

# N3410 Series Triple-channel Programmable DC Power Supply

## User Manual

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Version: V20211014

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## 1 Preface

Dear Customers,

First of all, we greatly appreciate your choice of N3410 series programmable DC power supply (N3410 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 N3410 series programmable 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 N3410, 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

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.
















### 2.1 Safety Notes

- **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 N3410's rated range.

### 2.2 Safety Symbols

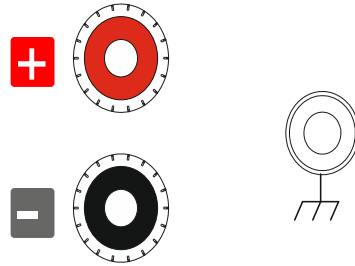
Please refer to the following table for definitions of international symbols used on the instrument or in the user manual.

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
	Three-phase current		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

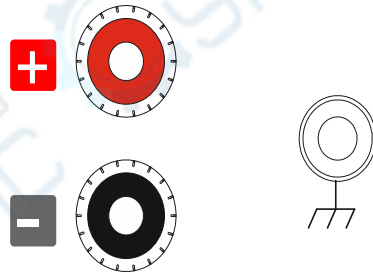
## 2.3 Warnings

If the output floating voltage of the power supply is greater than  $\pm 60\text{VDC}$ , operator will be exposed to the risk of electric shock at the terminal. When using a non-insulated metal short-circuit bar to connect positive(+) output terminal to positive(+) polarity of DUT, and connect negative(-) output terminal to negative(-) polarity of DUT, please make sure the output floating voltage should be not greater than  $\pm 60\text{VDC}$ .



The maximum floating voltage to ground is  $\pm 60\text{VDC}$ .  
(Using non-insulated short-circuit conductor)

If insulators are used instead of non-insulated metal short-circuit bars, or these short-circuit bars are removed from the terminals so that no operator can touch the non-insulated output conductors, the maximum output floating voltage can reach  $\pm 240\text{VDC}$ . The insulation of all wires at the operation site must meet the present voltage requirements.



The maximum floating voltage to ground is  $\pm 240\text{VDC}$ .  
(Using non-insulated short-circuit conductor)

## 3 Product

### 3.1 Brief Introduction

N3410 series is a triple-channel programmable DC power supply with high performance and high reliability. N3410 is with half 19 inch 2U size, integrating three independent output channels, and supporting both front and rear wiring. It has compact size and elegant appearance. N3410 supports both benchtop application with carrying handle and tilt stand, and supports rack installation for system integration. Test and measurement information is displayed intuitively on the 4.3 inch LCD screen. DVM measurement function is optional.

#### 3.1.1 Features

- Each channel isolated, programmable and controllable
- High accuracy and resolution, as low as 0.1mV/0.1mA<sup>1</sup>
- Low ripple&noise, Vrms less than 400μV, Vp-p less than 5mV
- Dynamic response time less than 1ms
- Sequence(SEQ) test function<sup>2</sup>
- Half 19 inch 2U size with tilt stand
- Graph for real-time output waveform display<sup>3</sup>
- Programmable hardware OVP and OCP protection
- Intelligent fan control
- High accuracy DVM measurement (for N3411P/N3412P/N3413P only)
- Supporting series, parallel and trace output modes
- Front and rear output terminals
- Communication interfaces: LAN/RS232

Remark 1: N3411E/N3412E/N3413E are with 10mV/1mA resolution.

Remark 2: SEQ is not available for N3411E/N3412E/N3413E.

Remark 3: Graph is not available for N3411E/N3412E/N3413E

## 3.2 Overview

### 3.2.1 N3410 Series Lineup

Table 2

Model	Channels	Specification
N3411	3	2CH: 32V*3A, 1CH: 6V*3A
N3411P	3	2CH: 32V*3A, 1CH: 6V*3A
N3411E	3	2CH: 32V*3A, 1CH: 6V*3A
N3412	3	2CH: 32V*5A, 1CH: 6V*3A
N3412P	3	2CH: 32V*5A, 1CH: 6V*3A
N3412E	3	2CH: 32V*5A, 1CH: 6V*3A
N3413	3	2CH: 60V*3A, 1CH: 6V*3A
N3413P	3	2CH: 60V*3A, 1CH: 6V*3A
N3413E	3	2CH: 60V*3A, 1CH: 6V*3A

### 3.2.2 Package Contents and Accessories

After receiving N3410, 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. Make sure the the following accessories are attached.

