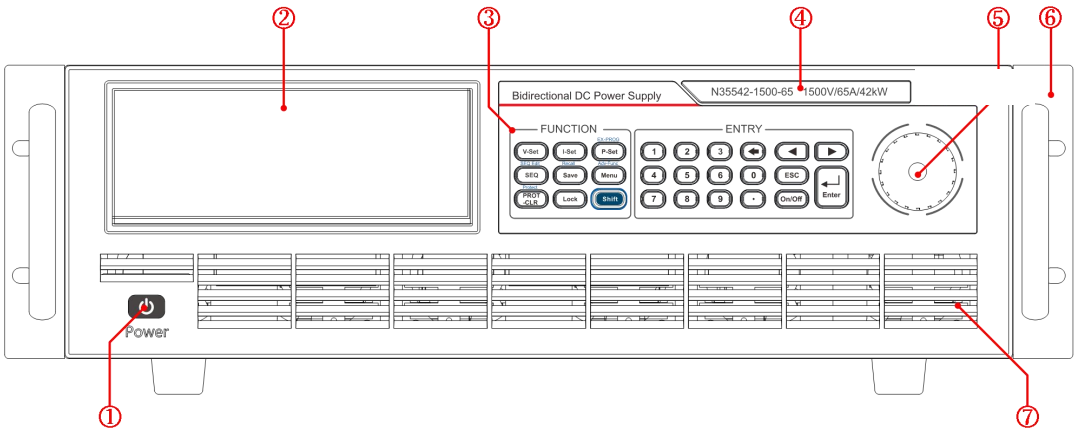


Figure 4 Front Panel

Table 2

Number	Name	Function
1	Power switch	Power control
2	Screen	Displaying data
3	Buttons	Operation mode
4	Device model	Displaying model number
5	Knob	Move cursor to adjust value size
6	Handle	Easy for moving
7	Air outlet	Exhaust outlet, cooling

3.3.1. Keyboard

N35500 front panel mainly includes a screen,knob and buttons.

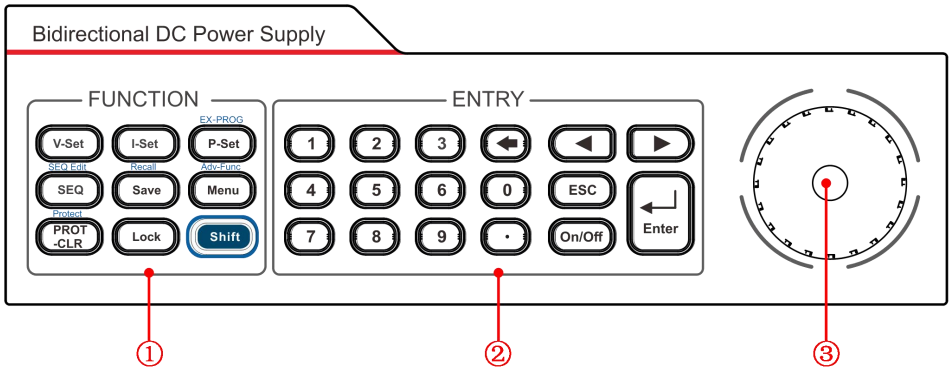


Figure 5 Buttons

Table 3

No.	Item
①	Functional button
②	Numeric button
③	Knob

3.3.1.1. Function Button

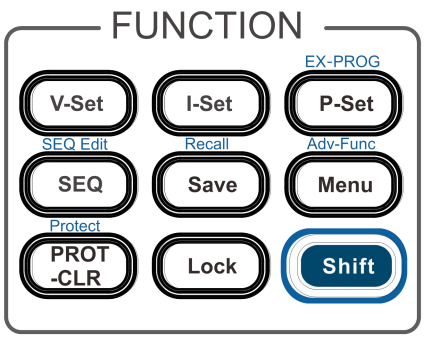


Figure 6 Function

Table 4

Button	Definition
[V-Set]	To set voltage
[I-Set]	To set source current, load current
[P-Set]	To set source power, load power
[SEQ]	Enter the SEQ test
[Save]	Save the parameters
[Menu]	Enter the main menu screen
[PROT-CLR]	To clear the fault indication or protection message
[Lock]	Lock/unlock
[Shift]	Compound function keys

[Shift+P-Set]（EX-PROG）	Pending
[Shift+SEQ]（SEQ Edit）	Enter the SEQ Edit interface
[Shift+Save]（Recall）	Recall the parameters setting
[Shift+Menu]（Adv-Func）	Enter the System interface
[Shift+PROT-CLR]（Protect）	Enter the Protection interface

3.3.1.2. Numeric Button

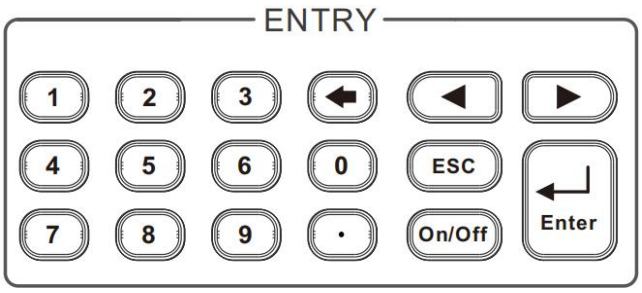


Figure 7 Function

Table 5

Button	Definition
1 ~ 9 , ·	To input digits
◄	To delete
◄ ►	To move cursor
Enter	To enter
ESC	To exit
On/Off	To turn on/off channel output

3.3.1.3. Knob

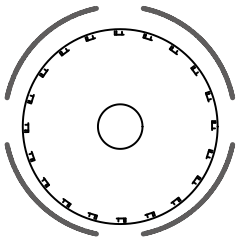
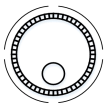


Figure 8 Knob

Table 6

Knob	Function
	By rotating: to select the required item, adjust the parameter By pressing: to enter the edit interface, confirm the input

3.3.2. Screen

The N35500 series power supplies feature a 6.8inch LCD high-definition color display.

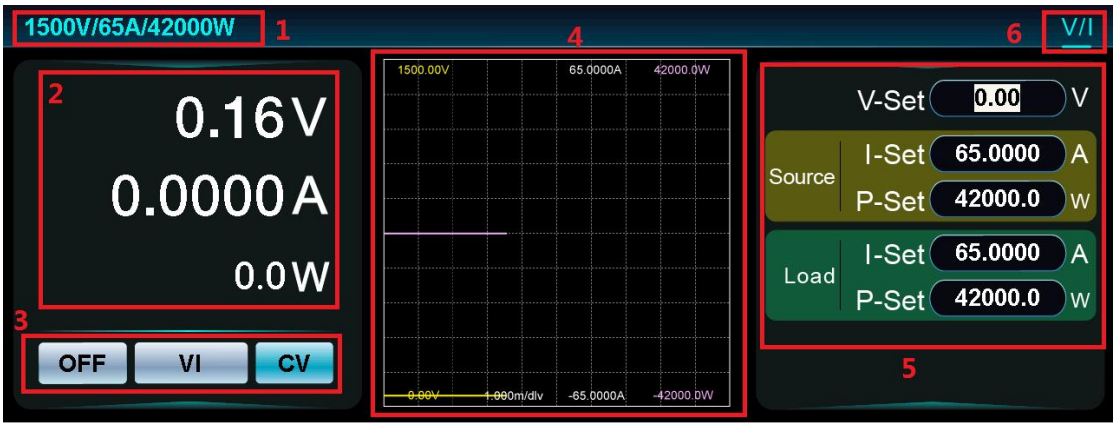


Figure 9 Screen

Table 7

No.	Definition	Description
1	Specification	N35500 series specification
2	CH Readback	Including current, voltage, power
3	Status	Output status: ON/OFF; Function mode: VI/CP/SEQ etc. Operation status:CC/CV

4	Waveform	Including voltage (yellow) /current (white)/power (pink)
5	Parameter Set	To set parameters
6	Function Mode	To display function mode
7	Alarm	OVP/OCP/OPP/OTP/UVP/UCP/MF

3.4. Rear Panel Introduction

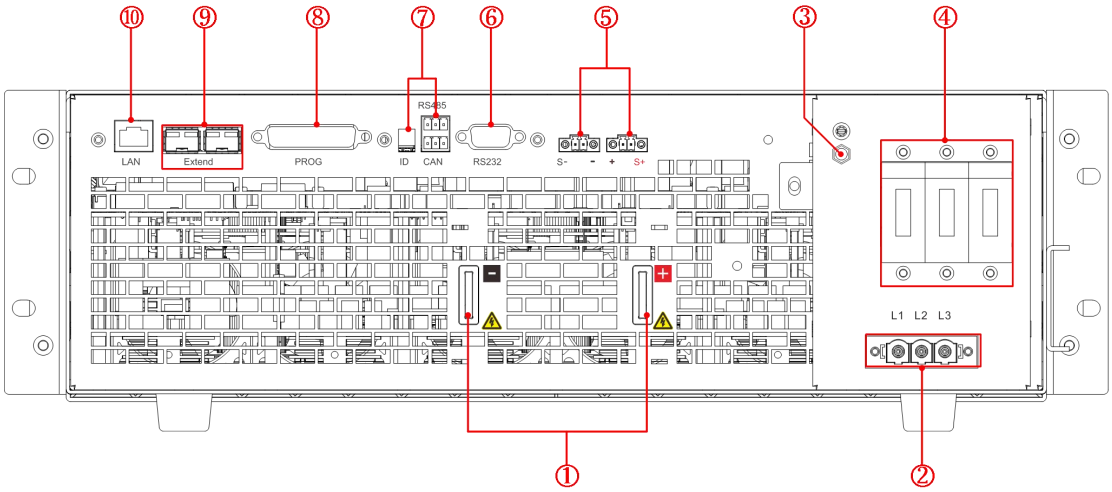


Figure 10 Rear Panel

Table 8

No.	Name	Definition
1	DC output interface	DC power supply output
2	AC input live wire	three phase, AC living terminal
3	AC input earth wire	three phase, AC grounding terminal
4	AC power switch	External AC power supply ON/OFF
5	Voltage sense interface	S+, S-, for voltage remote sense
6	RS232 interface	Serial port, for remote control
7	RS485 /CAN/Resistor	Connect RS485 and CAN
8	PROG interface	External programming interface
9	Extend interface	For parallel

10	LAN port	For communication control

3.4.1. AC Input Connection

Warning: Please confirm the AC input power and connect to correct AC power. Wrong AC power may cause serious damage to the instrument.

Notes for AC power input connection:

- AC input: 380VAC±10%， 47Hz~63Hz
- Reliable ground

3.4.2. DC Output Connection

Please select the proper output connection wire according to different power supply models. Do not use wires with smaller diameter to avoid overheating and danger. Please refer to the Recommended Wire Gauge Selection Table in Appendix.

Table 9

I-Range/A	Wire diameter/mm^2	Model	Set
0＜X≤30	6	OT-30A	1
30＜X≤50	10	OT-50A	1
50＜X≤80	16	OT-100A	1
80＜X≤125	25	OT-200A	1
125＜X≤175	35	OT-200A	1
175＜X≤250	50	OT-300A	1
250＜X≤475	95	OT-600A	1
475＜X≤600	120	OT-600A	1
600＜X≤750	150	OT-600A	1

I-Range/A	Wire diameter/mm²	Model	Set
750＜X≤1200	120	OT-600A	2

3.4.3. LAN Port

The N35500 series uses a standard RJ45 (LAN) interface for easy wiring, operation and system integration.

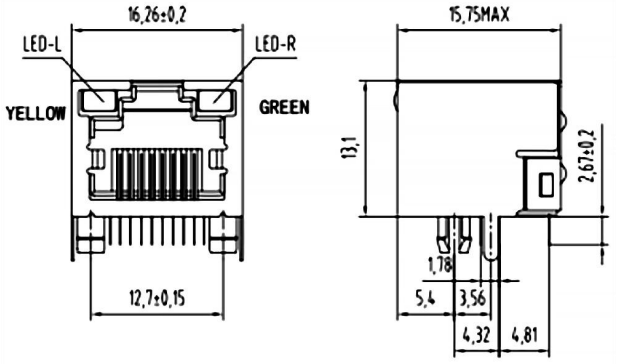


Figure 11 RJ45

The default connection to PC is via Ethernet. An Ethernet cable is provided as standard accessory in N35500 package. Default IP: 192.168.0.123.

Steps for connection to PC:

1. Check if N35500 is switched on properly.
2. Make sure the PC is switched on and its LAN port is working properly.
3. Connect one end of Ethernet cable to PC LAN port.
4. Connect another end of Ethernet cable to N35500 LAN port.
5. Check if the indicator light at LAN port on N35500 is flashing.

Note 1: If the indicator light at LAN port on N35500 does not flash after the Ethernet cable was plugged, please check whether the LAN port on computer is working properly, the information is correct and make sure the computer is switched on correctly, the IP address at the same segment.

Note 2: After completing the above operations, the indicator light at LAN port on N35500 will stop after a short flash. At this time, the hardware network connection

3.4.4. RS232 Serial Connection

N35500 can be connected with a controller by RS232 interface. A RS232 cable is provided as standard accessory in N35500 package. Default baud rate for RS232 interface is 115200.

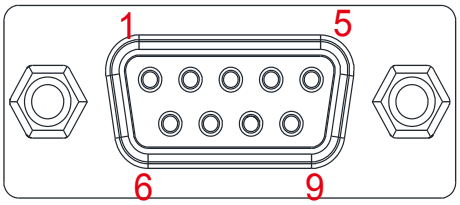


Figure 12 RS232 Interface

Table 10

Pin	Definition
1	NC
2	RXD, receive data
3	TXD, transmit data
4	NC
5	GND, ground
6	NC
7	NC
8	NC
9	NC

3.4.5. RS485/CAN Interface

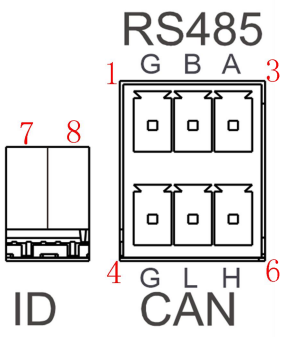


Figure 13 RS485/CAN Interface

Table 11

Pin	Item
1	GND
2	RS485_B
3	RS485_A
4	GND
5	CAN_L
6	CAN_H
7	RS485 Termination Resistor
8	CAN Termination Resistor

CAN termination switch down indicates access to a 120Ω resistor, which eliminates signal reflection at both ends of the bus and can speed up the recovery time from dominant to recessive, thus improving the bus's immunity to interference and the quality and stability of the signal. CAN termination switch up indicates that without a termination resistor, the reflection of the signal may be mistaken for a valid signal, which may lead to communication errors and data loss.

The 120 Ω resistor is calculated based on the actual wire harness characteristics. Taking two typical automotive cables and twisting them into a twisted pair gives an impedance of approximately 120 Ω, which is the recommended termination resistance for the CAN standard.

3.4.6. PROG Interface (Optional)

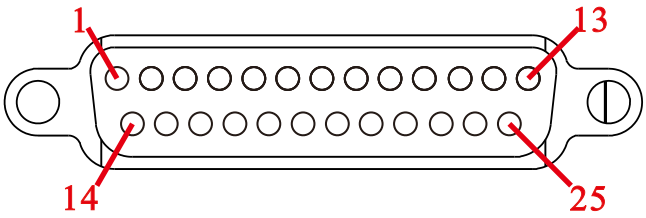


Figure 14 Programming Interface

The PROG interface, also known as external programming interface, has three types: input, output and analogue. Users can configure the corresponding functions of this interface to achieve the operation and monitoring of the operating status of the product. 6-channel input interface, 6-channel output interface can be individually configured functions to achieve different needs control.

The analogue interface function has been fixed, and the input range can be configured to control voltage, current and power when enabled. The functions of input and output interfaces are shown in the table

Table 12 Pin Definition

Type	Definition	Pin	Level	Description
Output	EXT_DO1	1	0-5V	Output interface, TTL high level defaulted
	EXT_DO2	14		
	EXT_DO3	2		
	EXT_DO4	3		
	EXT_DO5	16		
	EXT_DO6	4		
Input	EXT_DI1	17	0-5V	Input interface, OC (open collector) defaulted
	EXT_DI2	5		
	EXT_DI3	18		
	EXT_DI4	19		
	EXT_DI5	7		
	EXT_DI6	23		
Analog	V_REF	8	10V	10V reference output, 10mA loading capability
	I_MON	9	-10V-10V	This pin voltage can be configured to indicate the current or power at the output of N35500

	V_MON	10	0-10V	The voltage at this pin indicates the voltage at the output of N35500, and the value of this voltage is proportional to the output voltage.
	EXT_AIN1	11	0-10V	This pin can be configured as OFF or voltage externally given, and the voltage limit value of N35500 is set by the given voltage signal. The given voltage value is proportional to the output voltage, and its maximum range corresponds to the rated voltage of the output of N35500.
	EXT_AIN2	24	-10V-10V	This pin can be configured to indicate OFF (programming off), source current programming, load current programming, source power programming, load power programming
	EXT_AIN3	25	-10V-10V	This pin can be configured to indicate OFF (programming off), source current programming, load current programming, source power programming, load power programming
	EXT_AIN4	13	-10V-10V	This pin can be configured to indicate OFF (programming off), source current programming, load current programming, source power programming, load power programming
Ground	GND	15,6,20, 21,22,12		Negative of input, output, analog interface pins, common ground

3.4.7. Fiber Optic Interface (Optional)

The N35500 rear panel has two fiber optic interfaces. The current plan is to implement a column parallel connection for the interface on the right as shown in Figure15, and the interface on the left is reserved for a row parallel connection (temporarily held). Each optical interface has two terminals, with the left terminal being TX and the right terminal being RX. The interface definition is as shown in Table.

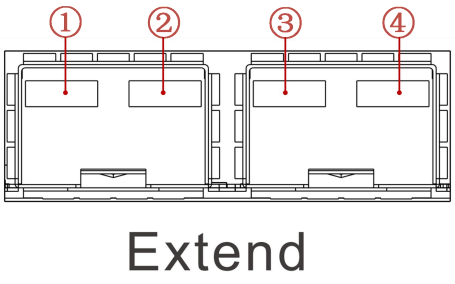


Figure 15 Fiber Optic Interface

Table 13

Pin	Definition	Description
①	NC	Reserved
②	NC	Reserved
③	TX	Send Info
④	RX	Receive Info

The connection method of the fiber optic interfaces is shown in Figure 16. The user settings for master-slave selection are sequentially 0, 1, 2...N, where N represents the last slave in the column parallel connection.

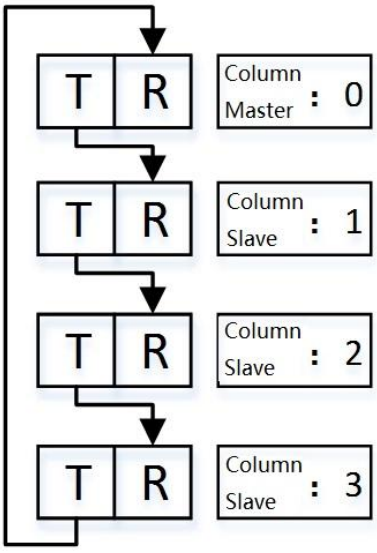


Figure 16 Connection

3.4.8. SENSE Terminal

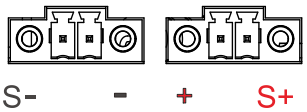


Figure 17 4-Wire Interface

SENSE terminal, also known as a four-wire interface, provides local sense and remote sense.

Table 14

Pin	Definition
S-	Remote sense negative
-	Remote sense negative, internally connected to the negative power supply output terminal
+	Remote sense positive, internally connected to power supply positive output terminal
S+	Remote sense positive

3.4.8.1. Local Sense

When local sense is employed, the output voltage is regulated at the power supply output terminals, and this method does not compensate for the voltage drop across the load line, so it is generally used when the load current is low, or the load regulation rate is not very critical.

3.4.8.2. Remote Sense

When N35500 is working, due to the parasitic resistance of the wire, the voltage at the load input terminal will be lower than the voltage at N35500 output terminal after the current flows through the wire, which will affect the output accuracy of N35500. N35500 series supports remote sense to compensate the voltage drop.

When using remote sense, please connect S+ to load input+ and connect S- to load input-.
Operation Steps:

- Shut off the power supply
- Remove the wire jumper from the 2PIN green connector.
- Select the appropriate wire to connect S+ to the positive terminal of the load and S- to the negative terminal of the load.
- Plug the connector into the 4-wire connector on the back panel of the power supply.
- Connect the power supply output terminals to the load normally
- Turn on the power supply

Note:

The compensated voltage drop at the SENSE terminal should not exceed 2V maximum.

3.4.9. Ground Terminal

The metal shielding of the N35500 series power supply is insulated from the internal live conductors, and the casing is normally uncharged. In order to prevent accidental occurrences from causing the shielding to become electrically charged, there is then a potential difference between the shielding and ground. If there is no good grounding and a person accidentally touches the shielding, then a pathway can be formed through the person to create danger. Therefore, a good connection must be made so that the shielding and ground are at equal potential. In addition, good grounding prevents the build-up of static electricity.

3.5. Model&Accessories Selection

3.5.1. Model Selection

Table 15

P / V	14kW	22kW	32kW	42kW
500V	N35514-500-65	N35522-500-130	N35532-500-180	N35542-500-195

750V	N35514-750-65	N35522-750-130	N35532-750-180	N35542-750-195
1000V	\	N35528-1000-65	\	\
1500V	\	N35522-1500-60	N35532-1500-60	N35542-1500-65
2250V	\	N35522-2250-60	N35532-2250-60	N35542-2250-65

3.5.2. Accessories Selection

When using N35500, users can separately purchase accessories to cope with different needs. Including the following:

1. AC power cord

Standard 2m power cord, 5m length power cord is optional.

2. Test cable

Optional. Different diameters are suitable for different currents. The length of test cable is 2m and 4m.

3. Parallel cable

Fibre optic parallel cable is optional, one cable is required for two single machines.

4. PROG cable

Interface standard, PROG cable optional.

5. SENSE wire

For remote sense.

6. Rack mounting kit

Can be installed in a standard 19-inch chassis.

Note

Accessories are sold separately, so user needs to purchase separately.

Table 16

Item	Definition
AC power cord	380V AC
Test cable	One each of red & black
Parallel wire	Fibre optic module, dual head, length 30cm

External programming	PROG interface
SENSE wire	RVVSP 2*0.3 ㎡
Kits	NF00Y

4. Inspection & Installation

4.1. Inspection

After receiving N35500, please check the instrument according to the following steps:

1. Check whether the instrument is damaged during transportation. If any severe damage to the package, please contact our authorized distributor or NGI.
2. Check accessories.
3. Check the whole instrument. If N35500 chassis is damaged or has abnormal operation, please contact our authorized distributor or NGI.

Table 17

Accessories	Pc	Description
AC power cord	1	380V AC
RS232 crossover cable	1	Female to female, length1.5m
Network cable	1	Blue, 2m
Plug-in connector （3.5-6Pin）	1	RS485 CAN interface, 3.5mm, 10Pin
D-Sub connector (25pin)	1	PROG interface
USB flash drive	1	8G
Test report	1	Test report
Cross Screws	2	M6*16
Quick Selection Guide	1	English type

Note

1. If there is missing or damaged equipment, contact NGI immediately. Please do not send the device back until you have received a positive answer.
2. If you confirm that there is no problem with the packaging, please store it properly. The instrument should be returned to the factory for service in accordance with the packing requirements.

4.2. Connection to Power Cord

Before connecting the power cord, observe the following precautions to prevent electric shock and damage to the instrument:

Warnings

- Make sure that the voltage matches the rated voltage of the instrument;
- Make sure the power switch is off;

According to the input power to select the power cord wire diameter, L1, L2, L3 were connected to the three-phase A, B, C, chassis grounding to earth wire.

The three-phase wire and earth wire are connected to the N35500 AC input port, and the AC input wiring is as shown in the figure, with no phase sequence requirement.

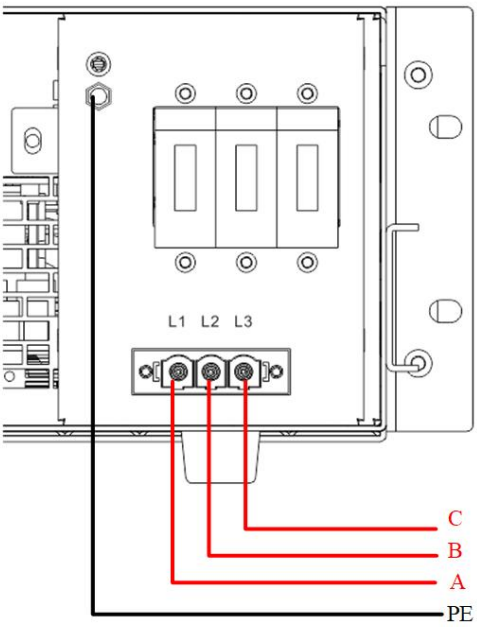


Figure 18 AC input wiring

4.3. Power-on Test

After N35500 is powered on, please check the device according to the following steps.

- Power-on test includes two parts: power-on and output inspection.

1. Power-on

Press **POWER** to switch on the power supply, if the power supply can not start normally, users should first check whether the power cord is connected, whether the power supply has been powered, whether the power switch has been turned on.