Table 3

N3410 Accessories	Instructions
Power cord	For AC power connection
USB flash drive	User manual, software & technical information

**If any loss or damage, please contact our authorized distributor or NGI.**

4. Check the whole instrument. If N3410 chassis is damaged or has abnormal operation, please contact our authorized distributor or NGI.

### 3.2.3 Appearance & Dimension

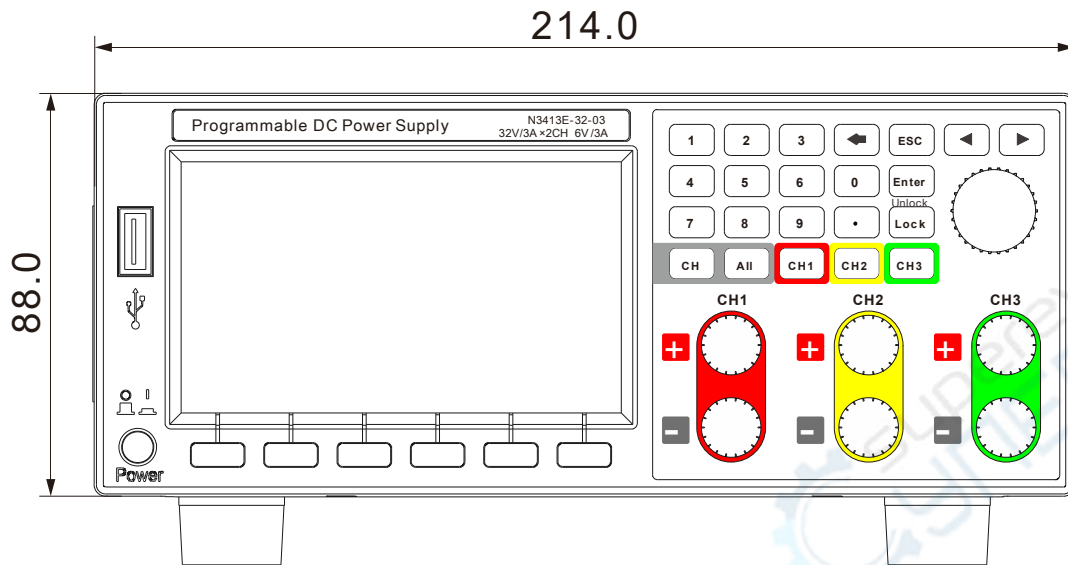


Figure 1 Front Panel Dimension(mm)

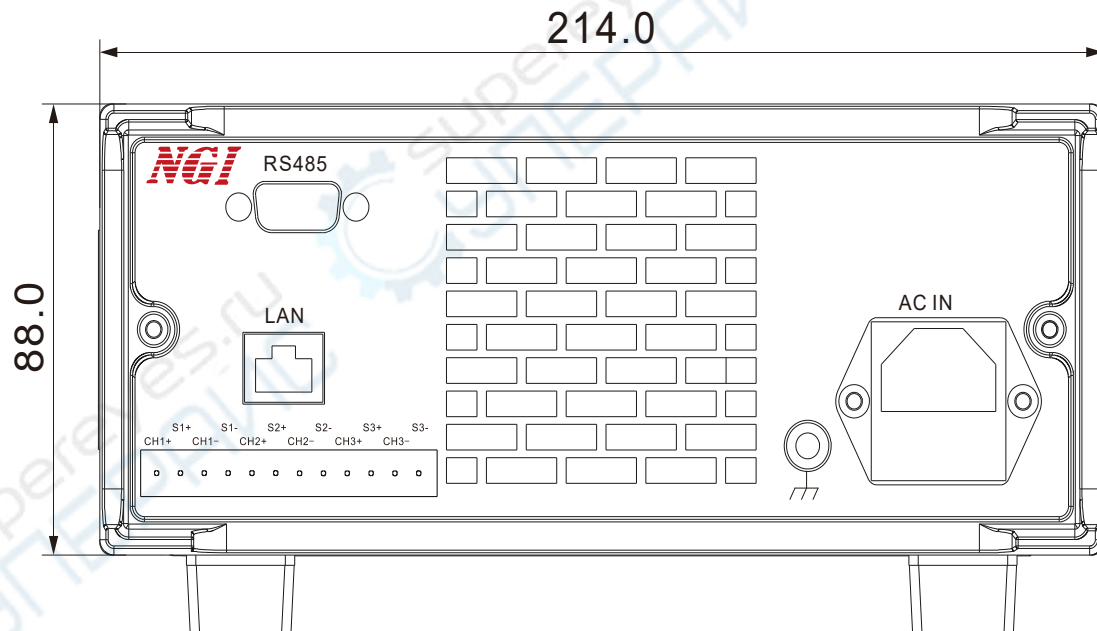


Figure 2 Rear Panel Dimension(mm)

Note: For N3411E/N3412E/N3413E, sense terminals are not available.