Figure 19 Power-on test interface

Warnings

When the power switch is off, some components inside the power supply may still carry a high voltage, to avoid the risk of electric shock, it is prohibited to open the cover.

2. Output Inspection

- Output Voltage Inspection

Steps to verify N35500's basic voltage function without connecting to a load:

1. Turn on the power switch.

2. Set the power supply voltage value to 1V.

3. Turn on the output.

4. Check that the voltage value displayed on the screen is close to the set voltage value.

5. Ensure that the supply voltage can be adjusted from 0V to the maximum voltage within the range.

- Output Current Inspection

Steps to verify N35500's basic current function during output short-circuited:

1. Turn on the power switch.

2. Ensure that the power output status is OFF.

3. Connect an insulated wire to the output of the power supply to short-circuit the positive and negative terminals, and the wire used should be able to withstand the maximum output current of the power supply.

4. Set the current value to 1A.

5. Turn on the output.

6. Check whether the current displayed on the screen is close to the set current value.

7. Ensure that the power supply current can be adjusted from 0A to the maximum current value within the range.

4.4. Connection of the DUT

4.4.1. DUT connection cable

N35500 series power supply does not come with a connection cable for the device under test, users need to choose their own wiring. The following points should be noted when selecting wiring:

- The maximum allowable current of the wires.
- The insulation level of the wire should not be lower than the maximum output voltage of the power supply.
- Maximum wire length and line voltage drop
- Noise and impedance effects on the load line.

1) Maximum Allowable Current

The following two factors should be considered when selecting the wire diameter:

1. The wire should be thick enough to avoid overheating when carrying rated current or short circuit current (whichever is greater).
2. The wire diameter should be reasonably selected so that the voltage drop on each wire is as small as possible to prevent excessive cable consumption, which affects the load regulation rate (although the N35500 series power supply can use the remote sense function to compensate for voltage, it is still recommended to minimise the voltage drop).

2) Influence of noise and impedance

In order to reduce noise or radiation, the DUT connection line and the remote sampling line should use twisted-pair cable with the shortest possible length. Shielded wires must be used in high noise environments. The shield is connected to the enclosure by a ground screw on the rear panel.

Even if the noise is not significant, the line and the remote sampling line should be twisted to reduce coupling and contribute to the stability of the power supply. The remote measurement line must be separated from the power input line.

Twisted-pair load lines reduce parasitic inductance in the cable and prevent high-frequency voltage spikes at the load terminal and power supply output caused by variations in load current.

The impedance between the power supply output and the load end makes the ripple noise at the load end greater than the ripple noise at the power supply rear panel terminals. If necessary, an additional filter loop with a bypass capacitor can be connected at the load side to limit the high-frequency load current.

4.4.2. 2/4-wire connection

The rated output voltage of the N35500 series power supplies is greater than the safe voltage, and hazardous voltages may be present at the output and at the connection to the equipment under test. To protect the user from accidental exposure to hazardous voltages, ensure that the equipment under test and its connections are free of any accessible live parts. Ensure that the insulation class of the connection line of the equipment under test is greater than or equal to the maximum output voltage of the power supply.

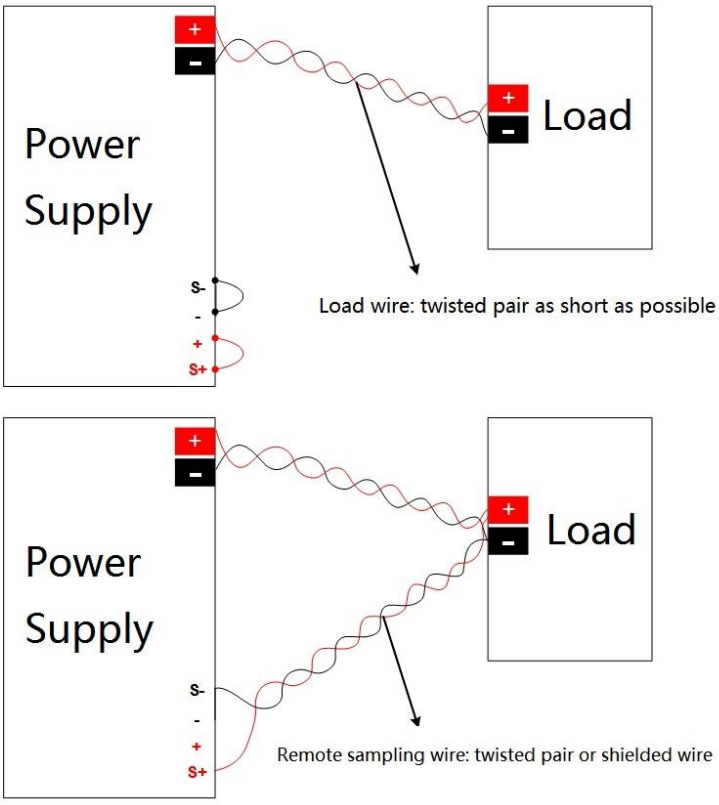


Figure 20 Four wire sense connection

4.5. Control Connection

The '+' and '-' terminals of the N35500 are connected to the DUT, and the wire diameter, length and polarity should be noted when connecting. Please avoid small wire diameters that may affect the accuracy of the test, or safety accidents that may be caused by large heat generation. N35500 can be connected to a computer via a network cable. Make sure that the wires are correctly connected and the communication settings are correct before powering on the computer. N35500 series

power supplies can also be controlled by multiple units at the same time.

If LAN communication is used, users need to connect the LAN of multiple N35500s to the computer via network cable.

Before powering up and connecting to the computer, check if the connection is correct and make sure that the IP addresses of all N35500s are not duplicated. N35500 series power supply adopts UDP network communication mode, users can set the IP address, the default port number is 7000 and the default ID is 1.

The device supports signal communication, including RS232\RS485 and CAN communication. When RS232/RS485 communication is used, the baud rate needs to be set. The baud rate can be set to 9600, 19200, 38400 and 115200, and the default is 115200. When using CAN communication mode, users need to set CAN ID and CAN baud rate, CAN ID setting range is 1~127, default is 1.

The remote control is shown in the figure.

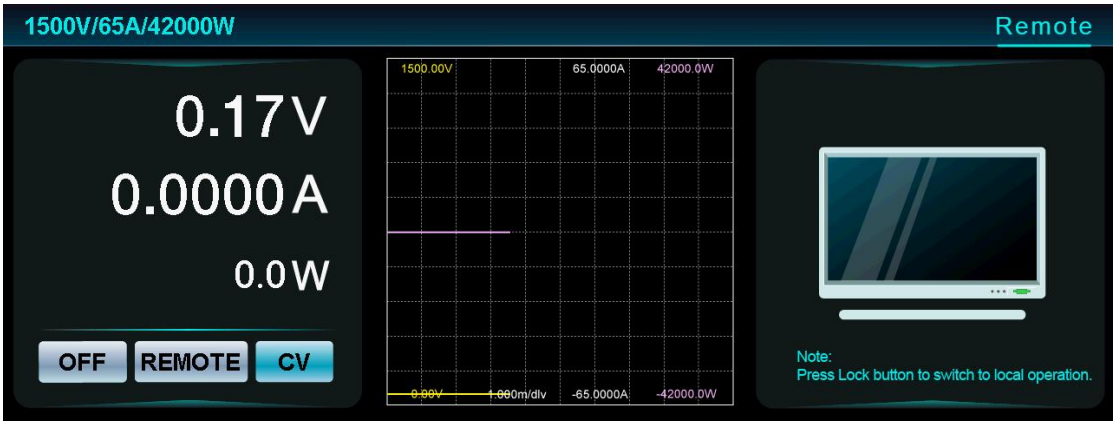


Figure 21 Remote Mode

5. Operation

N35500 series provides V/I mode, SEQ mode, SEQ Edit, Charge mode, Discharge mode, SR, CR, Protection, Wave, Parallel, Application, System, Factory Reset, About Us. Users can enter the required mode by pressing the corresponding button on the front panel.

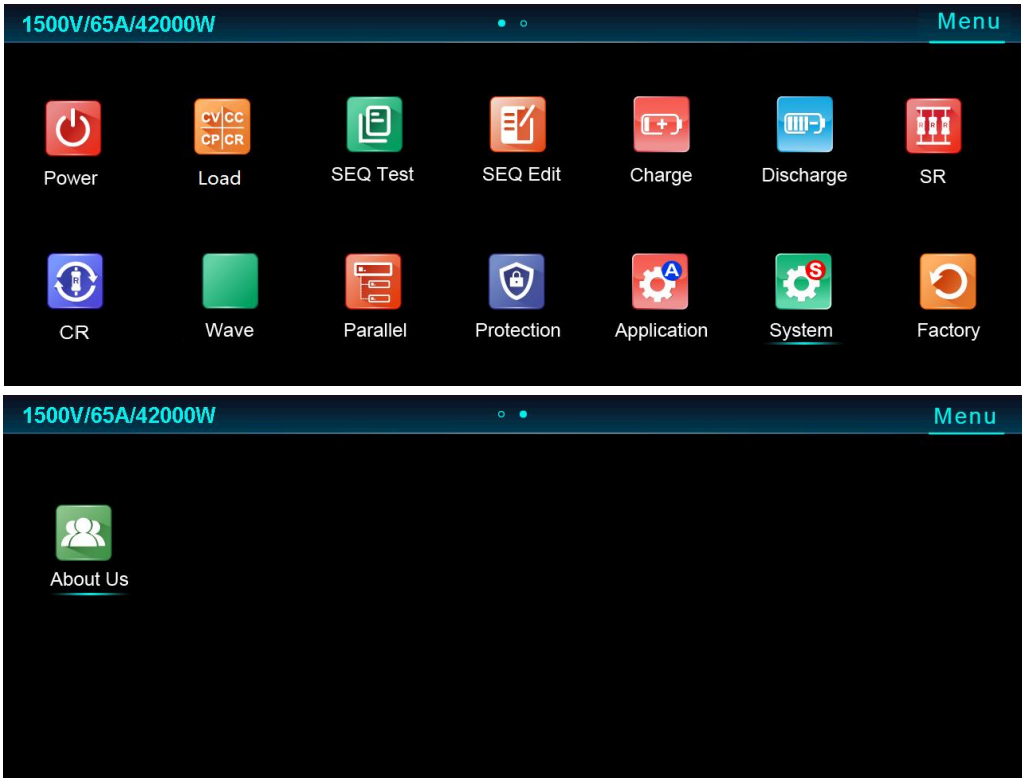


Figure 22 Main Menu

5.1. Parameter Setting

5.1.1. Numeric Input

Numeric input is used to input digit, such as voltage, slew rate, protection threshold, IP address, etc.

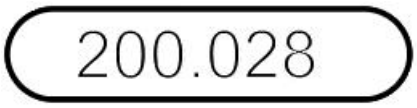


Figure 23 Numeric Edit

Steps for numeric input:
1. Press [◄] [►] or rotate the knob to move the cursor to the numeric input box.
2. Press [**Enter**] or the knob. The input box is now editable.
3. Press numeric buttons to input the value or press [◄] [►] to move the cursor and rotate the knob to adjust the numeric.
4. It will take effect immediately after the value is changed.
5. Press [Enter] or [ESC] or the knob to exit.

Warning: The value input should be within the rated range or upper limit(Max) & lower limit(Min).

5.1.2. Selection Operation

Selection operation is used to select parameters, such as power-off memory, CC/CV priority, master/slave option, etc.

Figure 24 Selection Operation

Steps for selection operation:
1. Press [◄] [►] or rotate the knob to move the cursor to the selection box.
2. Press [**Enter**] or the knob. The selection box is now editable.
3. Press [◄] [►] or rotate the knob to select the required option.
4. It will take effect immediately after the option is selected.
5. Press [**Enter**] or [**ESC**] or the knob to exit.

5.2. V/I Mode

5.2.1. Source/Load

N35500 series products have two operating states: source and load. When used as a power supply, the energy provided by the device is in the source mode, and the current and power readback are positive. When used as a load, the device absorbs external energy and returns to the power grid in the load mode. In this case, the current and power readback are negative. The conversion of the source and load state is determined by the set voltage of the power supply and the external voltage. After the bidirectional power supply is turned on, when the set voltage of the power supply is lower than the external voltage, the device is in the load mode, otherwise it is the source mode.

5.2.2. Operation Mode

N35500 has three operation modes, constant voltage (CV), constant current (CC), and constant power (CP). When N35500 output is turned on, the status display area will display the present output mode.

CV: When the actual output source(load) current is less than the source(load) current setting value and the actual output source(load) power is less than the source(load) power setting value, the power supply operates in source(load) CV mode, and the voltage outputs according to the setting value.

CC: When the actual output source(load) current reaches the source(load) current setting value, the power supply operates in source(load) CC mode. At this time, the output source(load)current outputs according to the current setting value.

CP: When the actual output source(load) power reaches the source(load) power setting value, the power supply operates in source(load) CP mode. At this time, the output source(load) power outputs according to the power setting value.

5.2.3. Operation Steps

Methods to enter **V/I** mode:

Method 1: Press 

or 

on the front panel directly.

Method 2: Press 

→ Select **V/I** by 
or 
→ Press 
or 

.

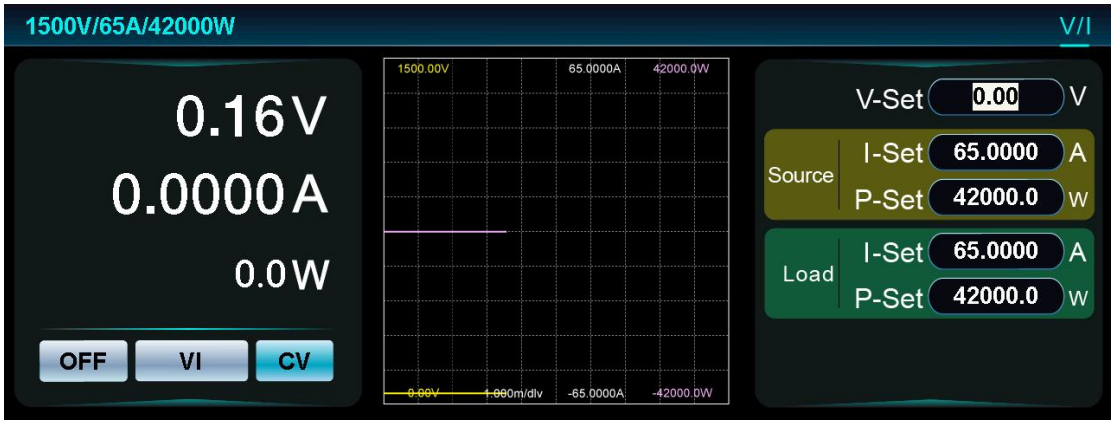


Figure 25 V/I Mode

Under V/I mode, users can set voltage, source current, load current and source power, load power. N35500 will begin to output after setting is completed and 

is pressed.

5.3. Load Mode

N35500 series can work in the following 4 operation modes:

Constant Current (CC)

Constant Voltage (CV)

Constant Resistance (CR)

Constant Power (CP)

5.3.1. Constant Current (CC)

5.3.1.1. Function Description

Under CC mode, N35500 series will sink a constant current regardless of the input voltage.

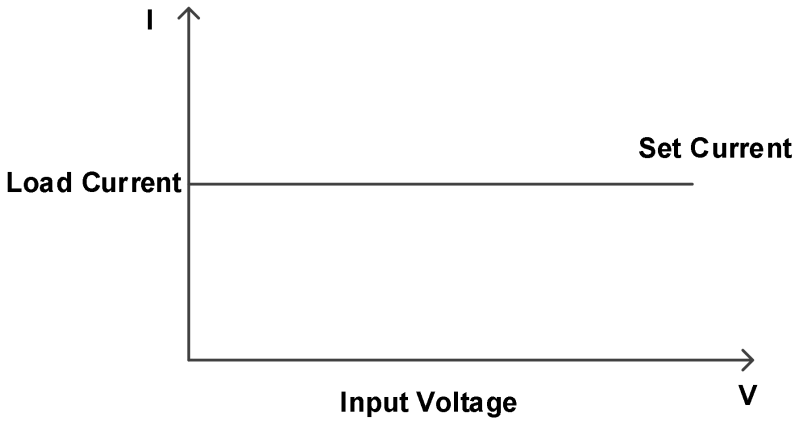


Figure 26 Constant Current Mode

5.3.1.2. Operation Steps

Please refer to the specification table for current and slew.

1. Select Load Mode in the main menu;

2. Select Load-CC as the working mode.

3. I-Set: input by numeric keys, press Enter to confirm;

4. I-Slew: input via numeric keys, press Enter to confirm;

5. Press On/Off key, the load is ON, the display channel status is ON, as shown in the figure;

6. Press ON/OFF key, the load is OFF, the test is completed. The display channel status is marked OFF.

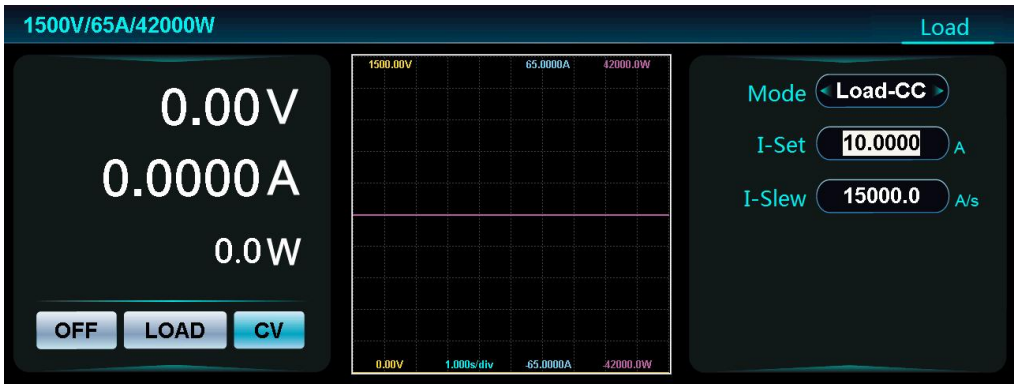


Figure 27 CC mode

5.3.2. Constant Voltage (CV)

5.3.2.1. Function Description

Under CV mode, N35500 attempts to sink enough current to maintain the input voltage at the set value.

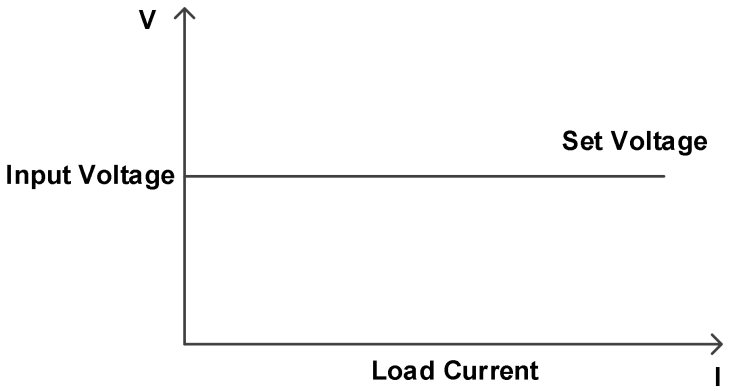


Figure 28 CV mode

5.3.2.2. Operation Steps

Please refer to the specification table for voltage and CV rate.

1. Select Load Mode in the main menu;

2. Select Load-CV as the working mode.

3. V-Set: input by numeric keys, press Enter to confirm;

4. V-Rate: input via numeric keys, press Enter to confirm;

5. Press On/Off key, the load is ON, the display channel status is ON, as shown in the figure;

6. Press ON/OFF key, the load is OFF, the test is completed. The display channel status is marked OFF.

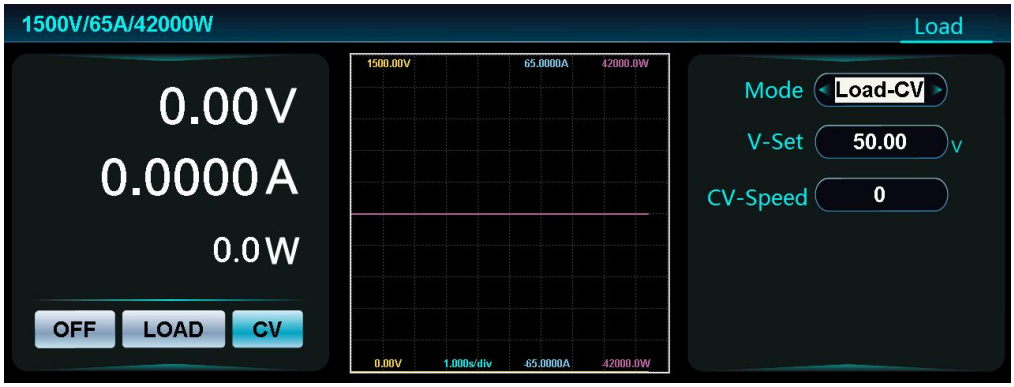


Figure 29 Constant Voltage Mode

5.3.3. Constant Resistance (CR)

5.3.3.1. Function Description

Under CR mode, N35500 is equivalent to a constant resistance, and the pulling current changes with the input voltage.

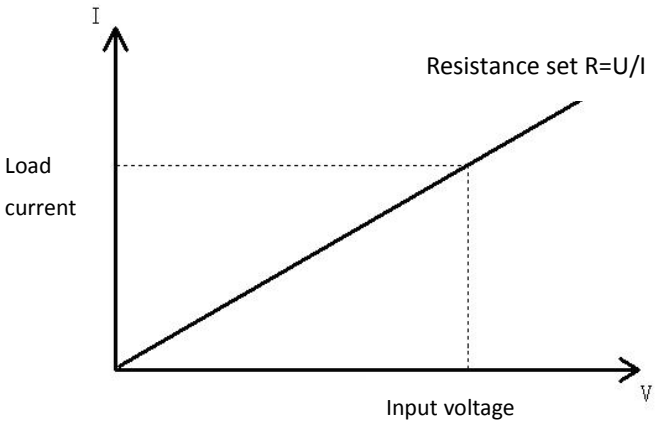


Figure 30 CR mode

5.3.3.2. Operation Steps

Please refer to the specification table for resistance.

1. Select Load Mode in the main menu;

2. Select Load-CR as the working mode.

3. R-Set: input by numeric keys, press Enter to confirm;

4. Press On/Off key, the load is ON, the display channel status is ON, as shown in the figure;

5. Press ON/OFF key, the load is OFF, the test is completed. The display channel status is marked OFF.

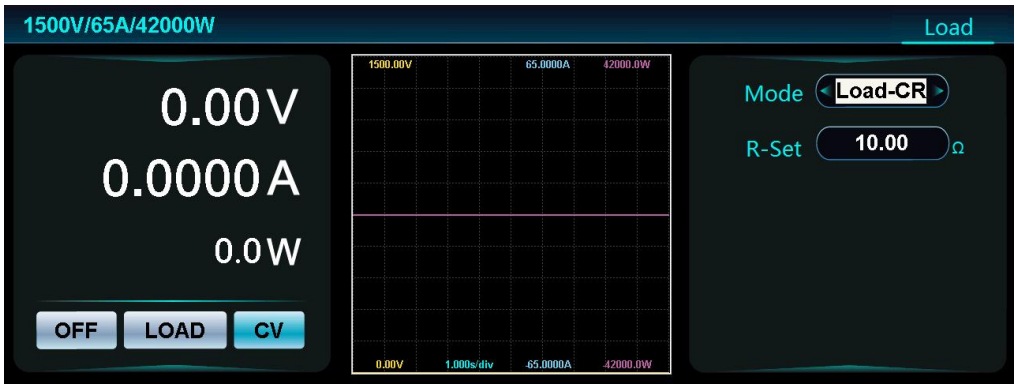


Figure 31 CR mode

Remarks

The external power supply must operate in CV mode. Ensure that the set resistance is greater than the output voltage/output current of the power supply. Failure to do so will cause the power supply to switch to CV/CC mode.

5.3.4. Constant Power (CP)

5.3.4.1. Function Description

In constant power mode, the device operates at the set power, if the input voltage increases, the input current will decrease and the power (P=UI) will be maintained at the set power. The operating curve is schematically shown in the figure.

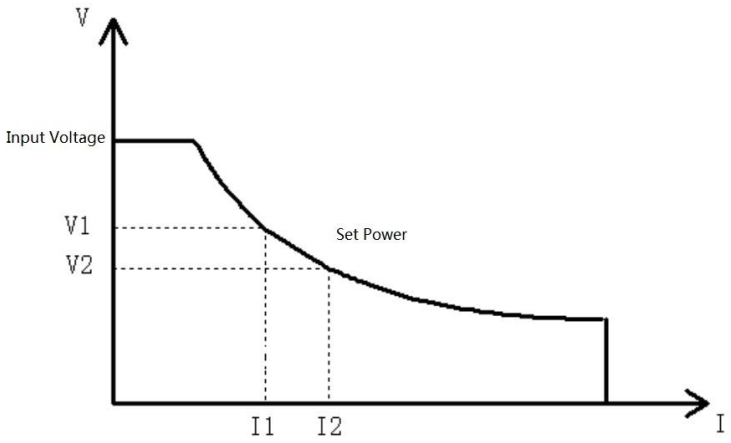


Figure 32 CP mode

5.3.4.2. Operation Steps

Please refer to the specification table for power.

1. Select Load Mode in the main menu;

2. Select Load-CP as the working mode.

3. P-Set: input by numeric keys, press Enter to confirm;

4. Press On/Off key, the load is ON, the display channel status is ON, as shown in the figure;

5. Press ON/OFF key, the load is OFF, the test is completed. The display channel status is marked OFF.

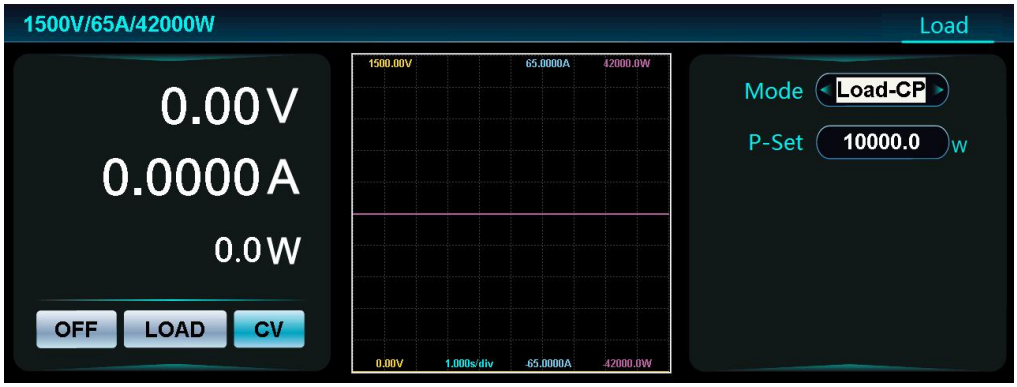


Figure 33 CP mode

5.4. SEQ Edit

N35500 series supports SEQ Edit, with up to 10 sequence files and Max. 1000 steps per file.

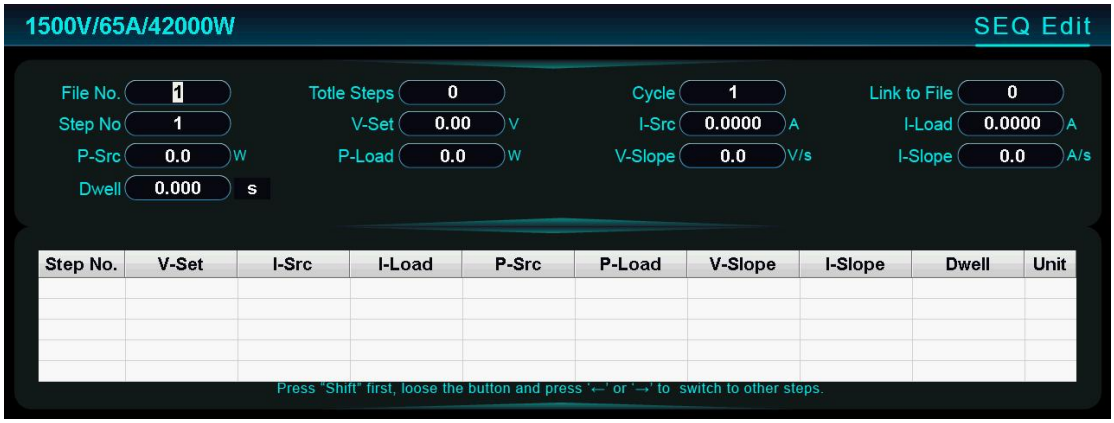


Figure 34 SEQ Edit

There are 13 items can be set. When File No. and Step No. are changed, interface will be refreshed at the same time.

Table 18

Parameter	Function
File No.	To set the sequence file number, range 1-10
Total Steps	To set the total test steps for the SEQ file, Max. 1000steps
Cycle	To set the number of cycles for the file under edit
Link to File	Link to the required file after the present file is completed. Zero means no link.
Step No.	To set the test step number
V-Set	To set the output voltage

I-Src	To set source current for present step
I-Load	To set load current for present step
P-Src	To set source power for present step
P-Load	To set load power for present step
Dwell	To set single step delay time, range 0.001-9999
V-Slope	To set the voltage slew rate, unit V/s
I-Slope	To set the current slew rate, unit A/s

5.5. SEQ Test

SEQ Test allows users to select the sequence file. SEQ test supports simulation of complex voltage & current waveform, which is frequently used for automotive electronics test, engine start-up test, etc.

The principle of SEQ Mode is easy to understand, which is to control the voltage, current and power according to the test steps edited by the user, and switch to the next step when the dwell is reached. As shown in the figure below.

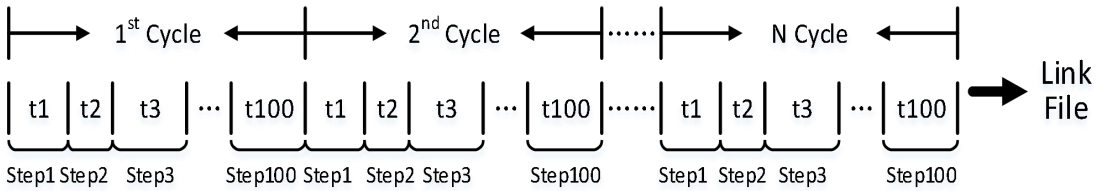


Figure 35 SEQ Operation Principle

Methods to enter **SEQ Test**:

Method 1: Press SEQ on the front panel directly.

Method 2: Press Menu → Select **SEQ Test** by ◄ ► or ○ → Press ○ or Enter.

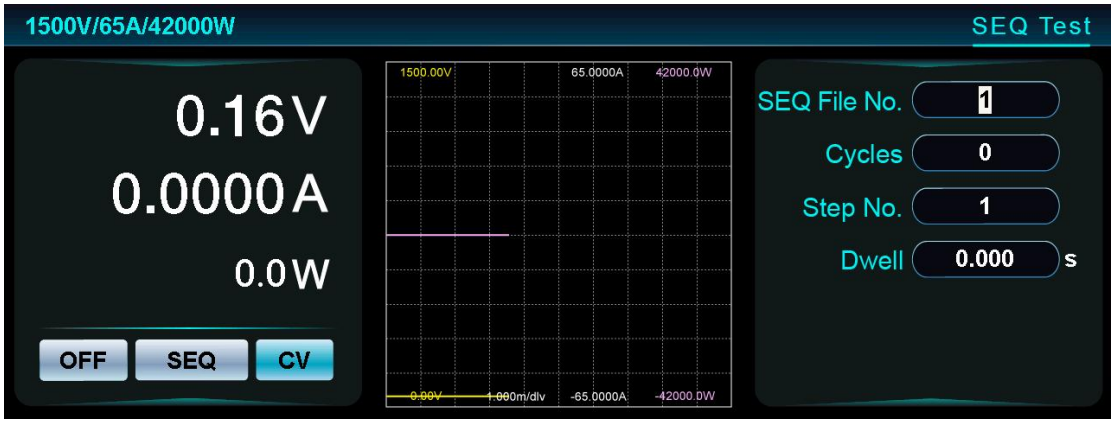


Figure 36 SEQ Test

Under SEQ test mode, users choose the required file number and press On/Off. It will start sequence test. After all steps of sequence file are operated, it will stop sequence test and the system automatically shuts output.

5.6. Charge

The N35500 series can be used to test batteries and overcapacity devices for charging under DC power.

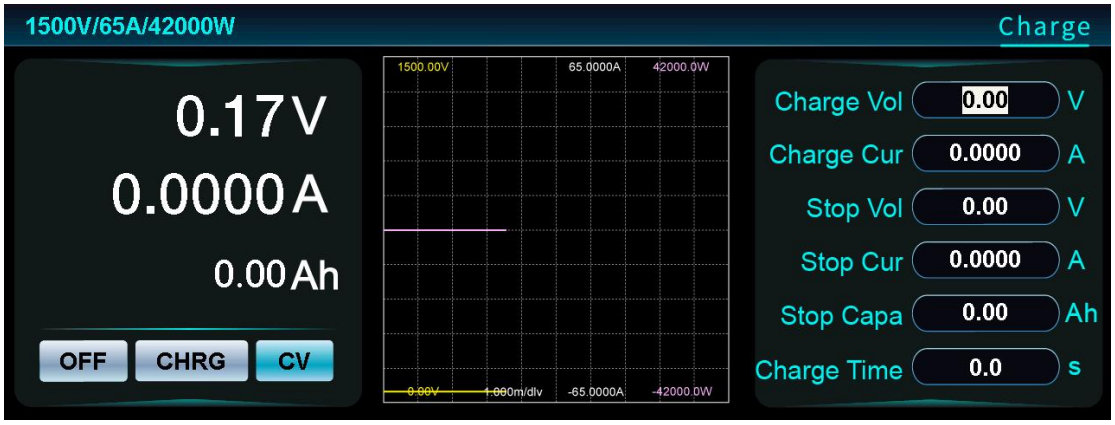


Figure 37 Charge Mode

Table 19

No.	Item	Function
1	Charge Vol	To set charging voltage
2	Charge Cur	To set charging current

3	Stop Vol	Judge the voltage value after charging is completed, when the actual voltage reaches the cut-off voltage, the power supply will automatically turn off the output. 0 means turn off this judgement, default is 0
4	Stop Cur	Judge the current value after charging is completed, when the actual current reaches the cut-off current, the power supply will automatically turn off the output. 0 means turn off this judgement, default is 0
5	Stop Capa	Judge the capacity after charging is completed, when the actual capacity reaches the cut-off capacity, the power supply will automatically turn off the output. Range：0.000～1080Ah, 0 means turn off this judgement, default is 0
6	Charge Time	Judge the time after charging is completed, when the cumulative time reaches the cut-off time, the power supply will automatically turn off the output. Range： 0～86400s. 0 means turn off this judgement, default is 0

In particular, the charging will be terminated if Stop Vol, Stop Cur, Stop Capa, Charge Time are met. When the charging function is switched on again, the charging capacity and charging time will be reset to zero and re-calculated.

5.7. Discharge

The N35500 series can be used to test batteries and overcapacity devices for discharging under DC power.

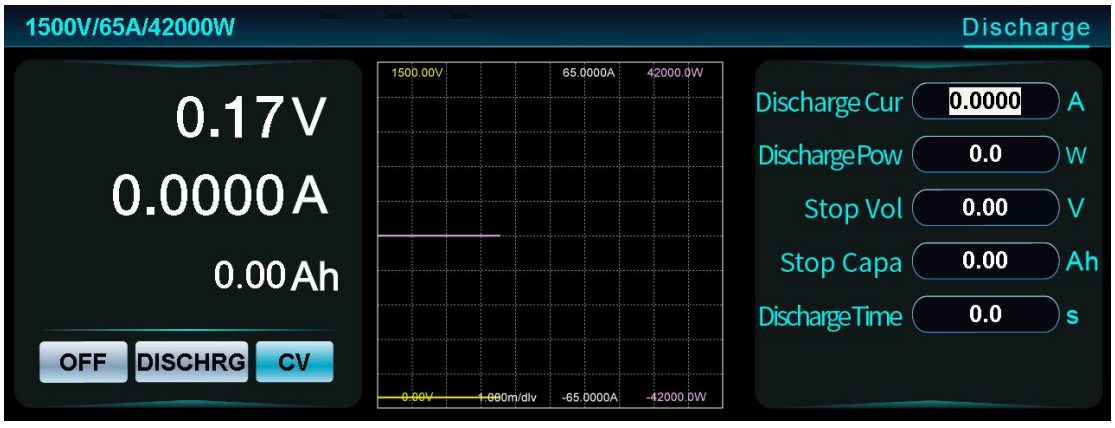


Figure 38 Discharge Mode

Table 20

No.	Item	Function
1	Discharge Cur	To set discharging current
2	Discharge Pow	To set discharging power
3	Stop Vol	Judge the voltage value after discharging is completed, when the actual voltage reaches the cut-off voltage, the power supply will automatically turn off the output. 0 means turn off this judgement, default is 0
4	Stop Capa	Judge the capacity after discharging is completed, when the actual capacity reaches the cut-off capacity, the power supply will automatically turn off the output. Range：0.000～1080Ah, 0 means turn off this judgement, default is 0
5	Discharge Time	Judge the time after discharging is completed, when the cumulative time reaches the cut-off time, the power supply will automatically turn off the output. Range： 0～86400s. 0 means turn off this judgement, default is 0

In particular, the discharging will be terminated if Stop Vol, Stop Pow, Discharge Time are met. When the discharging function is switched on again, the discharging capacity and discharging time will be reset to zero and re-calculated.

5.8. RESI

RESI can be used to simulate a battery external power supply.

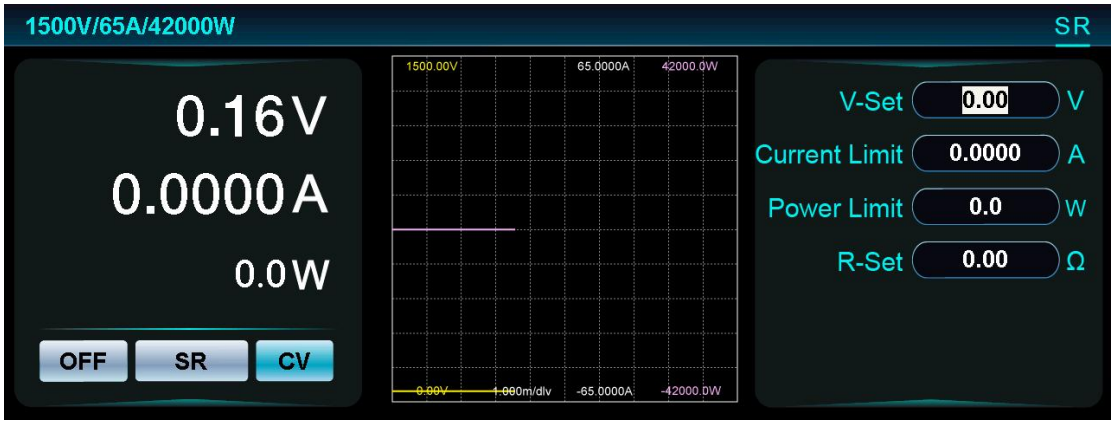


Figure 39 RESI

Due to the presence of internal resistance, the external supply voltage of actual battery decreases as the current increases, and the output of the battery satisfies the following equation:

Vo= Vs − Io × Ri

Vo is the actual output voltage, Vs is the open circuit voltage, Io is the actual output current and Ri is the internal resistance.

V-Set is the open-circuit voltage of the battery, corresponding to Vs in Eq;

Current Limit and **Power Limit** are the maximum permissible output current and maximum output power of the power supply respectively, and the actual value depends on the load condition;

R-Set is the analogue value of the internal resistance of the battery, corresponding to Eq. Ri.

5.9. CR

Resistive mode is to adjust the input current according to the input voltage to discharge in constant resistance mode.

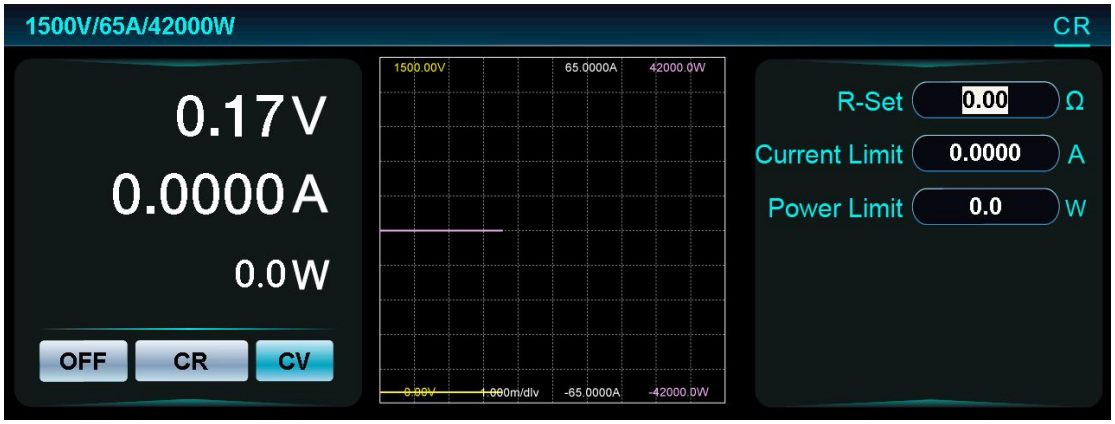


Figure 40 CR mode

The settable range of **R-Set** depends on the specification model;

Current Limit is the current limit value in CR mode;

Power Limit is the power limit value in CR mode.

5.10. Wave

The N35500 series DC power supply provides a wealth of waveform generation functions. This function enables periodic waveform information to be superimposed

on the DC output signal, including Carwave, Step, Advance etc. These functions allow users to simulate voltage and current variations in real-world applications, and are suitable for a wide range of complex testing needs for accurate testing and analysis.

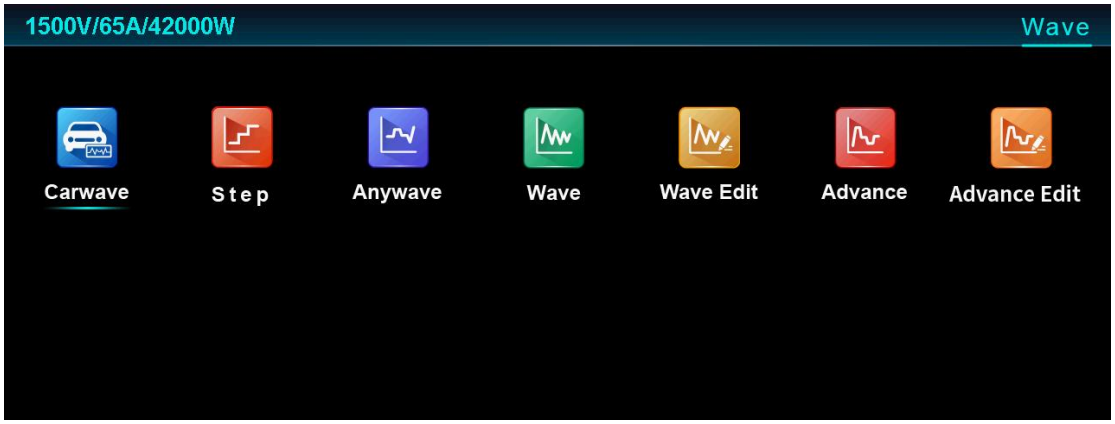


Figure 41 Wave

5.10.1. Carwave

5.10.1.1. ISO-16750-2

N35500 series products have four types of analog waveforms for vehicle electrical and electronic equipment immunity testing, which is convenient for customers to quickly call. The output pulse waveform is fully compliant with ISO-16750-2 international standard.

ISO16750-2	Simulation of "Environmental conditions and tests for electrical and electronic equipment for road vehicles", Part 2: "Electrical loads" curves.		
	Short-Drop	Car voltage short time drop waveform	
		12V	Select 12V car voltage short time drop waveform
		24V	Select 24V car voltage short time drop waveform
	Reset-Test	Car Voltage Reset Test Waveform	

		Usmin	Minimum supply voltage		
	Starting	Car start-up waveform			
		12V	Select 12V car start-up waveform		
			LEVEL1	Voltage/duration of the 12V waveform corresponding to level 1	
			LEVEL2	Voltage/duration of the 12V waveform corresponding to level 2	
			LEVEL3	Voltage/duration of the 12V waveform corresponding to level 3	
			LEVEL4	Voltage/duration of the 12V waveform corresponding to level 4	
		24V	Select 24V car start-up waveform		
			LEVEL1	Voltage/duration of the 24V waveform corresponding to level 1	
			LEVEL2	Voltage/duration of the 24V waveform corresponding to level 2	
			LEVEL3	Voltage/duration of the 24V waveform corresponding to level 3	
	Load-Dump	Load Dump Waveform			
		Test A	Select decentralization load dump suppression pulse		
			12V	Select 12V Voltage System	
				Td	Pulse Width
				U_S	Peak Voltage
			24V	Select 24V Voltage System	
				Td	Pulse Width
				U_S	Peak Voltage

		Test B	Select Centralization load dump suppression pulse		
			12V	Select 12V Voltage System	
				Td	Pulse Width
				U_S	Peak Voltage
			24V	Select 24V Voltage System	
				Td	Pulse Width
				U_S	Peak Voltage
				U_S*	Clamp Voltage

5.10.1.1.1. Car Start-up Short Time Voltage Drop Waveform

This waveform simulates a momentary drop in supply voltage when starting a car.

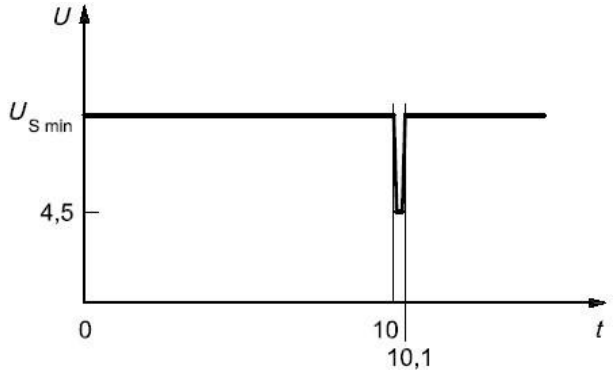


Figure 42 12V Waveform

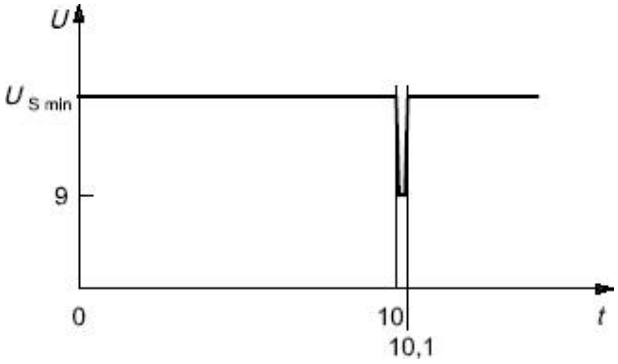


Figure 43 24V Waveform

5.10.1.1.2. Voltage Reset Test Waveform

The simulated waveform is suitable for testing devices with a reset function.This voltage profile simulates the supply voltage dropping from Us min to 0.95 Us min at a rate of 5%, holding it for 5s, then rising to Us min and holding it for at least 10s for a functional test. The voltage is then stepped down to 0.9 Us min and continued in a 5% gradient as shown in the graph until it drops to 0 V and then rises again to Us min. The waveform is as follows.

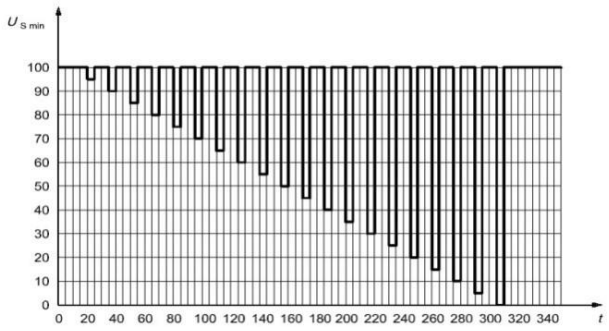


Figure 44 Car Voltage Reset Test Waveform

5.10.1.1.3. Car Start-up Waveform

To simulate the effect of DC voltage with ripple under DC power supply when starting a car, the voltage curve in the t8 time period is upgraded from the original constant voltage straight line in the standard DIN40839 voltage waveform to a curve containing a superimposed AC voltage waveform with a frequency of 2Hz, and the curve should be selected according to the actual test requirements.

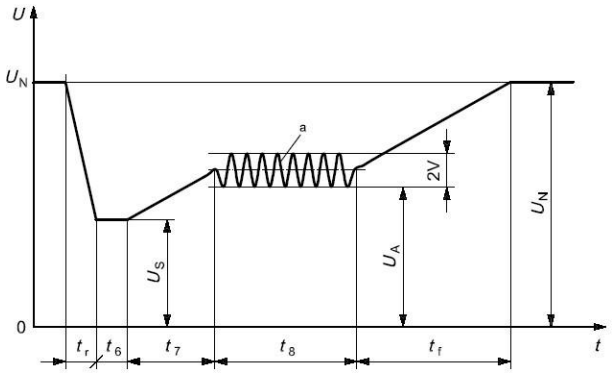


Figure 45 Car Start-up Waveform

Levels/voltages/duration of starting profile				
I	II	III	IV	Tolerances
U_S = 8 V	U_S = 4,5 V	U_S = 3 V	U_S = 6 V	+ 0,2 V
U_A = 9,5 V	U_A = 6,5 V	U_A = 5 V	U_A = 6,5 V	
t_r = 5 ms				± 10 %
t_6 = 15 ms				
t_7 = 50 ms				
t_8 = 1 s	t_8 = 10 s	t_8 = 1 s	t_8 = 10 s	
t_f = 40 ms	t_f = 100 ms	t_f = 100 ms	t_f = 100 ms	

Figure 46 12V Built-in Waveform Setup Standard

Levels/voltages/duration of starting profile			
I	II	III	Tolerances
U_S = 10 V	U_S = 8 V	U_S = 6 V	+ 0,2 V
U_A = 20 V	U_A = 15 V	U_A = 10 V	
t_r = 10 ms			± 10 %
t_6 = 50 ms			
t_7 = 50 ms			
t_8 = 1 s	t_8 = 10 s	t_8 = 1 s	
t_f = 40 ms	t_f = 100 ms	t_f = 40 ms	

Figure 47 24V Built-in Waveform Setup Standard

5.10.1.1.4. Car Load Dump Characteristic Curve

Inside most newer alternators, the magnitude of the load dump is suppressed (clamped) by the addition of a limiter diode. Load dump can occur due to corroded cables, poor contact or intentional disconnection from the battery while the engine is running.