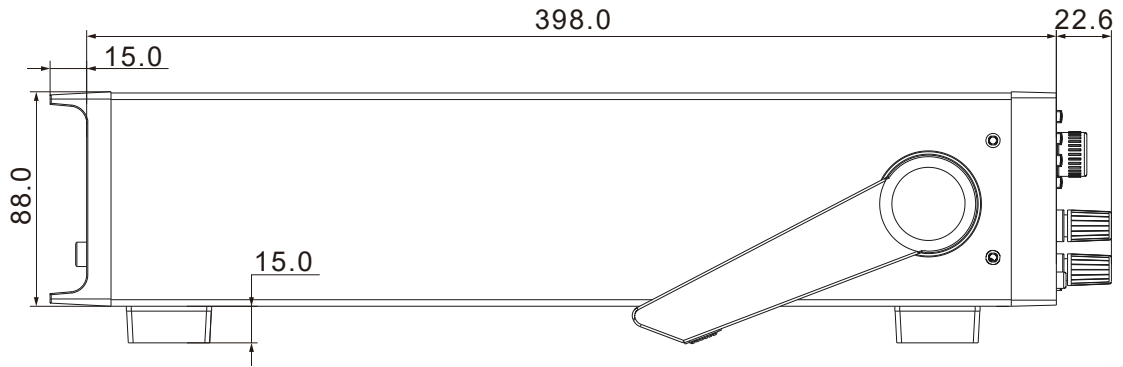


Figure 3 Side Dimension(mm) (N3411/N3411P/N3411E)

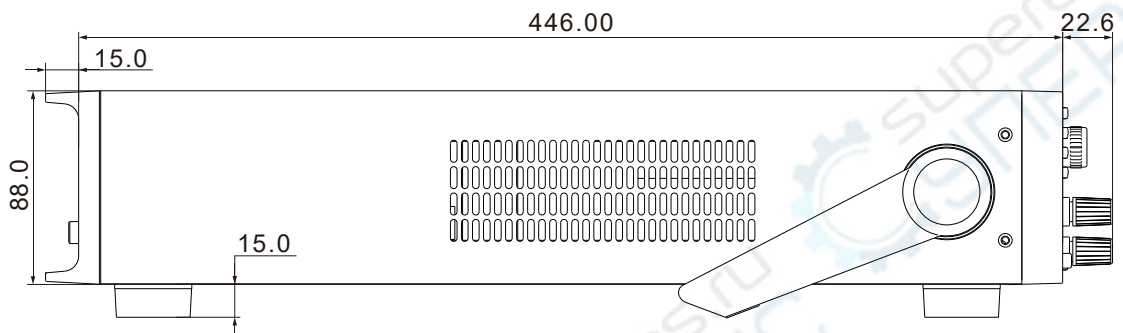


Figure 4 Side Dimension(mm) (N3412/N3412P/N3412E/N3413/N3413P/N3413E)

### 3.3 Front Panel Introduction

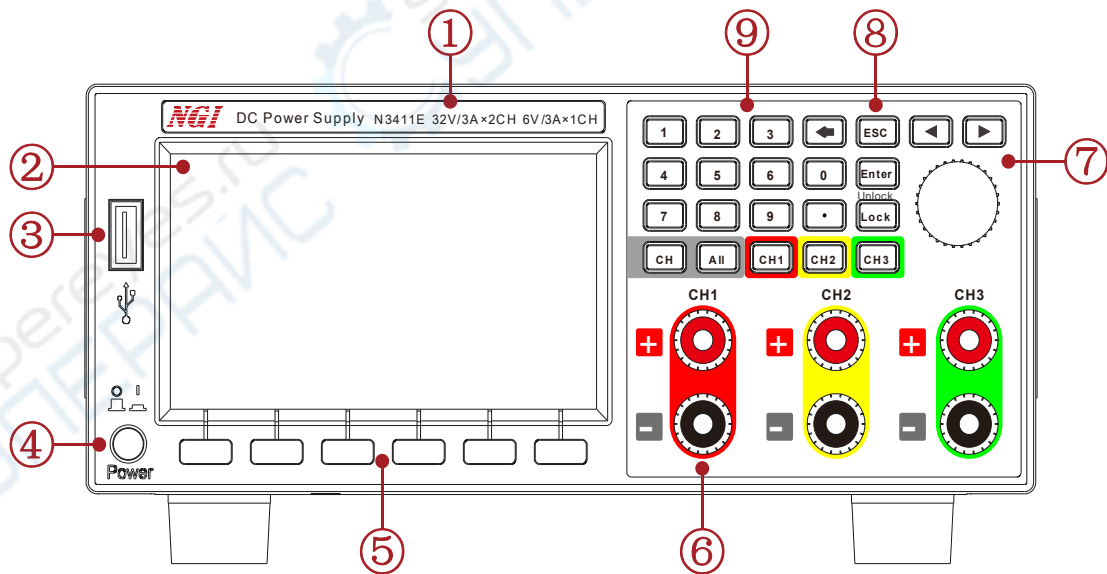


Figure 5 Front Panel









Table 4

Number	Name	Function
1	Device model	Displaying model number

2	Screen	Displaying data
3	USB port	For USB flash drive connection
4	Power switch	Power control
5	Switch button	Shortcut button for the function at the bottom of screen
6	Output interface	Output interface, red for positive(+), black for negative(-)
7	Knob/left&right arrow	By rotating knob: to select the required item, adjust the parameter By pressing knob: to enter the edit interface, confirm the input
8	Function button	Please see below chapter description.
9	Numeric button	For digit input

### 3.3.1.1 Function Button

Table 5

Button	Function
	Channel switch
	To turn on/off the output for all three channels
	Single channel control
	To lock/unlock
	To confirm
	To exit
	To delete
	To move the cursor

### 3.4 Rear Panel Introduction

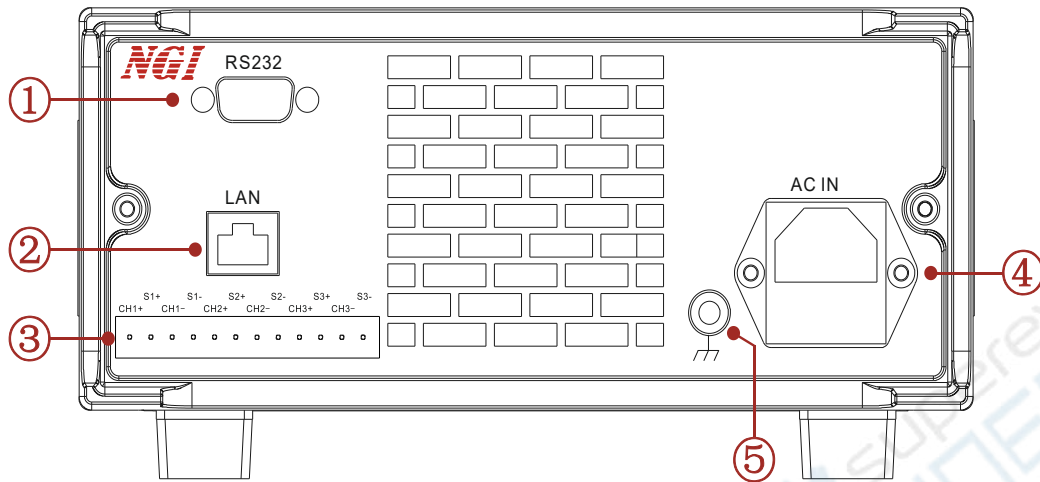


Figure 6 Rear Panel

Table 6

Number	Name
1	RS232 interface
2	LAN port
3	Output interface
4	AC power socket
5	Grounding screw

### 3.5 Power-on Test

Before power-on, please make sure the following.

- 1) The nominal voltage of the AC input socket should be in the correct range.
- 2) The power cord is plugged into AC input socket.



Warning: The three-core power cord provides chassis grounding. Before operating on N3410, please make sure N3410 is well grounded.

If N3410 cannot be started properly, please refer to the following steps.

- 1) Check whether the power cord is properly connected.
- 2) Check whether the power is switched on.
- 3) Check whether the fuse is burned out.
  - ◆ If yes, please replace it.
  - ◆ Please use the proper fuse.
  - ◆ When replacing, please open the plastic cover at the AC power socket.