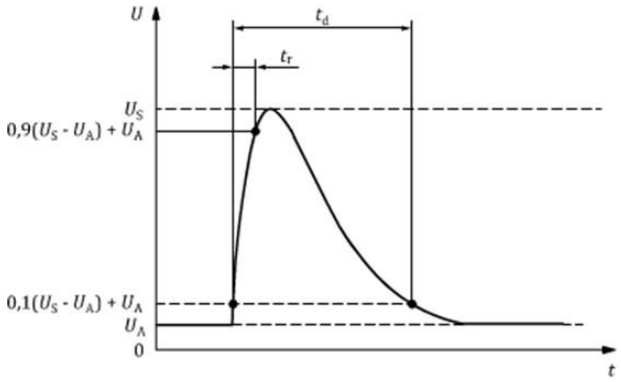


Figure 48 Test A

t：Time.

U：Test Voltage.

td：Pulse Duration.

tr：Time Unit

U_A：Supply voltage of operating generators：(12V)U_A=14V; (24V)U_A= 28V

U_S：Peak Voltage

Table 21

Parameter	Type		Minimum Test Requirement
	12V	24V	
U_S[a](V)	79≤U_S≤101	151≤U_S≤202	10 pulses every 1 minute
R_i[a](Ω)	0.5≤Ri≤4	1≤Ri≤8	
t_d(ms)	40≤t_d≤400	100≤t_d≤350	
t_r(ms)	–	–	
[a]If not otherwise agreed, use a higher voltage level with higher internal resistance or a lower voltage level with lower internal resistance.			

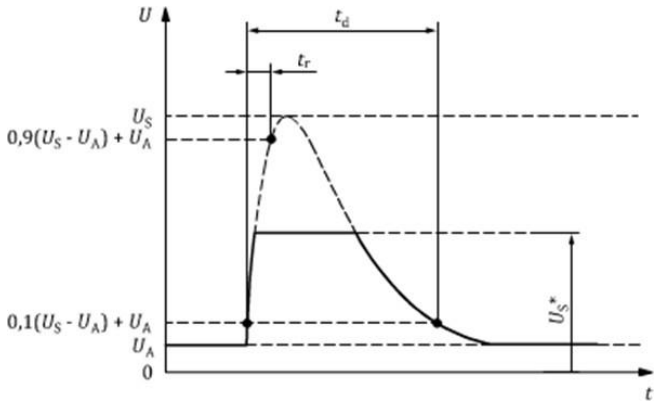


Figure 49 Test B

t：Time.

U：Test Voltage.

td：Pulse Duration.

tr：Time Unit

U_A：Supply voltage of operating generators：(12V)U_A=14V; (24V)U_A= 28V

U_S：Peak Voltage

U_S*：Voltage with load dump suppression (clamp voltage)

Table 22

Parameter	Type		Minimum Test Requirement
	12V	24V	
U_S[a](V)	79≤U_S≤101	151≤U_S≤202	5 pulses every 1 minute
U_S*(V)	Fixed at 35V, not settable.	Specified by customer (default: 58)	
R_i[a](Ω)	0.5≤Ri≤4	1≤Ri≤8	
t_d(ms)	40≤t_d≤400	100≤t_d≤350	
t_r(ms)	–	–	
[a]If not otherwise agreed, use a higher voltage level with higher internal resistance or a lower voltage level with lower internal resistance.			

5.10.1.2. LV124

LV124 provides curves that meet the experimental items, experimental conditions and experimental requirements for electrical and electronic components of automobiles under 3.5 tons.

Table 23

LV124	LV124 Waveform Protocol		
	E-04	Jump-start Experiment Pulse	
	E-07	Experimental parameters for slow drop and slow rise of supply voltage	
		Ubmax	Start-up Voltage
		Ubmin	Holding Voltage
		Ubmin Holding Time	Holding time of voltage at Ubmin

5.10.1.2.1. E-04 Jump Start

This waveform simulates the pulses generated during external startup of a car.The maximum experimental voltage is generated from the operating car and its raised chassis harness voltage. The waveform is shown below.

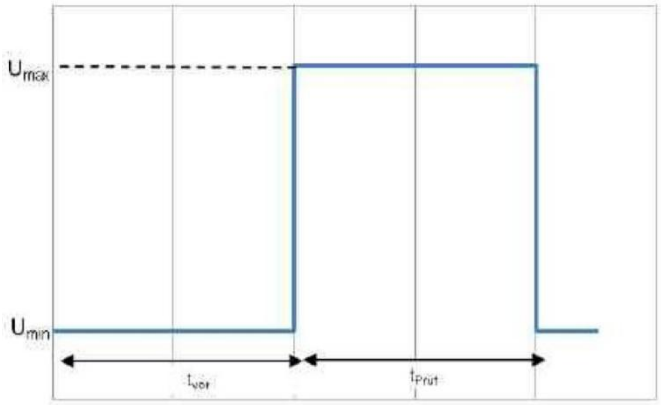


Figure 50 E-04 Jump Start

5.10.1.2.2. Supply voltage Slow Drop and Rise

Simulates the waveform of slow drop and slow rise of the supply voltage, such as the process of slow discharge and slow charge of a car battery. The waveform is shown below.

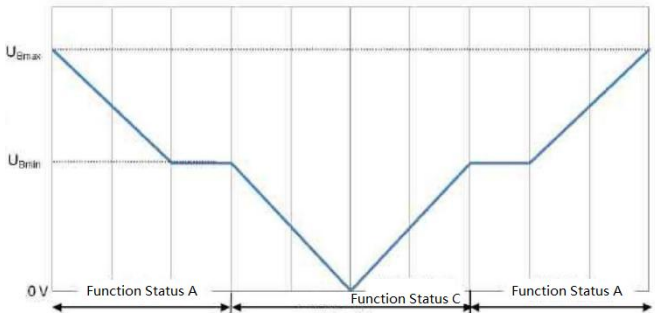


Figure 51 E-07 Supply voltage Slow Drop and Rise

Take the waveform when the car starts as an example, the operation steps to call up the test waveform are as follows (take the 24V voltage waveform as an example).

1. Enter the menu page and select Car Waveform;

2. "Locate 1": use the knob to select ISO16750 and press "Enter" to confirm;

3. "Locate 2": use the knob to select Short+Drop, press "Enter" to confirm;

4. "Locate 3": use the knob to select 12V, press "Enter" to confirm;

5. Press "On/Off" on the front panel to turn on the output, and the status bar shows that the status has changed from "OFF" to "ON".

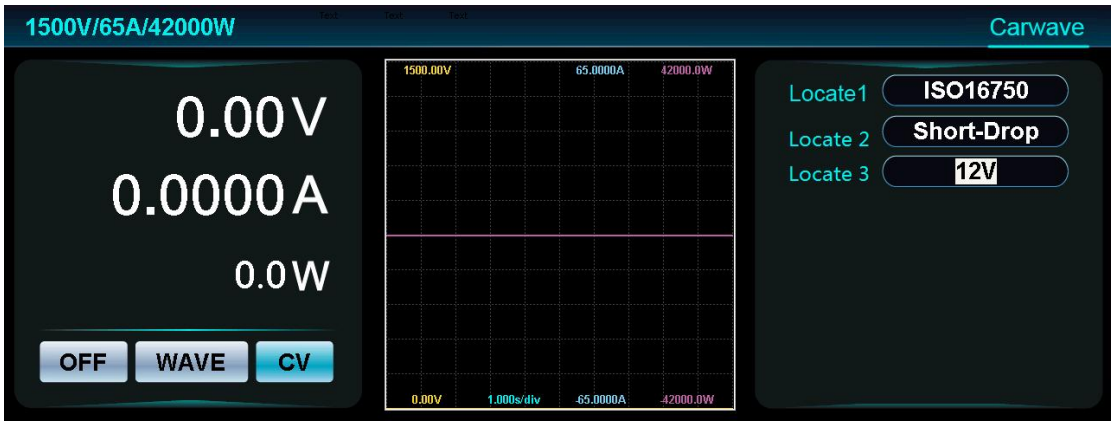


Figure 52 Car Waveform

5.10.2. Step

Step mode is a function that increases/decreases the starting output value to reach the end value. This function is suitable for precise measurement of over/under voltage and over current protection values, allowing the user to quickly locate protection thresholds.

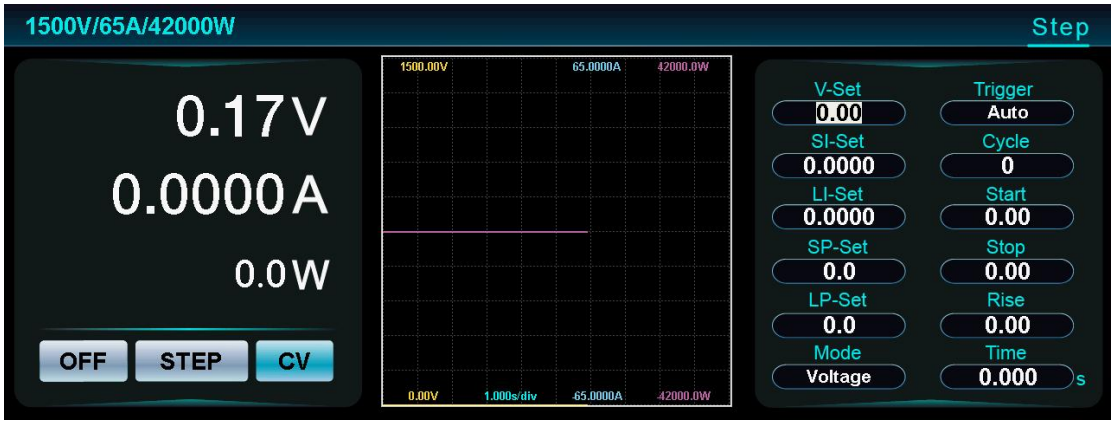


Figure 53 Step Mode

V-Set: set the reference voltage value for the present test;

SI-Set: set the initial value of source current for the present test;

LI-Set: set the initial value of load current for the present test;

SP-Set: set the initial value of source power for the present test;

LP-Set: set the initial value of load power for the present test;

Mode: the edited waveform is used to adjust the output voltage or output current;

Trigger: switch from steady state output to expected output waveform;

Auto: the edited waveform will automatically run the whole Step after being triggered;

Manual**:** the edited waveform is triggered to run one step at a time;

Cycle: maximum value is 65535, initial value is 0, set to 0 for infinite cycle;

Start: initial voltage/current amplitude, resolution is 0.01V/0.0001A, the minimum value is 0 and the maximum value is rated value in voltage mode, the minimum value is negative rated value and the maximum value is positive rated value in current mode, the initial value is 0;

Stop: target voltage/current amplitude, resolution is 0.01V/0.0001A, the minimum value is 0 and the maximum value is rated value in voltage mode, the minimum value is negative rated and the maximum value is positive rated value in current mode, the initial value is 0;

Rise: single-step value, specifically refers to the amount of change, the resolution of 0.01V/0.0001A, the minimum value is 0, the maximum value is the rated value, the initial value is 1;

Time: incremental single-step hold time, resolution of 0.001s, the minimum value is 0, the maximum value is 99999s, the initial value is 1;

Voltage Step Mode:

V-Set: 50

Start: 10

Stop: 100

Rise: 10

Time: 0.500

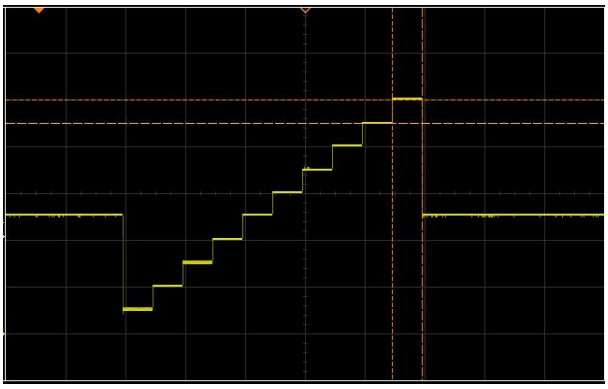


Figure 54 Waveform in Voltage Step Mode

Voltage Step Mode:

V-Set: 65

Start: 10

Stop: 50

Rise: 10

Time: 0.5

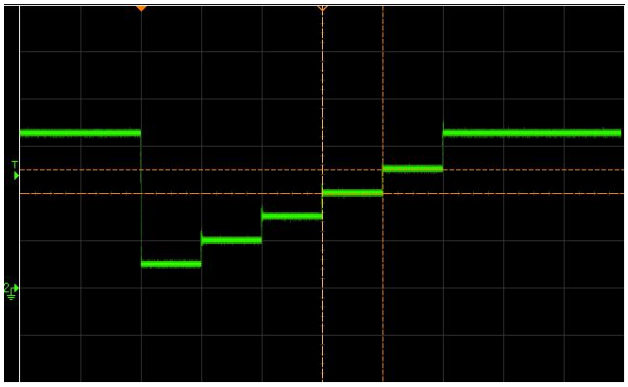


Figure 55 Waveform in Current Step Mode

5.10.3. Anywave

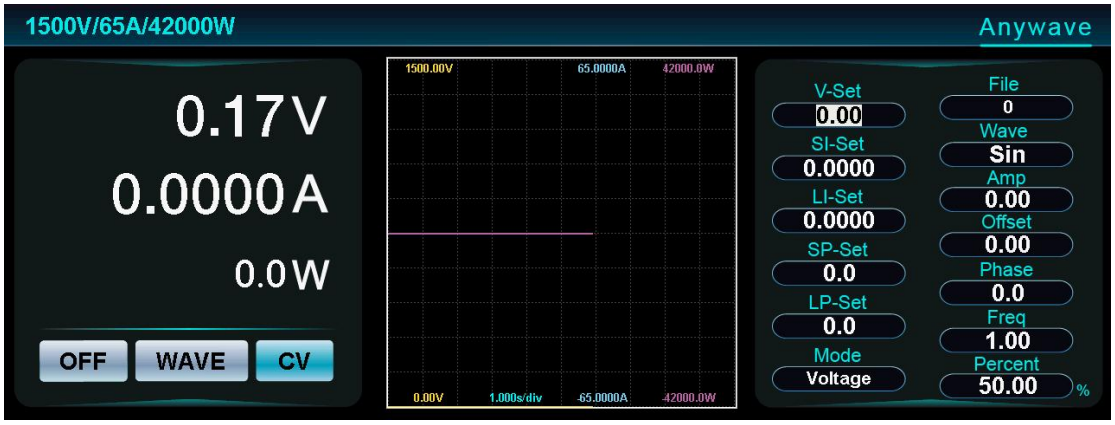


Figure 56 Anywave

V-Set: set the reference voltage value for the present test;

SI-Set: set the initial value of source current for the present test;

LI-Set: set the initial value of load current for the present test;

SP-Set: set the initial value of source power for the present test;

LP-Set: set the initial value of load power for the present test;

Mode: the edited waveform is used to adjust the output voltage or output current;

File: present editing file number, range 1~10;

Wave: output waveform selection, up to 10 files can be edited (1 is a sine wave, 2 is a triangle wave, 3 is a pulse wave, 4 ~ 10 customer-defined waveforms, by the host computer after importing the parameters, you can choose to run, otherwise, the default data) each waveform file can be configured up to 200 steps;

Amp: the amplitude of the output waveform, half-peak for sine wave, peak-to-peak for other waveforms; set the amplitude to ensure that it must be less than the bias value, otherwise the output waveform may be distorted. The resolution is 0.01V/0.0001A, the minimum value is 0, the maximum value is the rated value, and the initial value is 0;

Offset: DC component value of the output waveform, the resolution is

0.01V/0.0001A, the minimum value is 0 and the maximum value is the rated value when selecting voltage in mode, and the minimum value is the negative rated value and the maximum value is the positive rated value when selecting current in mode, the initial value is 0;

Phase: the phase of the output waveform, the resolution is 0.01, the minimum value is 0 the maximum value is 360, the initial value is 0;

Freq: the frequency of the output waveform, the resolution is 0.01Hz, the minimum value is 0.01Hz the maximum value is 1000Hz, the initial value is 1Hz;

Percent: only when selecting pulse wave and triangle wave, corresponding to the pulse wave duty cycle, triangle wave symmetry parameters, the resolution is 0.01, the minimum value is 0 maximum value is 100, the initial value is 0; by the precision of the device, the bandwidth parameters, the smaller setting value with a higher frequency with the device may not respond to the waveform. For example, when the 10% duty cycle of 1kHz pulse wave, the minimum pulse width time is 10 μ s, at this time, the device will not be able to output the expected waveform.

Sin Waveform:

Amp: 50

Offset: 150

Phase: 0

Freq: 1

Percent: 50

V-Set: 100

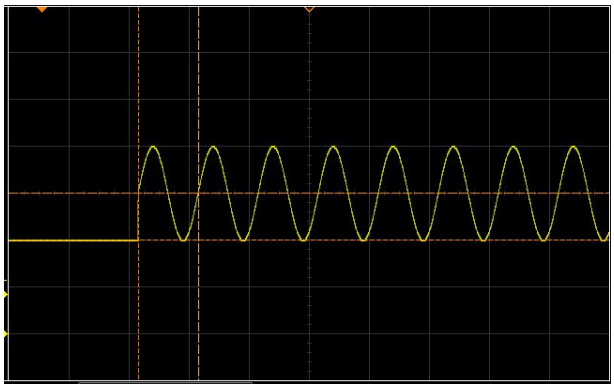


Figure 57 Sin wave

Pulse Waveform:

Amp: 100

Offset: 150

Phase: 0

Freq: 2

Percent: 50

V-Set: 100

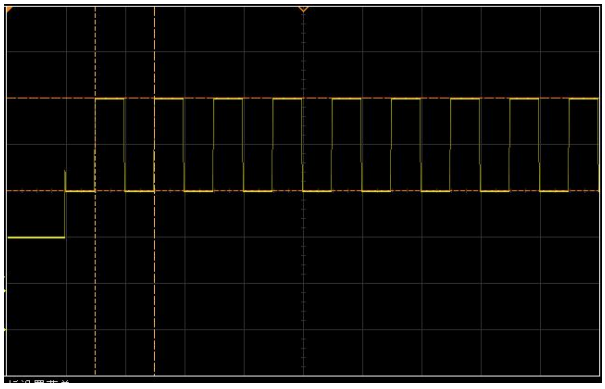


Figure 58 Pulse wave

Triangle Waveform:

Amp: 50

Offset: 150

Phase: 0

Freq: 1

Percent: 50

V-Set: 100

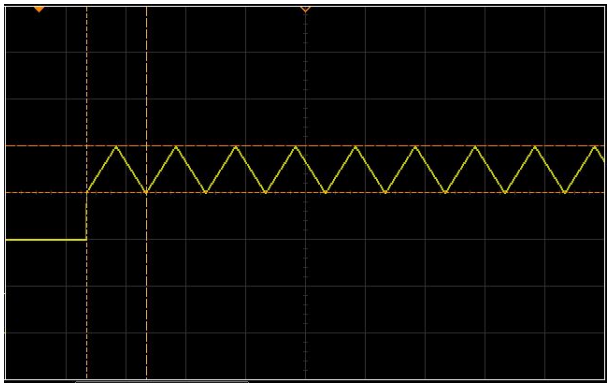


Figure 59 Triangle wave

5.10.4. Wave Edit

The basic waveform function is to program a set of curves describing the relationship between the coordinates of time points and amplitude points (time, amplitude), e.g., the voltage amplitude needs to reach 1000 V after 3 s and 200 V after 5 s. By setting up a series of state points at a certain moment in time, the system generates a connection line to program the waveforms through these state points automatically.

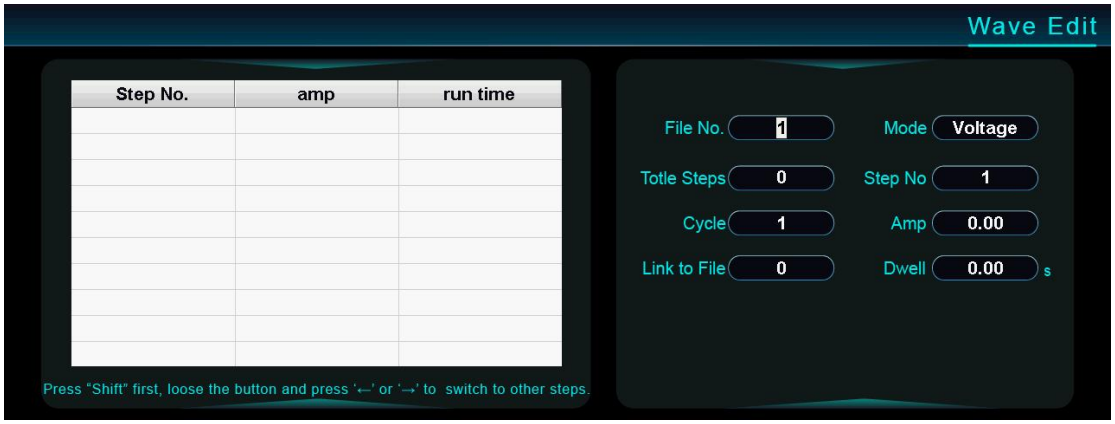


Figure 60 Wave Edit

File No.: present editing file number, range 1~10;

Total Steps: total steps of the present editing file, range 1~200;

Cycle: set the number of times the present file is run;

Link to File: link to the specified file.Range 0~10, 0 means no link;

Mode: the edited waveform is used to adjust the output voltage or output current;

Step No.: indicates the step number being edited;

Amp: voltage/current amplitude of the present sequence, with a resolution of 0.001V/A. When in voltage mode, the minimum value is 0 and the maximum value is rated; when in current mode, the minimum value is negatively rated, the maximum value is positively rated, and the initial value is 0;

Dwell: set the time of the present step running.

5.10.5. Wave

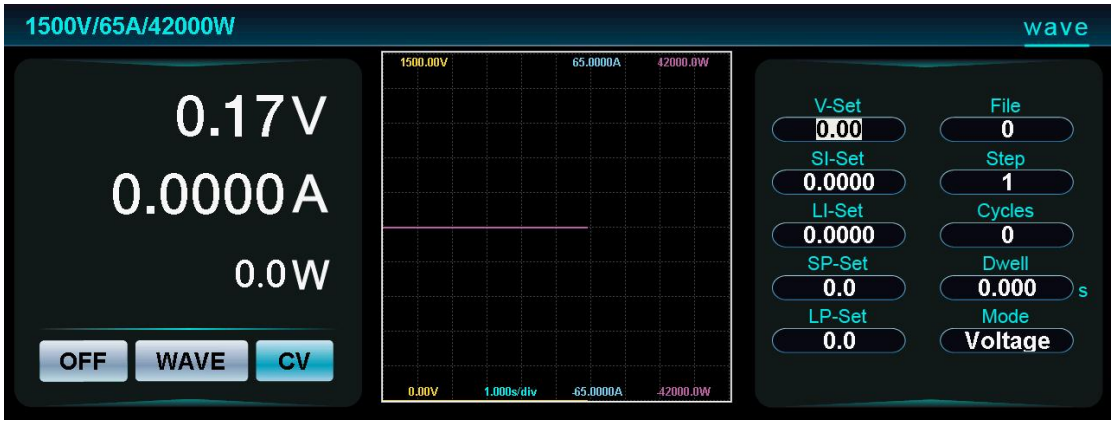


Figure 61 Wave

V-Set: set the reference voltage value for the present test;

SI-Set: set the initial value of source current for the present test;

LI-Set: set the initial value of load current for the present test;

SP-Set: set the initial value of source power for the present test;

LP-Set: set the initial value of load power for the present test;

File: present editing file number, range 1~10;

Step: present editing step number, range 1~10;

Cycles: set the number of times the present file is run;

Dwell: set the time of the present step running. Resolution: 0.001s; The minimum value is 0, The maximum value is 99999s, the initial value is 1s;

Mode: Indicates that the output of the present file is voltage or current;

Voltage Wave

Reference voltage 100V

First step: amplitude 50V running time 1S

Second step: amplitude 150V running time 2S

Third step: amplitude 25V running time 3S

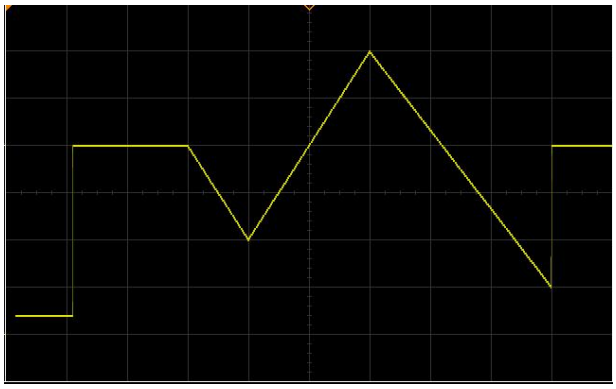


Figure 62 Voltage Wave

5.10.6. Advance Edit

Advance Edit is an advanced programming function of N35500, which allows users to edit multiple waveforms to simulate complex working conditions. The setting items can be referred to Anywave.

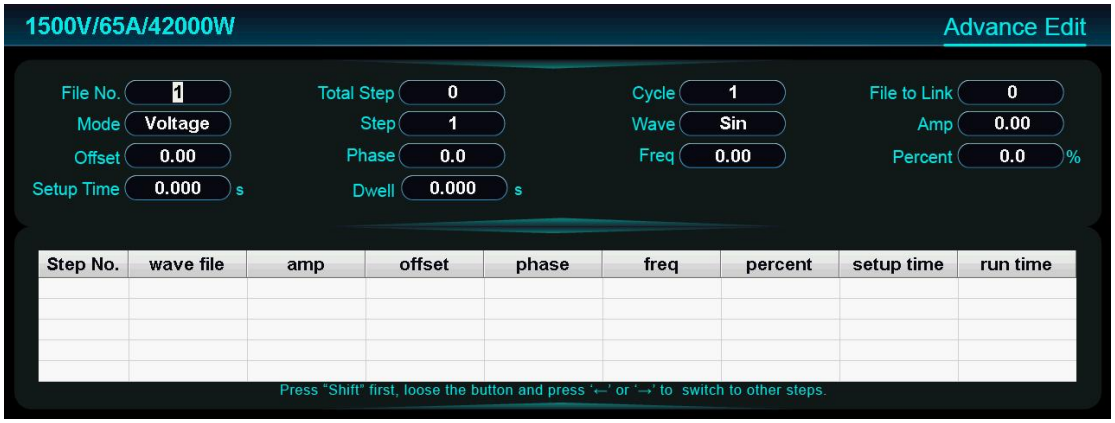


Figure 63 Advance Edit

File No.: present editing file number, range 1~10;
Cycle: set the number of times the present file runs, range 1~65535;
File to Link: connect to the specified file. Range 0~10, 0 means no link;
Mode: the edited waveform is used to adjust the output voltage or output current;
Step: the step number being edited;
Wave: the output waveform selection, up to 10 files can be edited (1 is a sine wave, 2 is a triangle wave, 3 is a pulse wave, 4 ~ 10 customer-defined waveform, by the host computer after importing the parameters, you can choose to run, otherwise, the default data) each waveform file can be configured up to 200 steps;
Amp: the amplitude must be less than the bias value, otherwise the output waveform may be distorted. The resolution is 0.001, the minimum value is 0 the maximum value is the rated value, the initial value is 0;
Offset: DC component value of the output waveform, the resolution is 0.001, the minimum value is 0 and the maximum value is the rated value in voltage mode, the minimum value is the negative rated and the maximum value is the positive rated value in current mode, the initial value is 0;
Phase: the phase of the output waveform, the resolution is 0.01, the minimum value is 0 the maximum value is 360, the initial value is 0;
Freq: the frequency of the output waveform, the resolution is 0.01Hz, the minimum value is 0.01Hz, the maximum value is 1000Hz, the initial value is 1Hz;
Percent: only when selecting pulse wave and triangle wave, corresponding to the pulse wave duty cycle, triangle wave symmetry parameters, the resolution is 0.01, the minimum value is 0 maximum value is 100, the initial value is 0; by the precision of the device, the bandwidth parameters, the smaller setting value with a higher frequency with the device may not respond to the waveform. For example, when the duty cycle of 1kHz pulse wave is 0.01%, the minimum pulse width time is 10 μ s, at this time, the device will not be able to output the expected waveform.
Setup Time: the change time from the last file to the present file;
Dwell: set the time for the present file to run.

5.10.7. Advance

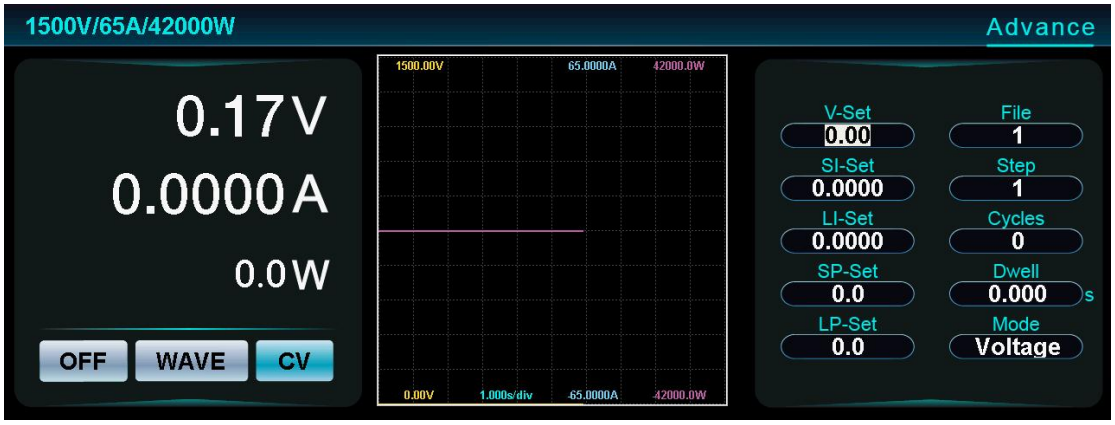


Figure 64 Advance

V-Set: set the reference voltage value for the present test;

SI-Set: set the upper limit of current for the present test;

LI-Set: set the lower limit of current for the present test;

SP-Set: set the upper limit of power for the present test;

LP-Set: set the lower power limit of the present test;

File No.: present editing file number, range 1~10;
Step: the step number being edited;
Cycle: set the number of times the present file runs, range 0~65535;

Dwell: set the time for the present file to run; The minimum value is 0.0001s; The maximum value is 9999999s, the initial value is 1s;

Mode: Indicates that the output of the present file is voltage or current;

Voltage Advance Wave

Step 1: Sine wave, Offset 50, Amp 30V, Dwell 2S, Freq 1Hz, duty cycle 50%

Step 2: Triangle wave, Offset 100, Amp 50V, Dwell 2S, Freq 2Hz, duty cycle 80%

Step 3: Pulse wave, Offset 120, Amp 60V, Dwell 5S, Freq 1Hz, duty cycle 10%

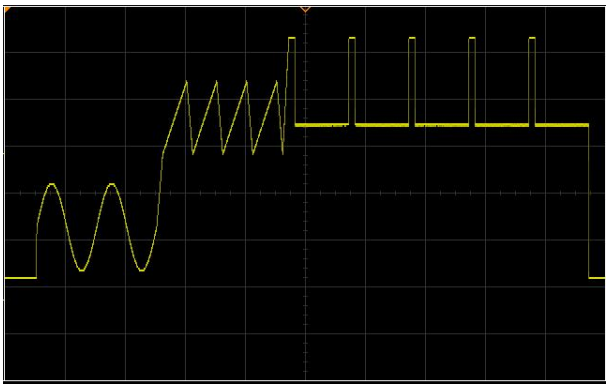


Figure 65 Voltage Advance Wave

5.11. Photovoltaic Array Simulation (Optional)

N35500 series supports photovoltaic simulation and can accurately simulate the I-V and P-V curves of the solar cell matrix. After users set the test regulations, materials, Vmp, Pmp and other parameters, it can simulate the output of I-V, P-V curve and generate a report in compliance with the regulations, which can be used to test the static and dynamic maximum power tracking efficiency of PV inverters.

NS91000 PV cell matrix simulation software includes static Sandia mode, Static EN50530 mode, Dynamic Sandia mode, Dynamic EN50530 mode, Customized curve settings, Sequence mode, Weather mode, and Shadow mode. When the device is under remote control, open the PV simulation software to use this function. Refer to the NS91000 PV Cell Matrix Simulation Software User Manual for specific operation steps.

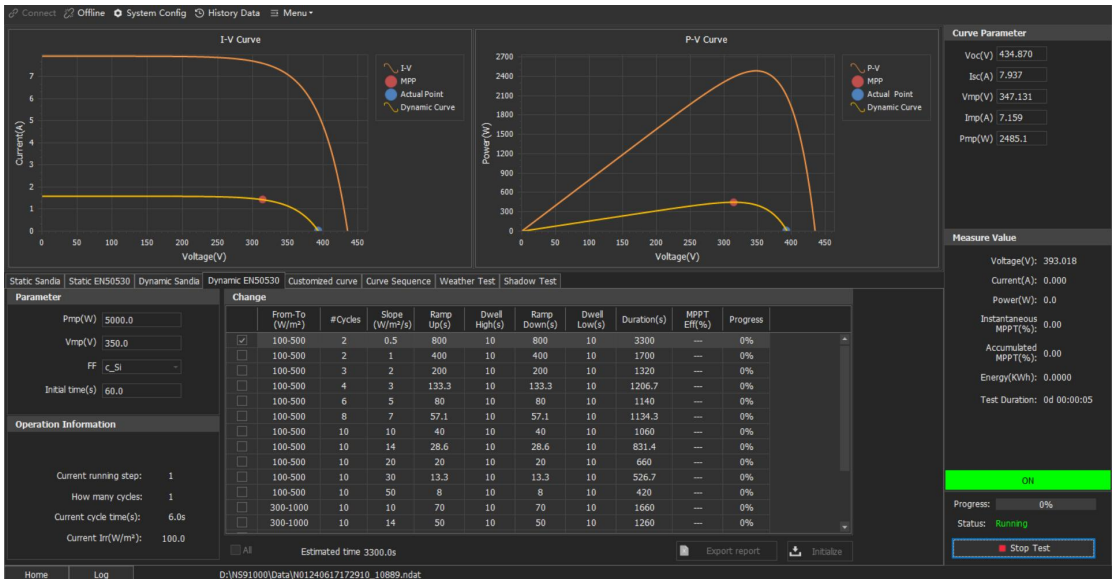


Figure 66 PV Simulation

5.12. Battery Simulation

NS81000 has 7 standard battery model libraries, users only need to select the corresponding battery type, configure the basic capacity and protection parameters, the software can quickly generate the corresponding type of battery characteristic curve; and there are 2 types of custom battery characteristic curve, engineers can be based on the actual measurement of the battery curve data, import the data into the software and carry out simulation.

Battery types: LiFePO4 battery, Ternary lithium battery, Lead-acid battery, Ni-MH battery, LTO, ICO, IMO.

More details refer to NS81000 User Manual.

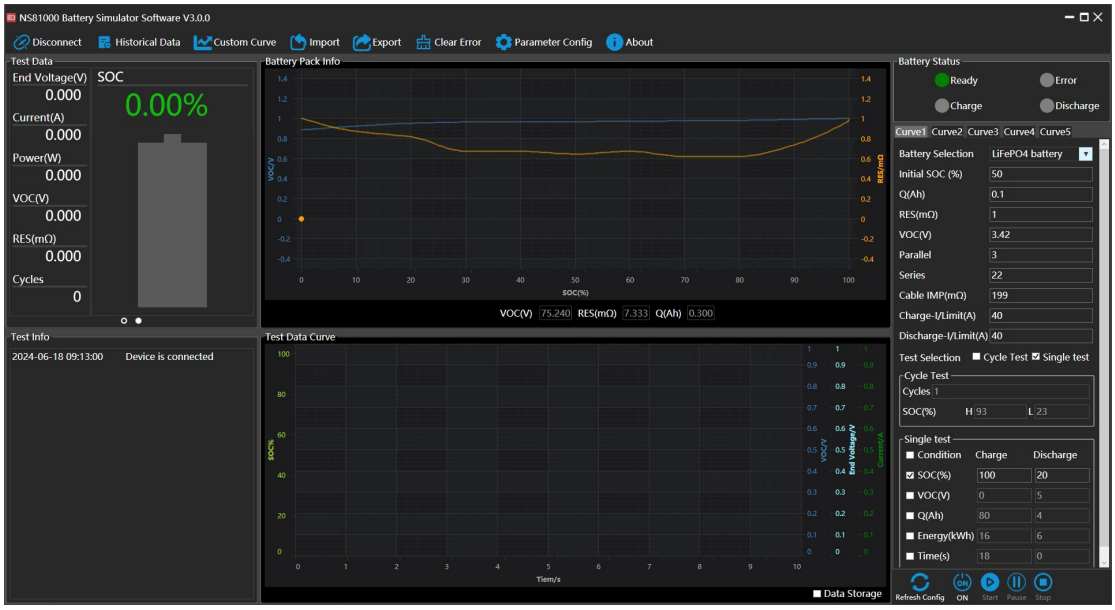


Figure 67 Battery Simulation

5.13. Parallel

N35500 supports parallel connection of 10 devices of the same specification, which can be controlled and read back simultaneously through the shared bus PAR.

5.13.1. Connection

The master-slave parallel function only supports connection of devices of the same specification. Wiring is shown in the figure below. Corresponding settings should be made for each power supply to realize master-slave parallel function. If voltage remote sense is required, it is necessary to connect the voltage remote sense terminals S+ and S- of the master to the compensation point.

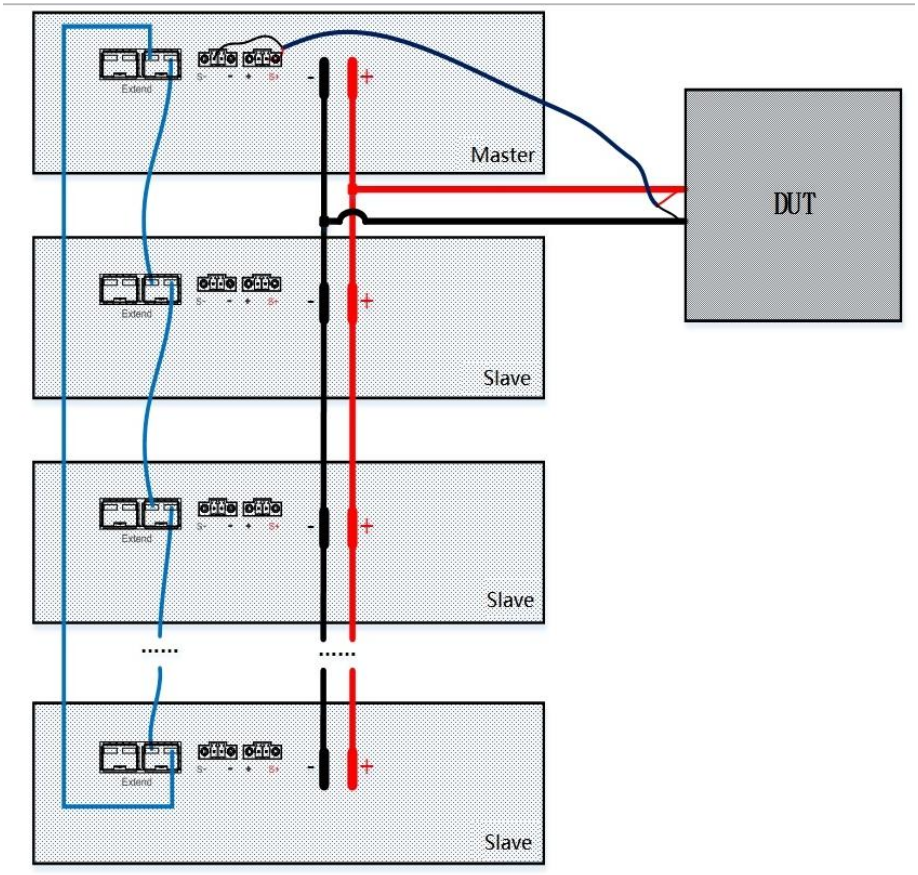


Figure 68 Parallel Connection Diagram

Figure 69 Parallel Interface

Note

When multiple devices are set as master and the control function is turned on, the parallel operation will fail.

Note

When using the parallel, power supplies of the same model and specification must be selected.

5.14. Protection

On protection interface, users can set various protection parameters. When protection occurs, alarm information will be shown on the screen.

Methods to enter **Protection**:

Method 1: Press Shift first and then PROT CLR on the front panel directly.

Method 2: Press Menu →choose **Protection** by ◄ ► or ○ →press Enter or ○.

Note: Please press PROT CLR to clear the alarm manually.

Figure 70 Protection Setting Interface

Table 24

No.	Item	Function
1	Undervoltage protection point	Undervoltage protection
2	Undervoltage protection ready time	
3	Undervoltage protection delay time	
4	Undercurrent protection point	Undercurrent protection
5	Undercurrent protection ready time	

6	Undercurrent protection delay time	
7	Overvoltage protection point	Overvoltage protection
8	Overvoltage protection delay time	
9	Overcurrent protection point	Overcurrent protection
10	Overcurrent protection delay time	
11	Over Power Protection Point	Over power protection
12	Over Power Protection delay time	

UVP

When the UVP setting is non-zero, it indicates that the function is turned on.

If the device meets the following conditions at the same time, the UVP warning will appear:

1. UVP set value is non-zero
2. The output time reaches the ready time of the device.
3. The terminal voltage is less than the set undervoltage protection point and the duration is greater than the protection delay time.

When UVP occurs, the device will respond as follows:

1. Output of the device is switched off
2. The buzzer rings once intermittently and three times continuously.
3. UVP will be displayed on the status bar in black letters on a red background.

UCP

When the UCP setting is non-zero, it indicates that the function is turned on.

If the device meets the following conditions at the same time, the UCP warning will appear:

1. UCP set value is non-zero
2. The output time reaches the ready time of the device.
3. The terminal current is less than the set undercurrent protection point and the duration is greater than the protection delay time.

When UCP occurs, the device will respond as follows:

1. Output of the device is switched off
2. The buzzer rings once intermittently and three times continuously.
3. UCP will be displayed on the status bar in black letters on a red background.

OVP

When the OVP setting is non-zero, it indicates that the function is turned on.

If the device meets the following conditions at the same time, the OVP warning will appear:

1. OVP set value is non-zero
2. The terminal voltage is greater than the set OVP point and the duration is greater than the protection delay time

When OVP occurs, the device responds as follows:

1. Output of the device is switched off
2. The buzzer sounds once intermittently and three times continuously.
3. OVP will be displayed in black letters on a red background in the status bar.

OCP

When the OCP setting is non-zero, it indicates that the function is turned on.

If the device meets the following conditions at the same time, the OCP warning will appear:

1. OCP set value is non-zero
2. The terminal voltage is greater than the set OCP point and the duration is greater than the protection delay time

When OCP occurs, the device responds as follows:

1. Output of the device is switched off
2. The buzzer sounds once intermittently and three times continuously.
3. OCP will be displayed in black letters on a red background in the status bar.

OPP

When the OPP set value is non-zero, it means that the power protection function is turned on

If the device meets the following conditions at the same time, it will depart OPP:

1. OPP set value is non-zero
2. the terminal source power is greater than the set power protection point, or the absolute value of the terminal load power is greater than the set power protection point, and the duration is greater than the protection delay time

When OPP occurs, the device responds as follows:

1. Output of the device is switched off
2. The buzzer rings once intermittently for three times.
3. OPP will be displayed in black letters on a red background in the status bar.

OTP

In order to prevent the chassis temperature is too high and affect the working performance of the device, make sure that the air around the device circulates normally, please do not cover all the heat dissipation holes of the chassis. The setting parameters for OTP are already fixed in the operating programme of the device and do not need to be set additionally.

OTP is a protective measure implemented when the internal temperature of the device exceeds 85 degrees Celsius, when OTP occurs, the device responds as follows:
1. Output of the device is switched off
2. The buzzer sounds once intermittently and three times continuously.
3. OTP will be displayed in black letters on a red background in the status bar.

Module Fault Alarm
When the device power module fails or the device is powered down, the N35500 will stop output and display the **MF** alarm.

5.15. Application

Figure 71 Application1

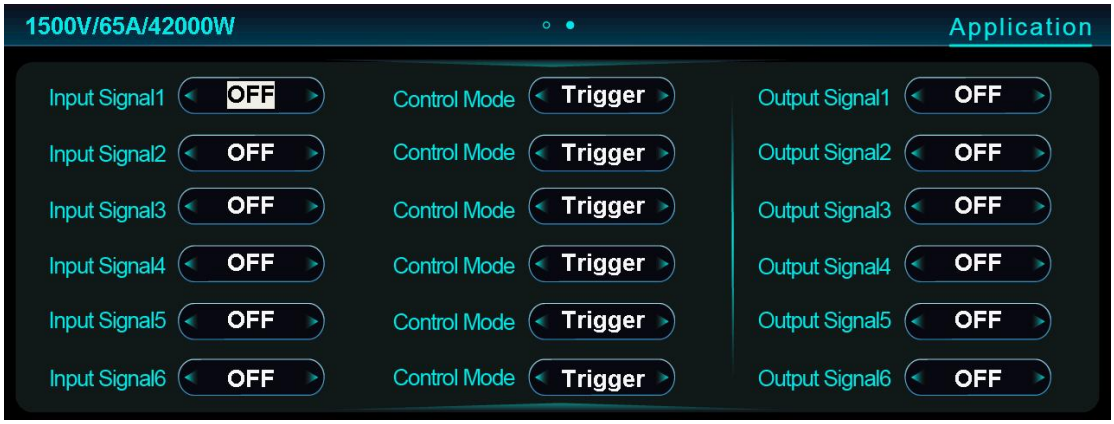


Figure 72 Application2

Table 25

No.	Item	Description
1	Time Shutdown	Default OFF, ON for turning on.

2	Timing Time	It can be set to 1.0~86400.0s, for example, set 5s that means the power output will be automatically OFF after 5s.
3	On Delay	Range 0.1~10s. After setting, press ON/OFF and then the power supply will delay the output accordingly.
4	Off Delay	Range 0.1~10s. After setting, press ON/OFF and then the power supply will delay the output accordingly.
5	Poweron State	Last/Last+OFF/Reset. Last means maintaining the last operation status before power on again; Last+OFF means maintaining the last OFF status if powered on again; Reset means resetting factory if powered on again.
6	Discharge Switch	Setting the circuit status ON/OFF (This function must be switched off in the charging test)
7	V-Slope	To set voltage fall slew
8	I-Slope	To set current fall slew
9	CV/CC Priority	If the user requires that voltage overshoot must be minimal, such as when biasing to a low voltage processor or FPGA core, it is recommended that the user use CV priority mode; CC priority mode should be used if the user has a low impedance component under test, such as when charging a battery or driving a system containing large capacitance.
10	Refer Voltage	Voltage reference provided to external
11	EX Program1	Corresponds to AI1 of the PROG interface, which can be set to OFF/APG-V, corresponding to control power OFF/supply voltage
12	EX Program2	AI2 corresponding to PROG interface can be set to OFF\APG-V\APG-SI\APG-LI\APG-SP\APG-LP, which corresponds to the control power OFF/voltage/source current/load current/source power/load power.
13	EX Program3	AI3 corresponding to PROG interface can be set to OFF\APG-V\APG-SI\APG-LI\APG-SP\APG-LP, which corresponds to the control power OFF/voltage/source current/load current/source power/load power.
14	EX Program4	AI4 corresponding to PROG interface can be set to OFF\APG-V\APG-SI\APG-LI\APG-SP\APG-LP, which corresponds to the control power OFF/voltage/source current/load current/source power/load power.
15	EX Monitor1	Corresponds to V_MON of the PROG interface, which can be set to OFF/MONI-V, corresponding to

		monitoring power OFF/power supply voltage
16	EX Monitor2	Corresponds to I_MON of the PROG interface, which can be set to OFF/IMONI-V/IMONI-I/IMONI-P, and corresponds to monitoring power OFF/voltage/current/power.