For more support, please contact NGI.

## 4 Operation

### 4.1 Menu

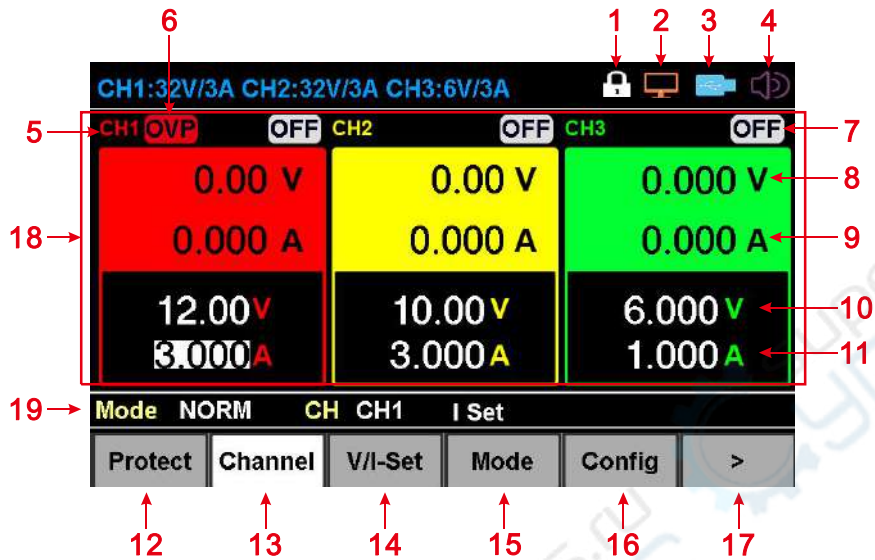


Figure 7 Menu

1. Lock icon

When this icon shows, it means N3410 buttons are locked. The other buttons are invalid in this case.

2. Ethernet connection icon

When this icon shows, it means N3410 has been connected to PC or other control devices through the Ethernet cable.

3. USB connection icon

When this icon shows, it means a USB flash drive has been connected to N3410 through the USB port.

4. Beeper icon

When this icon shows, it means beeper setting is ON.

5. Channel icon

It shows the channel number of three channels.

6. Alarm

The protection of specific channel occurs.

7. Channel state

There are three states: OFF, CV ON and CC ON.

8. Readback voltage
9. Readback current
10. Setting voltage
11. Setting current
12. Protect setting

Users can set over voltage and over current protection value of three channels separately.

13. Channel switch

Users can press the corresponding button below **Channel** to switch among channel 1 to 3.

14. V/I Set

The cursor will switch between voltage setting and current setting by continuously pressing the corresponding button under **V/I Set**.

15. Mode switch

There are four options: normal, series, parallel and trace.

16. Config

Users can configure the system parameters.

17. More

There are extra four options: Timer, SEQ, Graph and About Us.

18. The readback and setting interface of three channels

The first channel is red. The second channel is yellow. The third channel is green.

19. The present mode, selected channel and cursor position

## 4.2 Output Interface Wiring

1. Choose a load wire with a suitable gauge.
2. Connect the positive polarity of load wire to the positive output interface, and the negative polarity of load wire to the negative output interface. The wiring method is shown in the figure below.

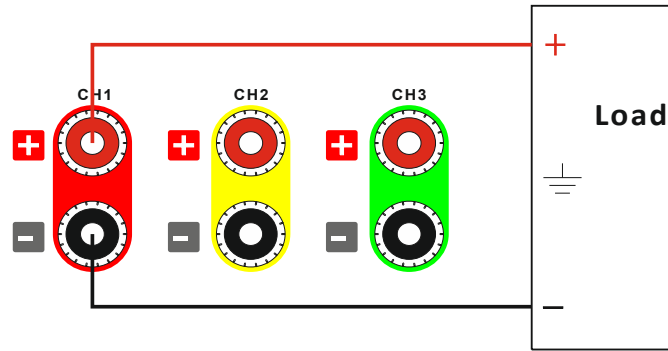


Figure 8 Wiring Diagram

Before connecting to the output interface, please make sure N3410 is not turned on, otherwise there may be a danger of electric shock.

## 4.3 Basic Operation

There is a row of switch buttons at the bottom of screen. Users can press the corresponding button to switch to the function required.