Table 26

No.	Item	Description
1	Input Signal1	Corresponding to DI1 of PROG interface, OFF/ONOFF/Clear can be selected, ONOFF means power output ON/OFF, Clear means clearing the power failure state
	Control Mode	Set Trigger/Hold for input signal 1, Trigger means rising edge trigger, Hold means one action for one level change.
2	Input Signal2	Corresponding to DI2 of PROG interface, OFF/ONOFF/Clear can be selected, ONOFF means power output ON/OFF, Clear means clearing the power failure state
	Control Mode	Set Trigger/Hold for input signal 2, Trigger means rising edge trigger, Hold means one action for one level change.
3	Input Signal3	Corresponding to DI3 of PROG interface, OFF/ONOFF/Clear can be selected, ONOFF means power output ON/OFF, Clear means clearing the power failure state
	Control Mode	Set Trigger/Hold for input signal 3, Trigger means rising edge trigger, Hold means one action for one level change.
4	Input Signal4	Corresponding to DI4 of PROG interface, OFF/ONOFF/Clear can be selected, ONOFF means power output ON/OFF, Clear means clearing the power failure state
	Control Mode	Set Trigger/Hold for input signal 4, Trigger means rising edge trigger, Hold means one action for one level change.
5	Input Signal5	Corresponding to DI5 of PROG interface, OFF/ONOFF/Clear can be selected, ONOFF means power output ON/OFF, Clear means clearing the power failure state
	Control Mode	Set Trigger/Hold for input signal 5, Trigger means rising edge trigger, Hold means one action for one

		level change.
6	Input Signal6	Corresponding to DI6 of PROG interface, OFF/ONOFF/Clear can be selected, ONOFF means power output ON/OFF, Clear means clearing the power failure state
	Control Mode	Set Trigger/Hold for input signal 6, Trigger means rising edge trigger, Hold means one action for one level change.
7	Output Signal1	Corresponds to DO1 of PROG interface, OFF/ONOFF/Fault, ONOFF indicates power output ON/OFF state, Fault indicates power failure/alarm
8	Output Signal2	Corresponds to DO2 of PROG interface, OFF/ONOFF/Fault, ONOFF indicates power output ON/OFF state, Fault indicates power failure/alarm
9	Output Signal3	Corresponds to DO3 of PROG interface, OFF/ONOFF/Fault, ONOFF indicates power output ON/OFF state, Fault indicates power failure/alarm
10	Output Signal4	Corresponds to DO4 of PROG interface, OFF/ONOFF/Fault, ONOFF indicates power output ON/OFF state, Fault indicates power failure/alarm
11	Output Signal5	Corresponds to DO5 of PROG interface, OFF/ONOFF/Fault, ONOFF indicates power output ON/OFF state, Fault indicates power failure/alarm
12	Output Signal6	Corresponds to DO6 of PROG interface, OFF/ONOFF/Fault, ONOFF indicates power output ON/OFF state, Fault indicates power failure/alarm

5.16. System

The user presses the "Menu" button to enter the "System " interface, which is shown in Figure:

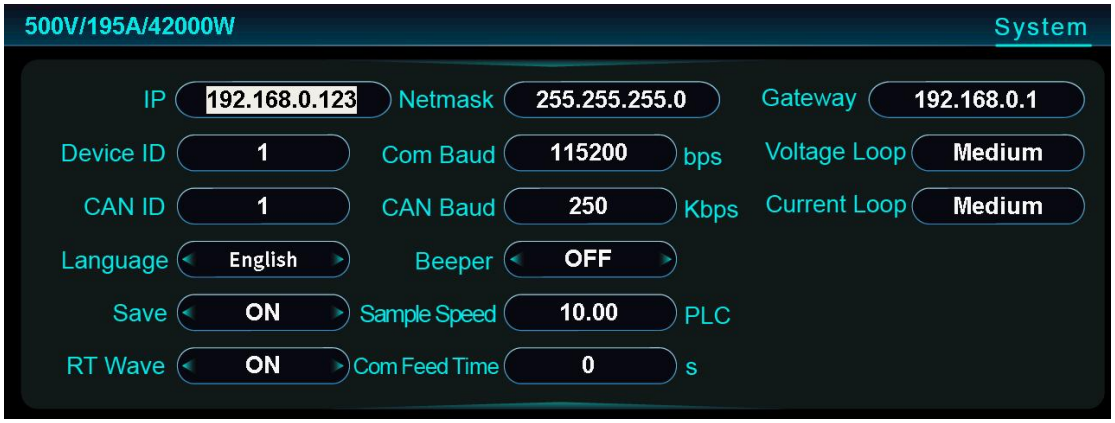


Figure 73 System

Table 27

No.	Item	Function
1	IP	The default IP address is 192.168.0.123. The computer IP must be on the same network segment as the power supply, otherwise the connection will not be successful.
2	NetMask	Default 255.255.255.0
3	Gateway	Default 192.168.0.1
4	Device ID	Range 1-248, Default 160
5	Com Baud	Support 9600, 19200, 38400, 115200, Default 115200
6	Beeper	Default ON
7	Language	Set Language
8	CAN ID	Set CANopen communication ID, range1-127, default 1
9	CAN Baud	Set CANopen Baud Rate, unit kbps
10	Save	When turned on, every time the user modifies the setting item, it will be saved to EEPROM, otherwise it will not be saved
11	Sample Speed	Unit PLC
12	RT Wave	Real time waveform, default OFF
13	Com Feed Time	Detects communication status with the host within a set time; device will be off if exceeds 0-180s.
14	Voltage Loop	Adjusts voltage loop response speed; options: Fast, Medium, Slow.
15	Current Loop	Adjusts current loop response speed; options: Fast, Medium, Slow.

5.17. Factory Reset

Method to enter **Factory Reset**:

Press Menu →choose **Factory Reset** by ◀ ▶ or ○ →press Enter or ○.

After selecting Confirm, please press Enter to complete the setting.

Note: After setting completed, it will take effect only after N35500 is restarted.

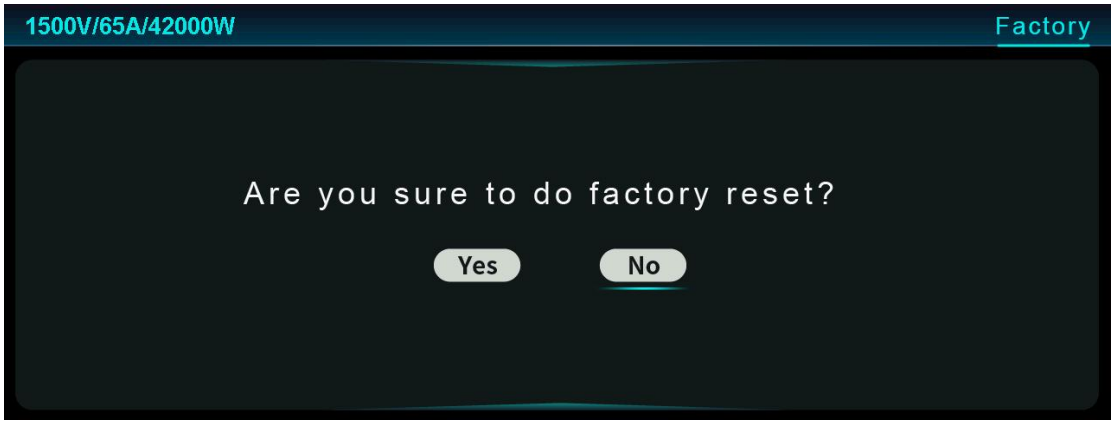


Figure 74 Factory Reset

5.18. About Us

Users press the Menu button and select About Us to enter the interface, and it is shown in the figure.

Figure 75 About Us

6. Application Software Installation & Configuration

6.1. PC Software Configuration

To make better use of the system performance, the following computer configuration is recommended:

- CPU: 2.0G, dual-core and above
- Memory: 4G and above
- Hard disk: 80G and above
- Port: Ethernet port
- Operating system: Microsoft Windows 7 and above

6.1.1. Port Connection

Please plug the Ethernet cable to PC Ethernet port and the other side to N35500 LAN port. After N35500 series is turn on, enter the system configuration interface to check the network IP. PC needs to keep the same network segment with N35500 in order to search the device. When master computer is in remote sense, configure the system parameters in the device interface , as shown in the following figure.

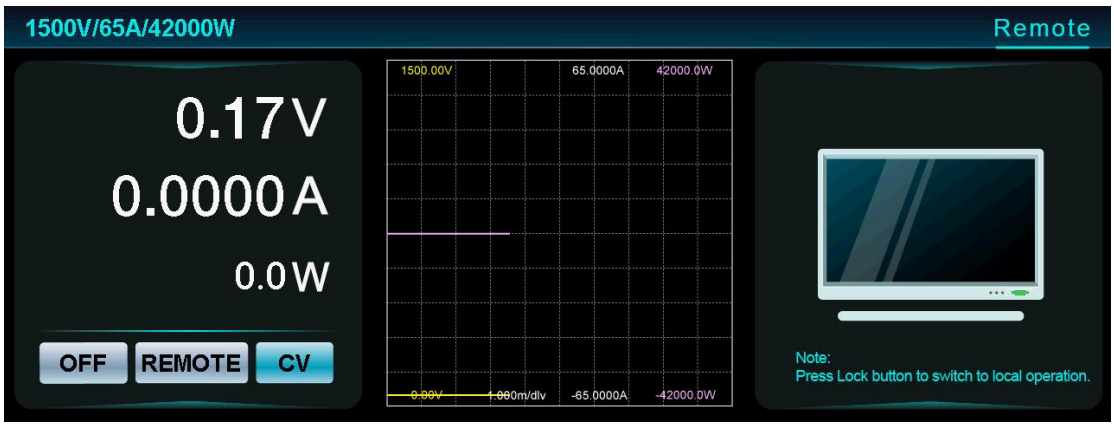


Figure 76 Remote Sense

After the master computer is disconnected, wait for 3s-5s, and then press the **LOCK** to release the remote mode.

6.1.2. Disabling operating system standby mode

■ Windows 7 settings

Click **Start** → Click **Control Panel** → Click **Power Options** → Click **Change Computer**

Sleep Time.

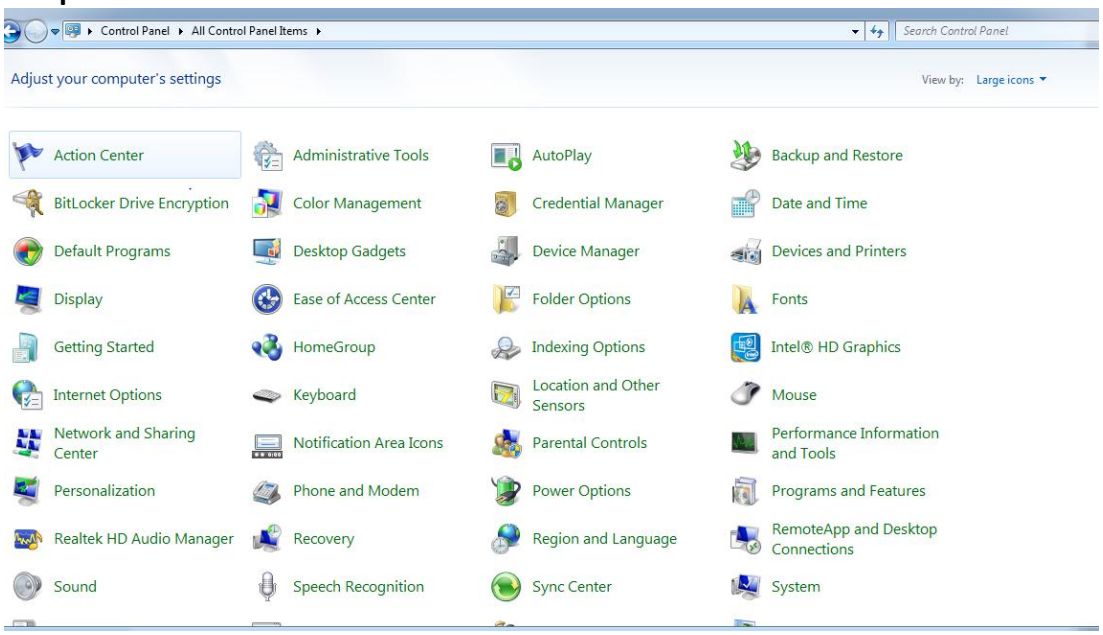


Figure 77 Windows 7 settings

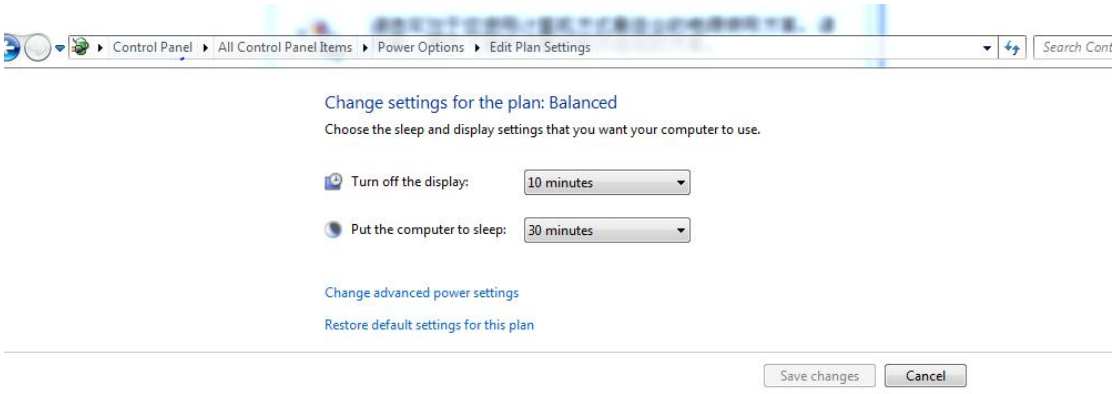


Figure 78 Windows 7 settings

Set **Turn off the display** and **Put the computer to sleep** to Never.

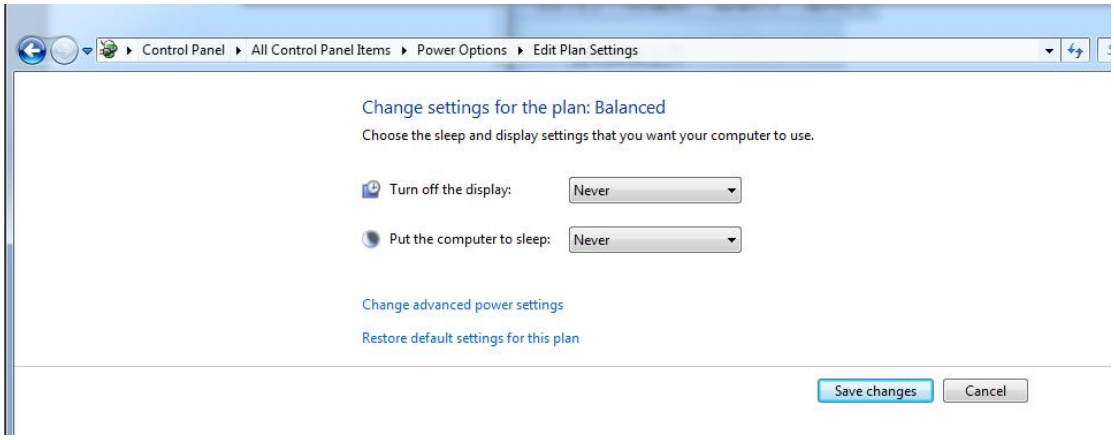


Figure 79 Windows 7 settings

■ Windows 10 settings

Click **Start**→Click **Settings**.

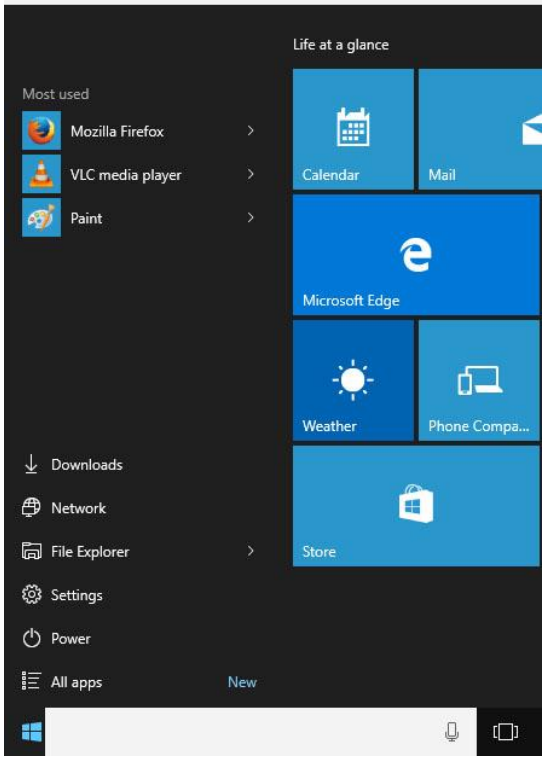


Figure 80 Windows 10 settings

Click **System**.

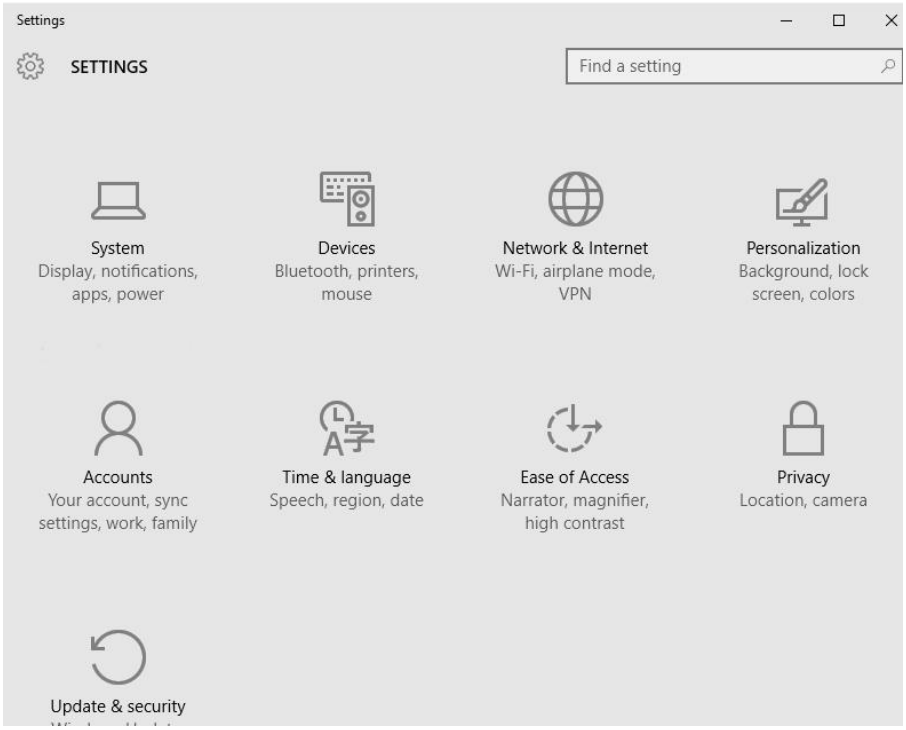


Figure 81 Windows 10 settings

Click **Power & sleep**.

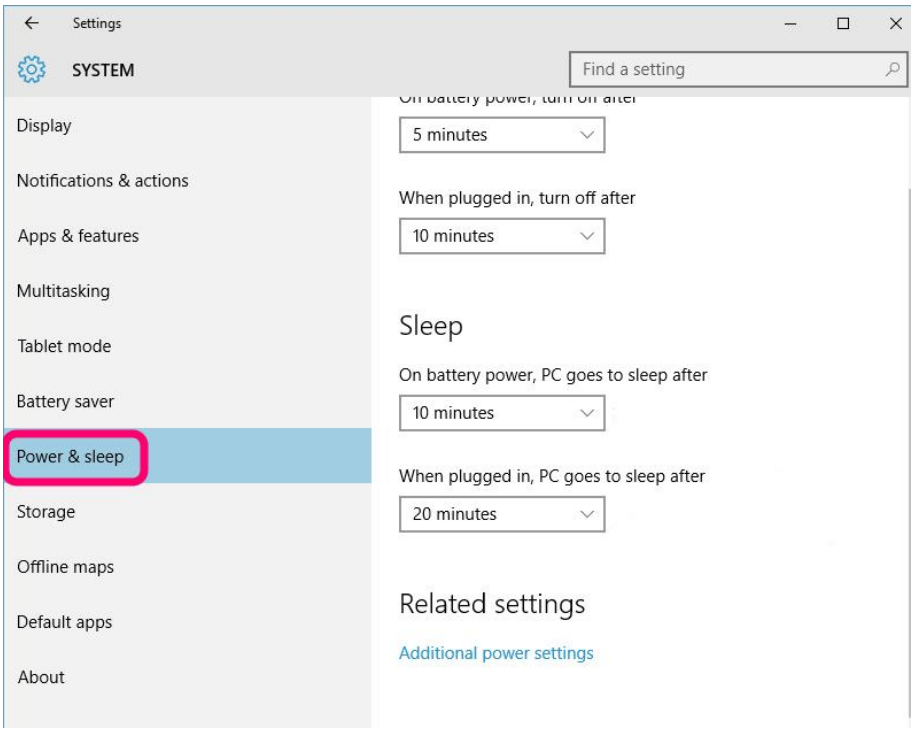


Figure 82 Windows 10 settings

Select **Never** for both options under **Sleep**.

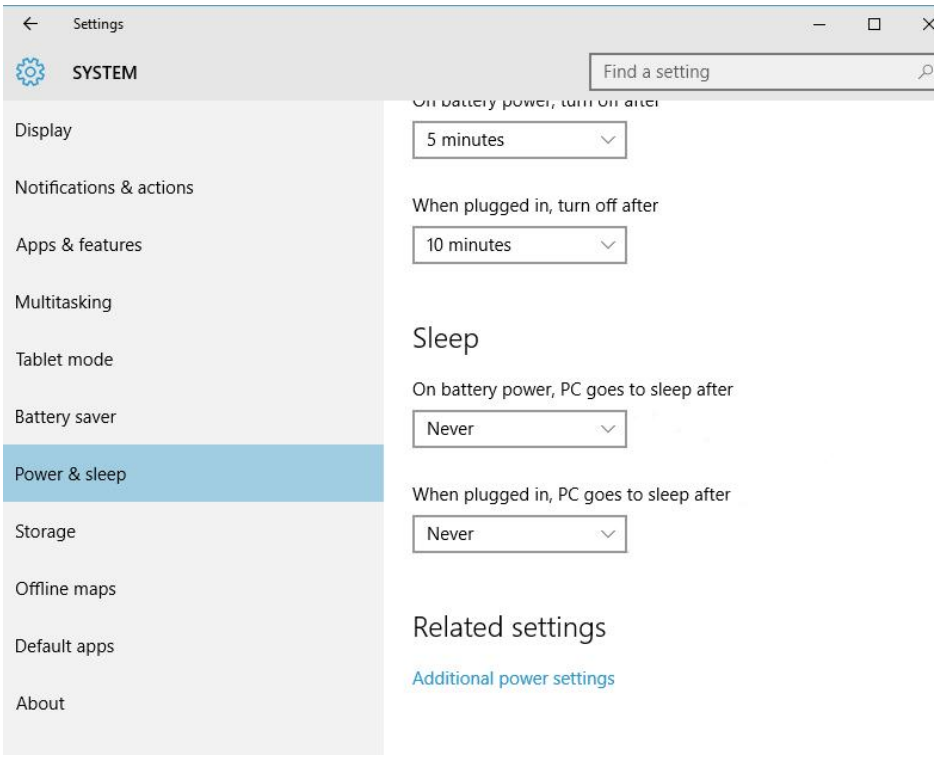


Figure 83 Windows 10 settings

6.1.3. Network IP Address Setting

The default IP of LAN port is 192.168.0.XXX (range from 0 to 255). Before operation, the computer IP should be assigned to the same network segment of N35500. But IP addresses should be different.

■ Windows 7 Setting

Click **Start**→Click **Control Panel**→Click **Network and Sharing Center**.

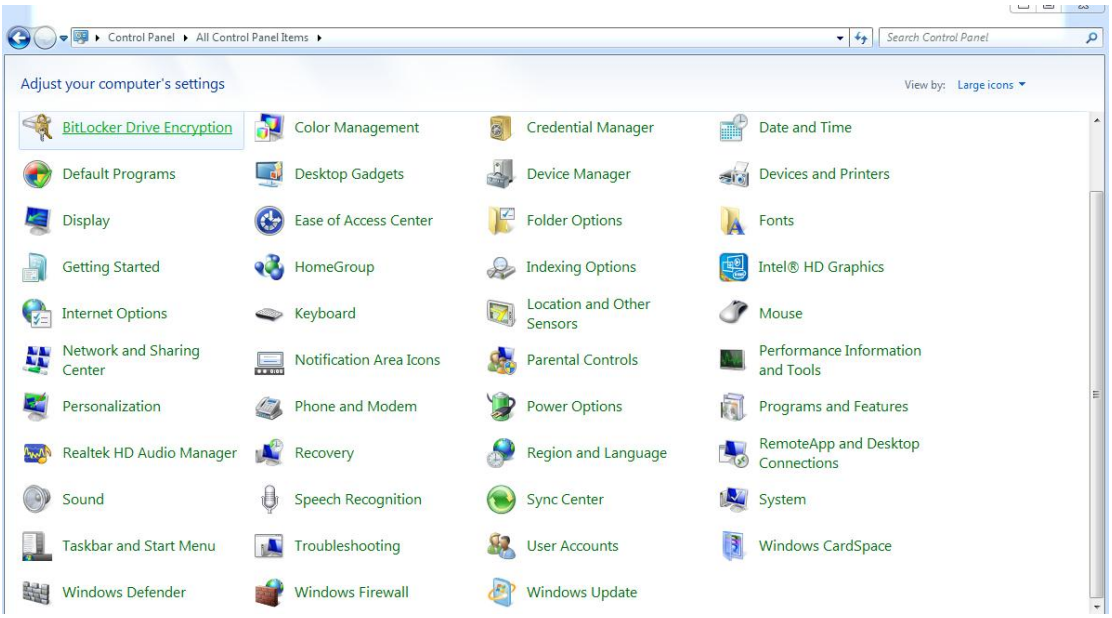


Figure 84 Network IP Address Setting

Click **Change adapter settings**.

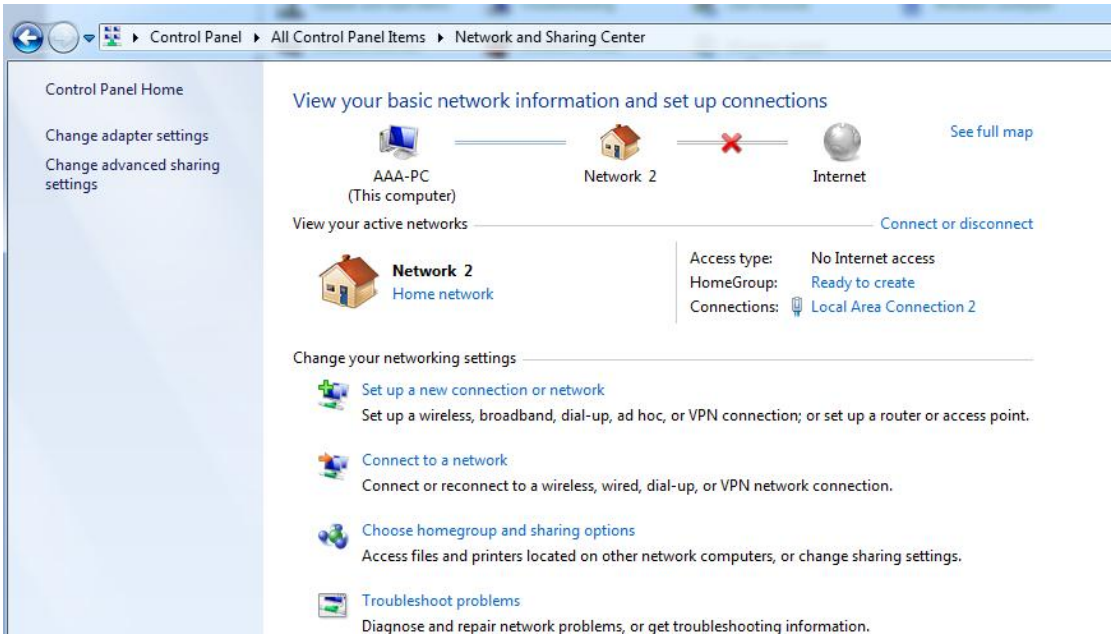


Figure 85 Network IP Address Setting

Select the network→Right click and choose **Properties**.

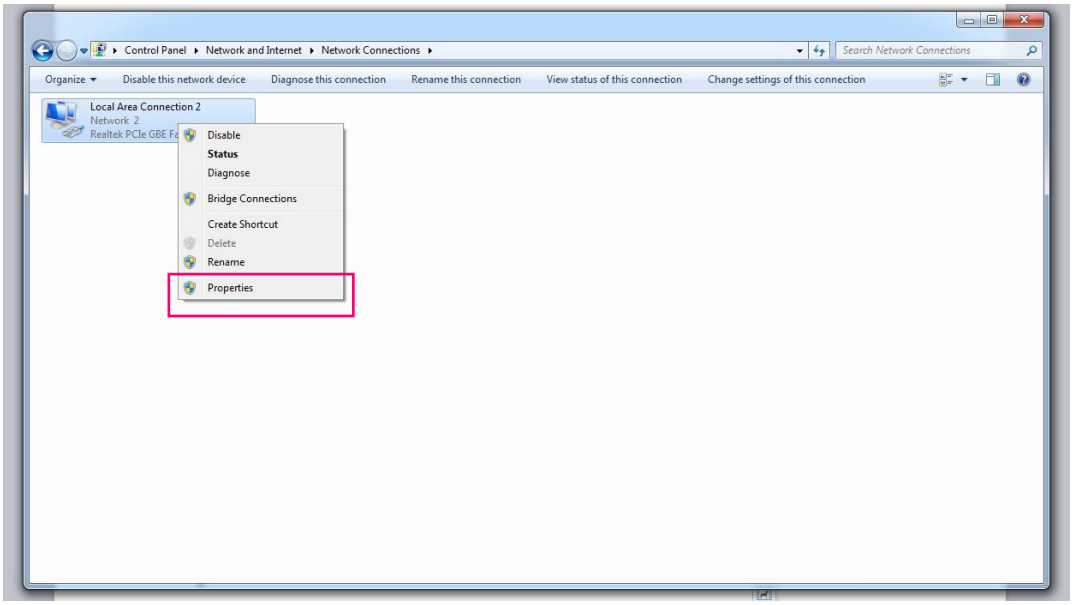


Figure 86 Network IP Address Setting

Click Internet Protocol Version 4(TCP/IPv4) and fill the below information and press **OK**.

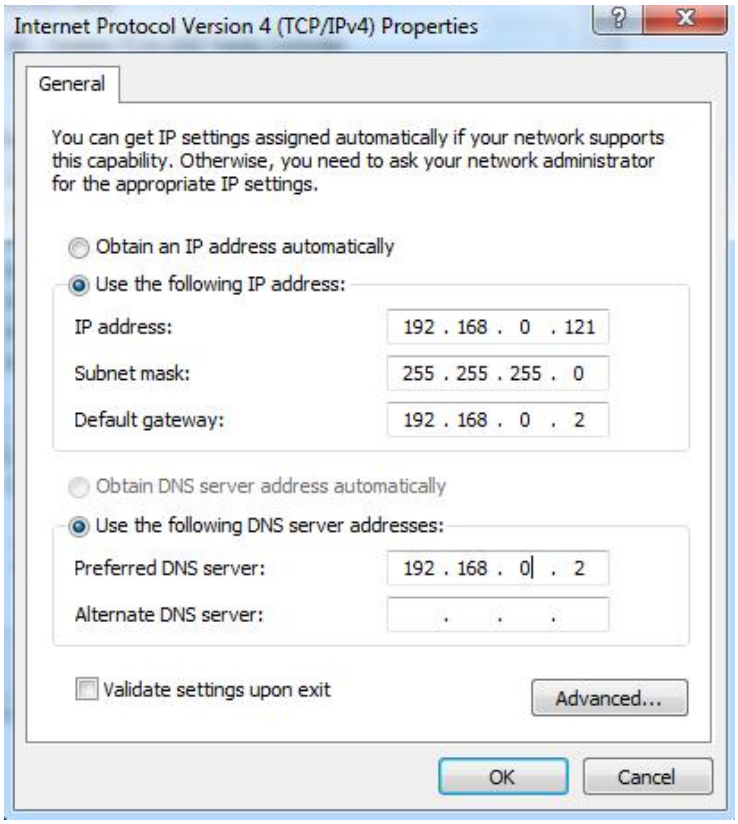


Figure 87 Network IP Address Setting

Click **Start**→Input **cmd**.

Input ping 192.168.0.123(default IP of N35500) and check if N35500 can communicate properly.

Figure 88 Run Command

If communicating properly, the below information will be reverted.

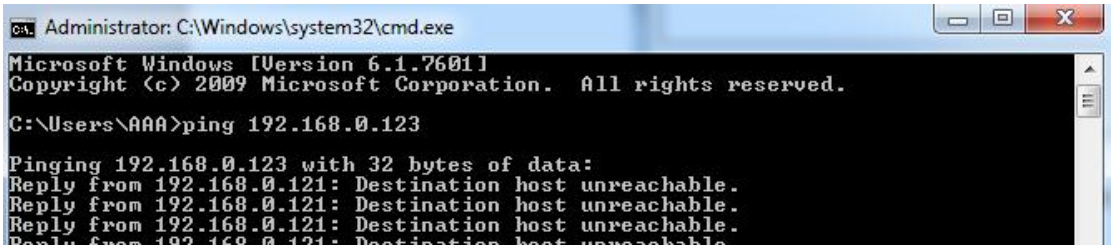


Figure 89 Communication Test

■ Windows 10 Setting

Click **Start**→Click **Set**→Click **Network & Internet**.

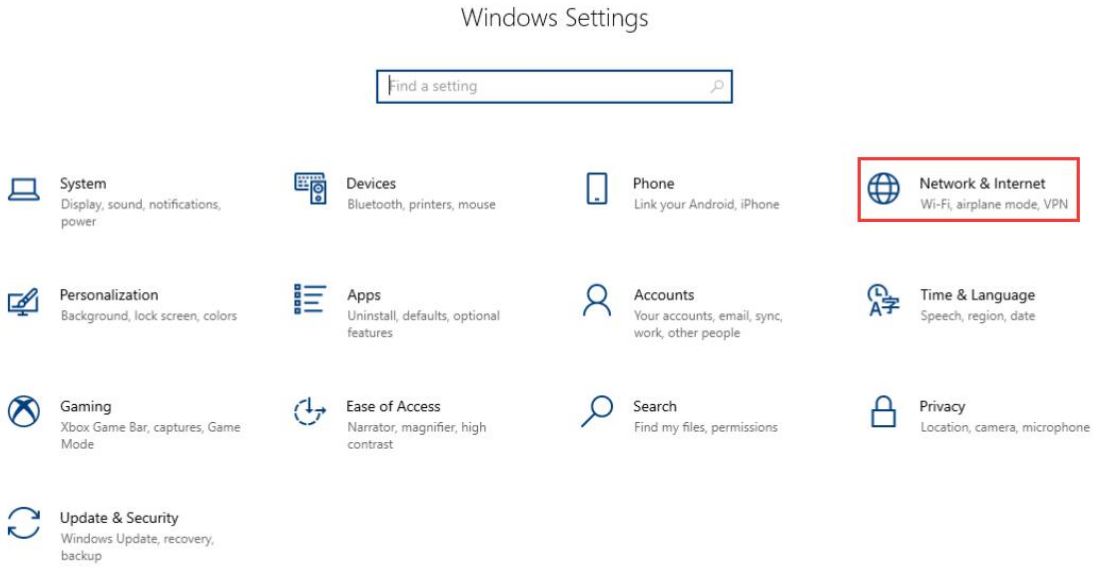


Figure 90 Network IP Address Setting

Click **Change adapter options**.

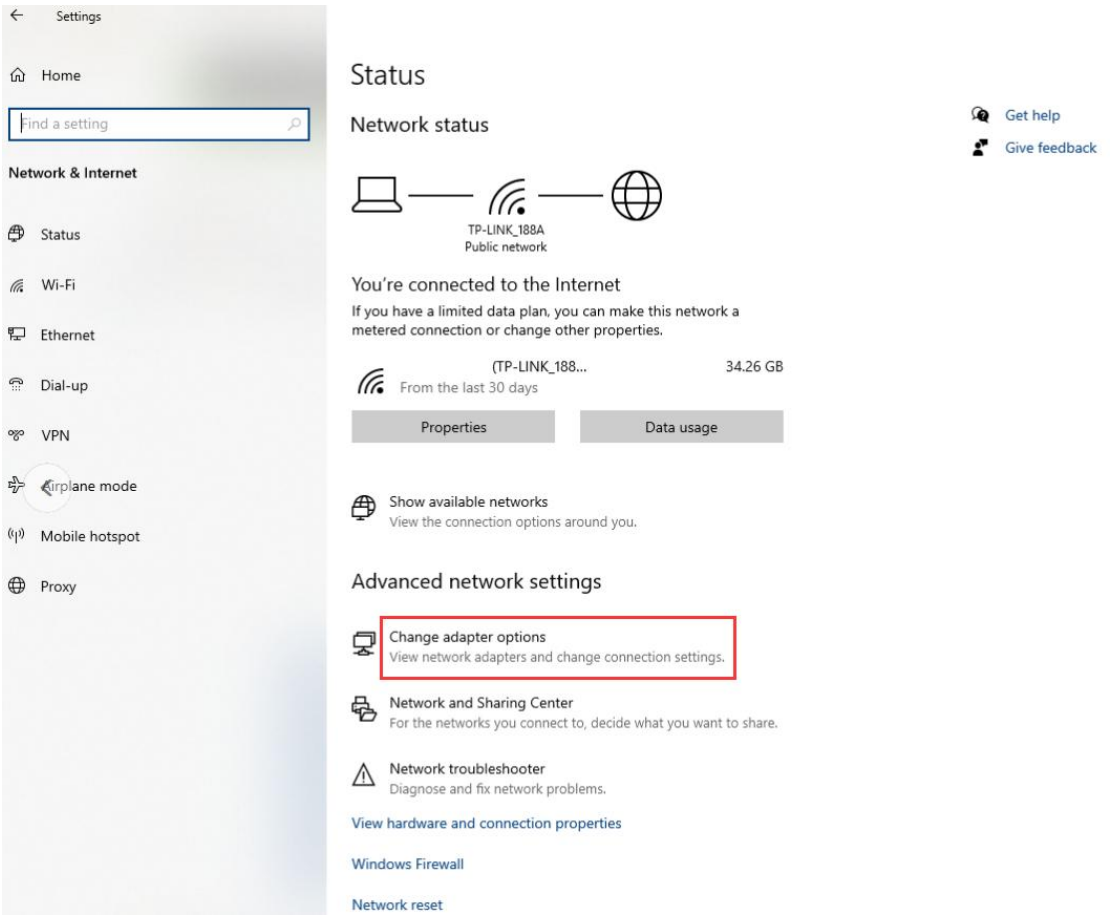


Figure 91 Network IP Address Setting

Select the network→Right click and choose **Properties**.

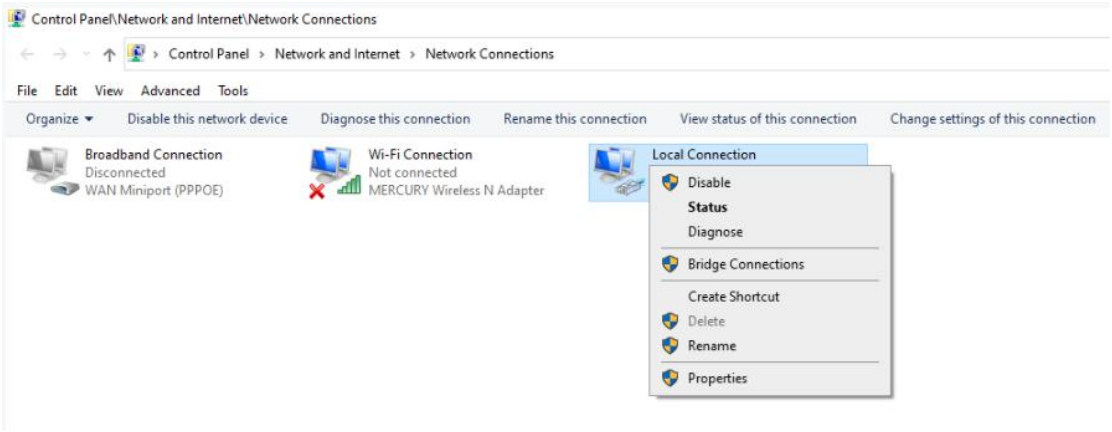


Figure 92 Network IP Address Setting

Click Internet Protocol Version 4(TCP/IPv4) and fill the below information and press **OK**.

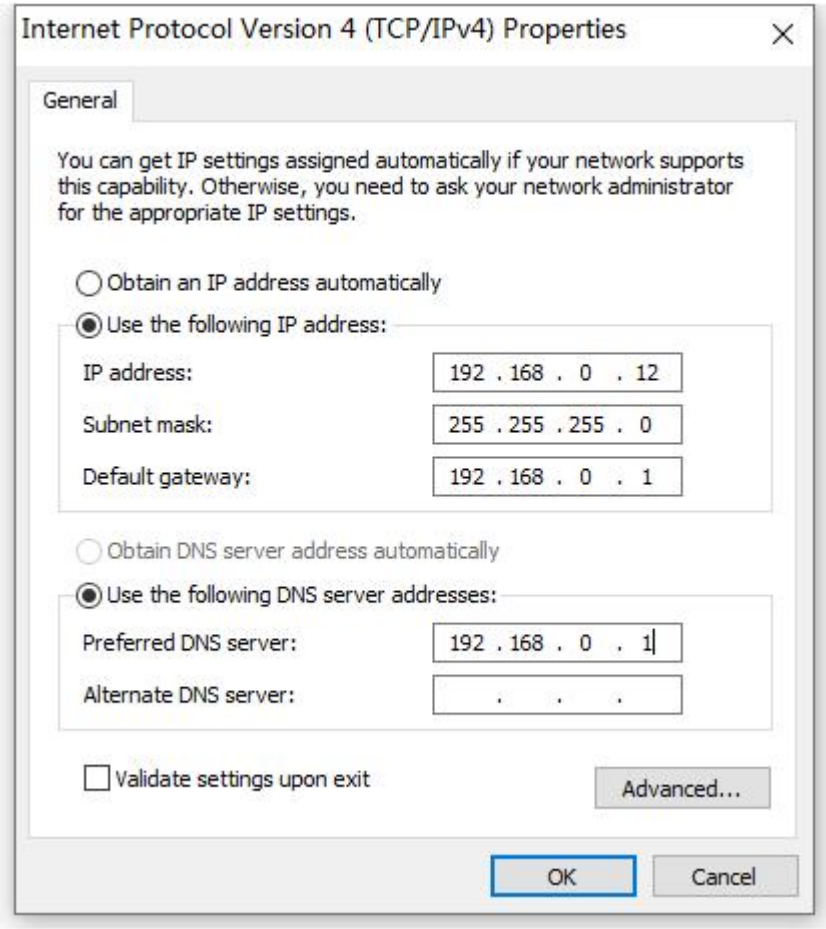


Figure 93 Network IP Address Setting

Click **Start**→Input **cmd**.

Input ping 192.168.0.123(default IP of N35500) and check if N35500 can communicate properly.

Figure 94 Run Command

If communicating properly, the below information will be reverted.

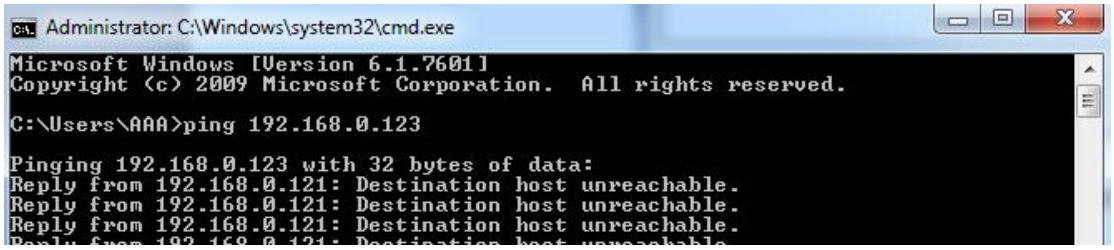


Figure 95 Communication Test

6.2. Application Software Installation and Uninstallation

6.2.1. Installation

1) Find the installation program "setup.exe" from the USB flash drive in accessory bag.
2) Make double-click on the file and begin installation.

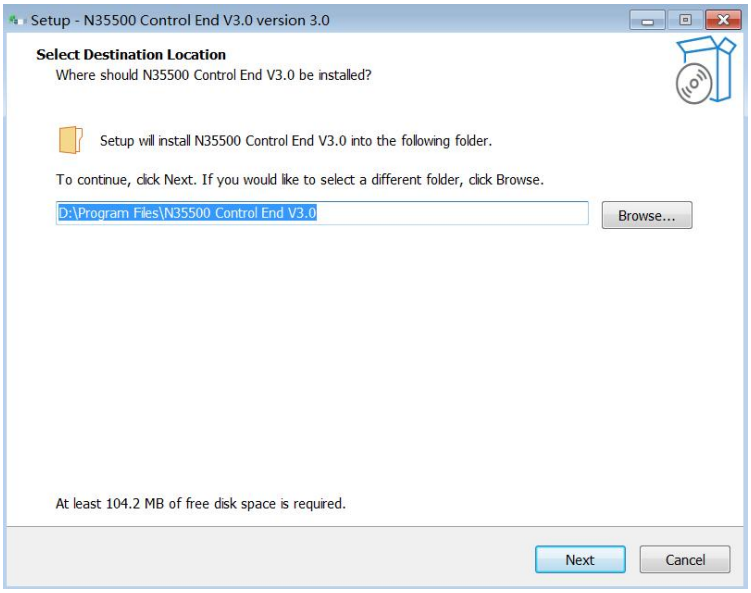


Figure 96 Program Installation

3) Click Next as prompted until the installation is completed. The software will automatically create a shortcut on the desktop.

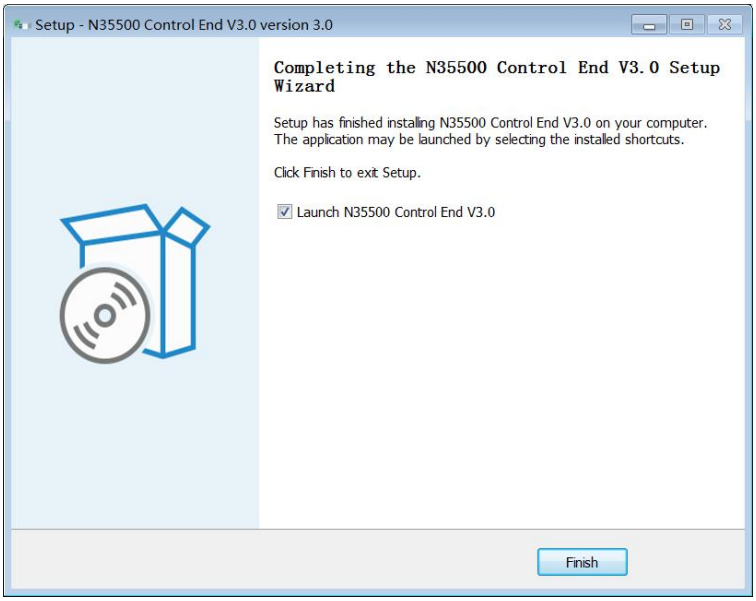


Figure 97 Installation Completed

6.2.2. Uninstallation

Methods for uninstallation:
Method 1: Program uninstallation can be completed through **Uninstall Program** in **Control Panel** of the operating system, or by right-clicking the shortcut and selecting uninstall.

Method 2: Find the setup program in your computer disk and delete.

6.3. Operation

After the application software is successfully installed, a shortcut icon will be generated on the desktop. Please click the shortcut to enter the menu.

Figure 98 Shortcut

6.3.1. Online and Search

Operation Steps:

1. Click **Hardware Config**.

2. Click **Hardware Cfg**→Select 192.168.0.XXX network→Click **OK**→Click **Save** after the device is searched.

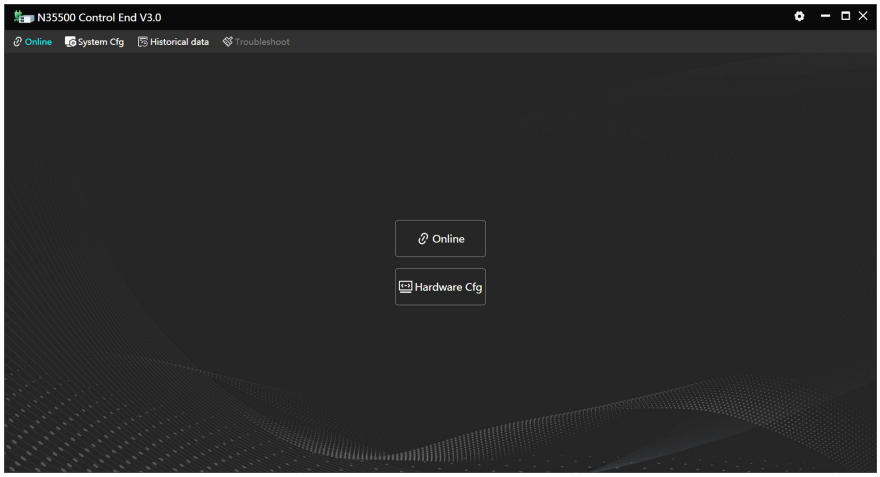


Figure 99 Application Interface

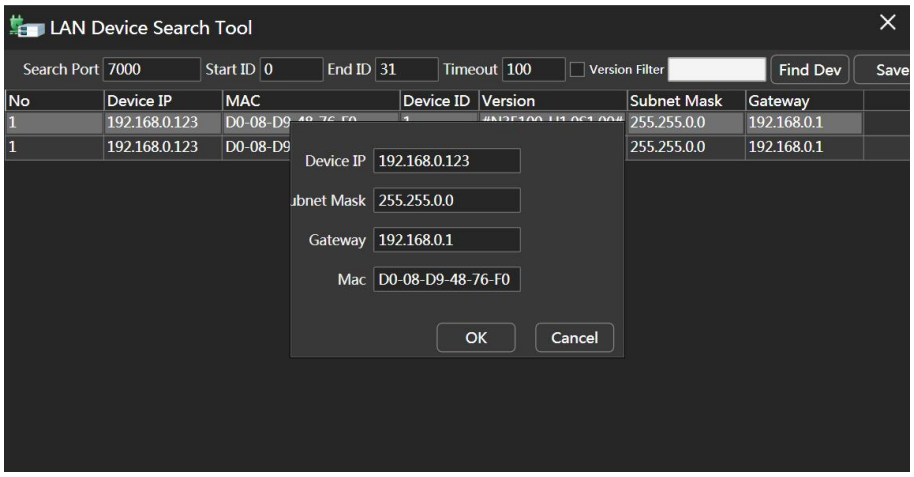


Figure 100 Hardware Configuration

6.3.2. Software Interface

Figure 101 Application Software Interface

Application software interface introduction:

1. Toolbar

It includes Offline, System Cfg, Historical Data, Troubleshoot.

2. Function

V/I, Charge, Discharge, Res, CR, SEQ, Car Wave, Step, Wave, AnyWave, Advanced are Included. Parameters can be set for each mode, after setting the parameters, click Submit or OK, which means to turn on the power under that mode.

3. Data Info

Data chart and Info Echo are included.

4. Start Recording

Click to save data, which can be browsed in historical data.

5. Parameter Cfg

Protective parameters and output parameters are included.

6.3.3. V/I Mode

V/I mode is default mode, and users can set the voltage parameters in this mode. Respectively, users also can set the current and power of the source mode and load mode.

Operation steps:

Click **Refresh** after the setting is completed→write the set value→click **ON** and **OFF** to control the switch. As shown in the figure below:

Figure 102 V/I Mode

6.3.4. Charge

Click **Charge** to test charging voltage, current and to set end voltage, end current etc. click **ON** and **OFF** to start or stop test.
As shown in the figure below:

Figure 103 Charge

6.3.5. Discharge

Click **Discharge** to test discharging power, current and to set end voltage, end time

etc. →click **ON** and **OFF** to start or stop test.
As shown in the figure below:

Figure 104 Discharge

6.3.6. SR

In this mode, users can set parameters of Voltage, Max-I, Max-P, Internal-R. Click **Refresh** and **ON** to start test.

Figure 105 Resistance Simulation

6.3.7. CR

Click **CR** to simulate resistance/current/power value→click **ON** and **OFF** to start or stop test.
As shown in the figure below:

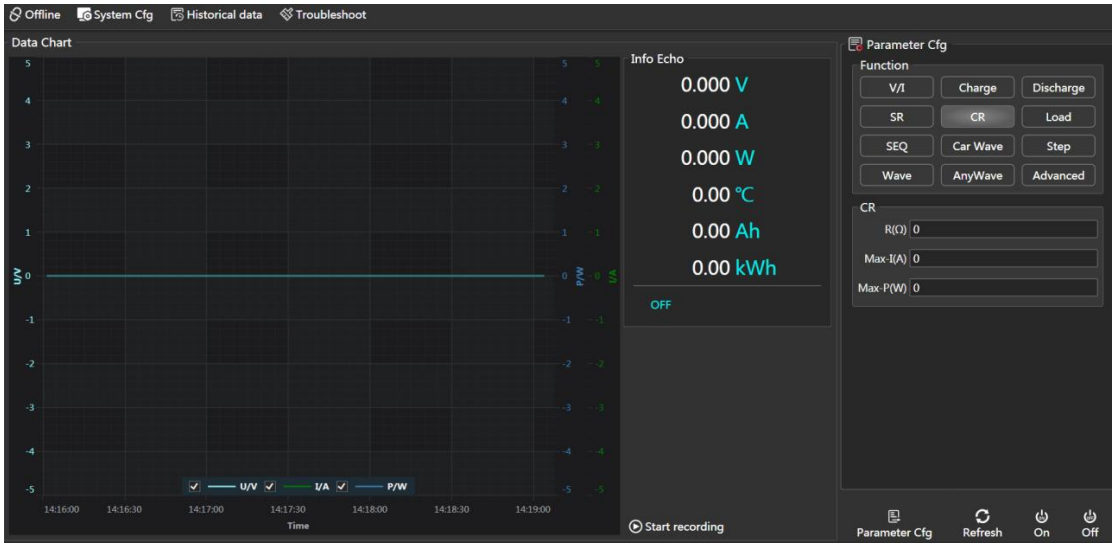


Figure 106 CR

6.3.8. Load Mode

Click **Load** to set voltage/ resistance/current/power value→click **Refresh**→Click **ON** and **OFF** to start or stop test.
As shown in the figure below:

Figure 107 Load

6.3.9. SEQ Mode

Operation steps:
Click **SEQ** to select and edit SEQ file→click **ON** and **OFF** to execute or end file.
As shown in the figure below:

Figure 108 SEQ Test

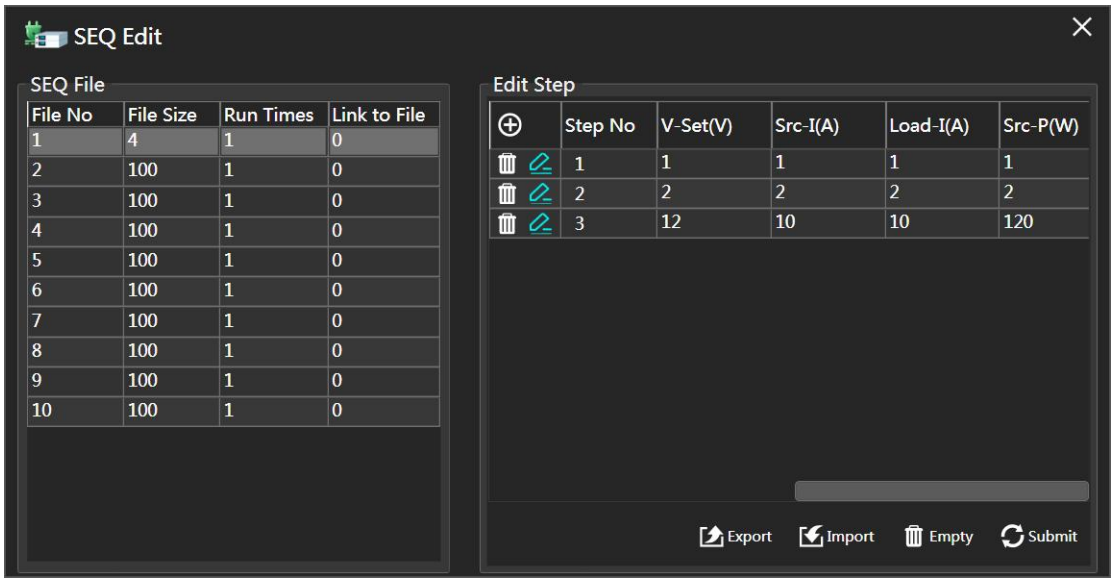


Figure 109 SEQ Edit

6.3.10. Car Wave

Car Wave test for selection of waveform.

L1 Selection: Select the test execution standard;

L2 Selection: Select the test content;

L3 Selection: Select the standard value of the test content.

After selecting, click **Refresh** and **ON** to start test.

Figure 110 Car Wave

6.3.11. Step

Step mode is a function that increases/decreases the start output value by a fixed amount of steps to reach the end value.

Click **Step** to set V/I and increment→click **Refresh**→Click **ON** and **OFF** to start or stop wave output.
As shown in the figure below:

Figure 111 Step

6.3.12. Wave

Click **Wave** to select and edit file→click **Submit**→After selecting SEQ file, please set reference voltage, current limit and power limit→click **Refresh**→Click **ON** and **OFF** to start or stop wave output.
As shown in the figure below:

Figure 112 Wave

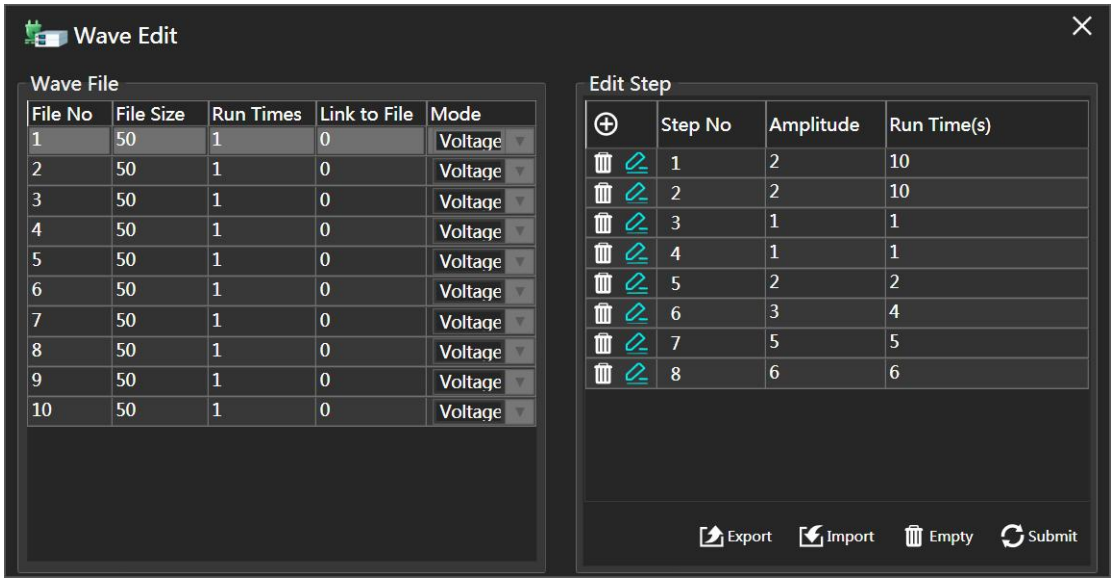


Figure 113 Wave Edit

6.3.13. Advanced

Advanced is used to edit multiple waveform to simulate complex conditions.

Click **Advanced** to select and edit file→click **Submit**→After selecting SEQ file, please set reference voltage, current limit and power limit→click **Refresh**→Click **ON** and **OFF** to start or stop wave output.

As shown in the figure below:

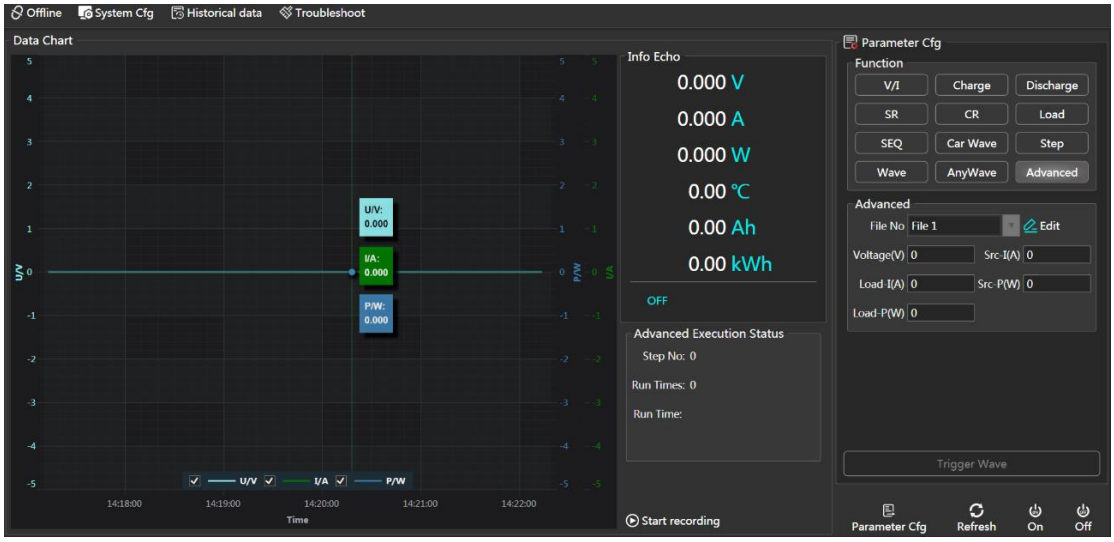


Figure 114 Advanced

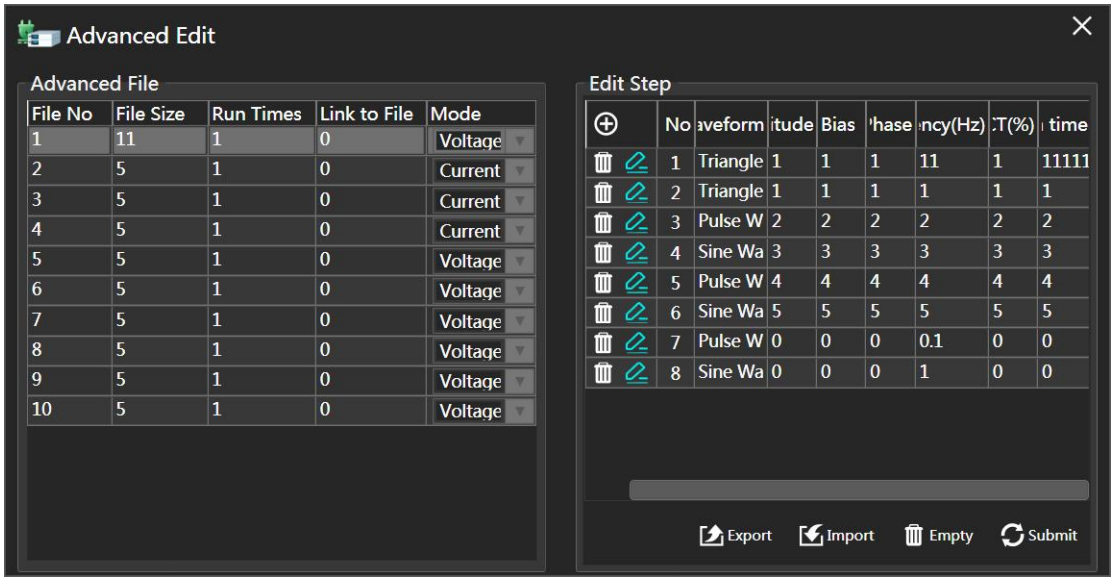


Figure 115 Advanced Edit

6.3.14. Any Wave

Anywave is a function that outputs customized sine, pulse, and triangle waveform.

Click **Anywave** to set Amplitude, Bias, Phase, Frequency and Percentage etc.→click **Refresh**→Click **ON** and **OFF** to start or stop wave output.

As shown in the figure below:

Figure 116 AnyWave

6.3.15. Parameter Cfg

In the protection interface, settings can be made, click **Submit** to confirm.
In the M/S Control interface, the device can be set as the master or slave 1–63. For detailed settings, refer to **Chapter 5.11.**
In the output parameter interface, channel output parameters can be configured. For detailed settings, refer to **Chapter 5.15**.

Click **Parameter Cfg** to set relevant parameters →click **Submit**→close interface**.** As shown in the figure below：

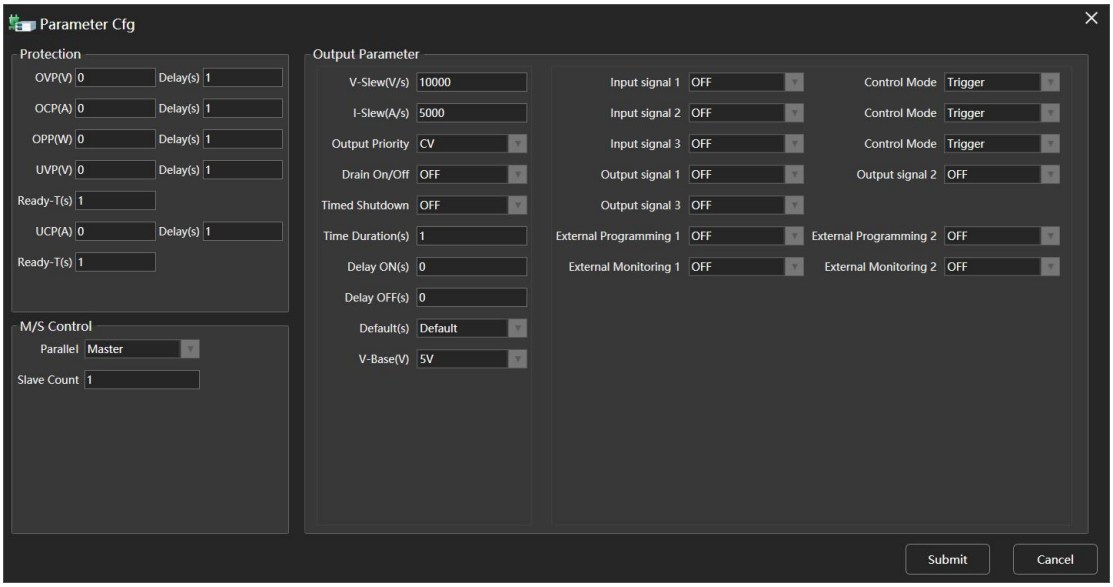


Figure 117 Parameter configuration

⚠ **Warning: Disconnect power before cleaning.**

7.2. Fault Self-inspection

Device Fault Self-inspection

Due to system upgrade or hardware problem, the device may break down. Please do the following necessary inspection to eliminate the troubles, which can save your maintenance and time cost. If the troubles cannot be recovered, please contact NGI.

The inspection steps are as below.

- Check whether the device is powered.
- Check whether the device can be turned on normally.
- Check whether the fuse has no damage.
- Check whether other connectors are correct, including wire cables, plug, etc.
- Check whether the system configuration is correct.
- Check whether all the specifications and performances are within the device working range.
- Check whether the device displays error information.
- Operate on a replacement device.

Calibration Intervals

It is suggested that N35500 series should be calibrated once a year.

8. Main Technical Data

Warning

1. The measurement accuracy is identified by the following conditions: within one year after calibration, operation temperature between 18℃ and 28℃, and the relative humidity up to 80%.
2. Please prepare for half an hour before precision measurement.
3. If the operating voltage exceeds 1.1 times the rated voltage, permanent damage can be caused to the equipment.

Model: N35542-500-195

Model	N35542-500-195
Voltage	0~500V
Current	-195A~195A
Power	-42kW~42kW
CV Mode	
Range	0~500V
Setting Resolution	1mV
Setting Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Voltage Ripple （20Hz~20MHz）	≤3Vp-p
	≤0.4Vrms
CC Mode	
Range	-195A~195A
Setting Resolution	1mA
Setting Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Current Ripple （20Hz~20MHz）	≤1.4Ap-p
	≤200mArms
CP Mode	
Range	-42kW~42kW
Setting Resolution	0.1W
Setting Accuracy(23±5℃)	0.1%+0.1%F.S.
Voltage Measurement	
Range	0~500V

Readback Resolution	1mV
Readback Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Temperature Coefficient	≤15ppm/℃
Current Measurement	
Range	-195A~195A
Readback Resolution	1mA
Readback Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Temperature Coefficient	≤30ppm/℃
Line Regulation	
Voltage	＜0.01%F.S.
Current	＜0.02%F.S.
Load Regulation	
Voltage	＜0.01%F.S.
Current	＜0.05%F.S.
Dynamic Characteristic	
V-Rise Time(no load)[1]	≤5ms
V-Rise Time(full load)[1]	≤5ms
V-Fall Time(no load)[2]	≤10ms
V-Fall Time(full load)[2]	≤5ms
Transient Recovery Time	Output voltage recovery to within 0.75% of rated output voltage (10%~60%load) ≤1ms
Others	
Isolation(output to ground)	2250V DC
Max. Efficiency	93%
PF	0.99
Protection	OVP、OCP、OPP、UVP、UCP
Communication Interface	LAN/RS232/RS485/CAN
Communication Response Time	5ms
AC Input	Three phase , Please refer to the voltage mark at the rear panel.
Temperature	Operating temperature: 0℃~50℃[3], storage temperature: -10℃~70℃
Operating Environment	Altitude <2000m, relative humidity: 5%-90%RH(non-condensing), atmospheric pressure: 80~110kPa
Dimension	132.5mm(H)*428.0mm(W)*755.0mm(D)with output shield
Net Weight	Approx.42kg

Note [1]: 10%~90% variation time

Note [2]: 90%~10% variation time

Note [3]: Above 35℃ derating output

Model: N35528-1000-65

Model	N35528-1000-65
Voltage	0~1000V
Current	-65A~65A
Power	-28kW~28kW
CV Mode	
Range	0~1000V
Setting Resolution	10mV
Setting Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Voltage Ripple （20Hz~20MHz）	≤3Vp-p
	≤0.4Vrms
CC Mode	
Range	-65A~65A
Setting Resolution	0.1mA
Setting Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Current Ripple （20Hz~20MHz）	≤1.4Ap-p
	≤200mArms
CP Mode	
Range	-28kW~28kW
Setting Resolution	0.1W
Setting Accuracy(23±5℃)	0.1%+0.1%F.S.
Voltage Measurement	
Range	0~1000V
Readback Resolution	10mV
Readback Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Temperature Coefficient	≤15ppm/℃
Current Measurement	
Range	-65A~65A
Readback Resolution	0.1mA
Readback Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Temperature Coefficient	≤30ppm/℃
Line Regulation	
Voltage	＜0.01%F.S.
Current	＜0.02%F.S.
Load Regulation	

Voltage	＜0.01%F.S.
Current	＜0.05%F.S.
Dynamic Characteristic	
V-Rise Time(no load)[1]	≤5ms
V-Rise Time(full load)[1]	≤5ms
V-Fall Time(no load)[2]	≤10ms
V-Fall Time(full load)[2]	≤5ms
Transient Recovery Time	Output voltage recovery to within 0.75% of rated output voltage (10%~60%load) ≤1ms
Others	
Isolation(output to ground)	2250V DC
Max. Efficiency	93%
PF	0.99
Protection	OVP、OCP、OPP、UVP、UCP
Communication Interface	LAN/RS232/RS485/CAN
Communication Response Time	5ms
AC Input	Three phase , Please refer to the voltage mark at the rear panel.
Temperature	Operating temperature: 0℃~50℃[3], storage temperature: -10℃~70℃
Operating Environment	Altitude <2000m, relative humidity: 5%-90%RH(non-condensing), atmospheric pressure: 80~110kPa
Dimension	132.5mm(H)*428.0mm(W)*755.0mm(D)with output shield
Net Weight	Approx.38kg

Note [1]: 10%~90% variation time

Note [2]: 90%~10% variation time

Note [3]: Above 35℃ derating output

Model: N35542-1500-65

Model	N35542-1500-65
Voltage	0~1500V
Current	-65A~65A
Power	-42kW~42kW
CV Mode	
Range	0~1500V
Setting Resolution	10mV
Setting Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Voltage Ripple （20Hz~20MHz）	≤3Vp-p
	≤0.4Vrms
CC Mode	
Range	-65A~65A
Setting Resolution	0.1mA
Setting Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Current Ripple （20Hz~20MHz）	≤1.4Ap-p
	≤200mArms
CP Mode	
Range	-42kW~42kW
Setting Resolution	0.1W
Setting Accuracy(23±5℃)	0.1%+0.1%F.S.
Voltage Measurement	
Range	0~1500V
Readback Resolution	10mV
Readback Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Temperature Coefficient	≤15ppm/℃
Current Measurement	
Range	-65A~65A
Readback Resolution	0.1mA
Readback Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Temperature Coefficient	≤30ppm/℃
Line Regulation	
Voltage	＜0.01%F.S.
Current	＜0.02%F.S.
Load Regulation	

Voltage	＜0.01%F.S.
Current	＜0.05%F.S.
Dynamic Characteristic	
V-Rise Time(no load)[1]	≤5ms
V-Rise Time(full load)[1]	≤5ms
V-Fall Time(no load)[2]	≤10ms
V-Fall Time(full load)[2]	≤5ms
Transient Recovery Time	Output voltage recovery to within 0.75% of rated output voltage (10%~60%load) ≤500μs
Others	
Isolation(output to ground)	2250V DC
Max. Efficiency	93%
PF	0.99
Protection	OVP、OCP、OPP、UVP、UCP
Communication Interface	LAN/RS232/RS485/CAN
Communication Response Time	5ms
AC Input	Three phase , Please refer to the voltage mark at the rear panel.
Temperature	Operating temperature: 0℃~50℃[3], storage temperature: -10℃~70℃
Operating Environment	Altitude <2000m, relative humidity: 5%-90%RH(non-condensing), atmospheric pressure: 80~110kPa
Dimension	132.5mm(H)*428.0mm(W)*755.0mm(D)with output shield
Net Weight	Approx.42kg

Note [1]: 10%~90% variation time

Note [2]: 90%~10% variation time

Note [3]: Above 35℃ derating output

Model: N35542-2250-65

Model	N35542-2250-65
Voltage	0~2250V
Current	-65A~65A
Power	-42kW~42kW
CV Mode	
Range	0~2250V
Setting Resolution	10mV
Setting Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Voltage Ripple （20Hz~20MHz）	≤3Vp-p
	≤0.4Vrms
CC Mode	
Range	-65A~65A
Setting Resolution	0.1mA
Setting Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Current Ripple （20Hz~20MHz）	≤1.4Ap-p
	≤200mArms
CP Mode	
Range	-42kW~42kW
Setting Resolution	0.1W
Setting Accuracy(23±5℃)	0.1%+0.1%F.S.
Voltage Measurement	
Range	0~2250V
Readback Resolution	10mV
Readback Accuracy(23±5℃)	≤0.02%+0.02%F.S.
Temperature Coefficient	≤15ppm/℃
Current Measurement	
Range	-65A~65A
Readback Resolution	0.1mA
Readback Accuracy(23±5℃)	≤0.1%+0.1%F.S.
Temperature Coefficient	≤30ppm/℃
Line Regulation	
Voltage	＜0.01%F.S.
Current	＜0.02%F.S.
Load Regulation	

Voltage	＜0.01%F.S.
Current	＜0.05%F.S.
Dynamic Characteristic	
V-Rise Time(no load)[1]	≤5ms
V-Rise Time(full load)[1]	≤5ms
V-Fall Time(no load)[2]	≤10ms
V-Fall Time(full load)[2]	≤5ms
Transient Recovery Time	Output voltage recovery to within 0.75% of rated output voltage (10%~60%load) ≤500μs
Others	
Isolation(output to ground)	2250V DC
Max. Efficiency	93%
PF	0.99
Protection	OVP、OCP、OPP、UVP、UCP
Communication Interface	LAN/RS232/RS485/CAN
Communication Response Time	5ms
AC Input	Three phase , Please refer to the voltage mark at the rear panel.
Temperature	Operating temperature: 0℃~50℃[3], storage temperature: -10℃~70℃
Operating Environment	Altitude <2000m, relative humidity: 5%-90%RH(non-condensing), atmospheric pressure: 80~110kPa
Dimension	132.5mm(H)*428.0mm(W)*755.0mm(D)with output shield
Net Weight	Approx.42kg

Note [1]: 10%~90% variation time

Note [2]: 90%~10% variation time

Note [3]: Above 35℃ derating output

Note [4]: The above specifications are only for reference. For other specifications, please contact NGI.

Note [5]: All specifications are subject to change without notice.