### 4.3.1 Channel Switch






Method to switch the required channel:

**Method 1:** Press the button below **Channel** on the screen.

**Method 2:** Press  on the front panel.

### 4.3.2 Voltage/Current Setting

Take channel 2 for example to set voltage and current.

1. Press button below **Channel** on the screen to switch to channel 2.
2. Press button below **V/I-Set** on the screen and move cursor to voltage/current setting area.
3. Press  or .
4. Input digit by pressing numeric buttons or pressing   to move the cursor and rotate  to adjust the value.



5. Press or to confirm the setting.

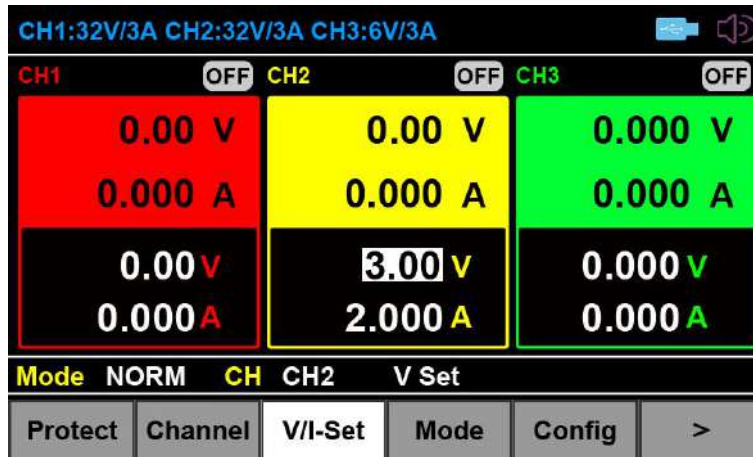


Figure 9 Voltage/Current Setting

### 4.3.3 Protect Setting

The OVP/OCP setting range of N3410 series is shown below. By default, OVP/OCP is set to the maximum value.

Table 7

Model	N3411	N3412	N3413
OVP Setting Range (CH1/CH2)	3~34.12V	3~34.12V	3~63.5V
OCP Setting Range (CH1/CH2)	1~3.25A	1~5.35A	1~3.25A
OVP Setting Range (CH3)	3~6.8V		
OCP Setting Range (CH3)	1~3.25A		

Steps to set protection parameters:

1. Press button below **Protect** on the screen.
2. Press or on OVP/OCP setting area.
3. Input digit by pressing numeric buttons or pressing to move the cursor and rotate to adjust the value.
4. Press or to confirm the setting.
5. Press button below **Channel** on the screen to switch to other channels.
6. Press to return to previous page.



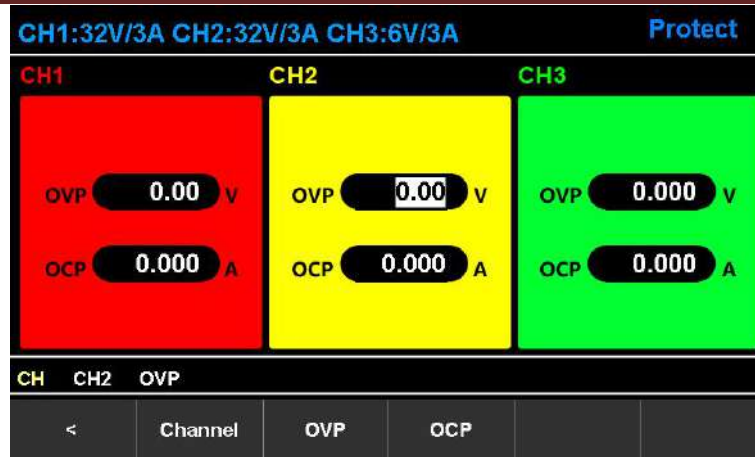


Figure 10 Protection Setting

When the output voltage/current is higher than OVP/OCP set value, N3410 will shut off output, and alarm OVP/OCP will be displayed on the screen. At this time, users can press for three times continuously to clear the protection.

When overvoltage/overcurrent protection occurs, please also check whether OVP/OCP setting value is lower than output voltage/current. If this is not the case, please contact our authorized distributor or NGI.

Note: When overvoltage/overcurrent occurs, the protection circuit inside N3410 will shut off output. If an active load such as a battery is connected to N3410 output interface, when overvoltage/overcurrent occurs, the current from the active load such as the battery is poured into the internal circuit of N3410, which will damage N3410. To avoid this situation, users can connect a diode in series with the output interface, as shown in the figure below.

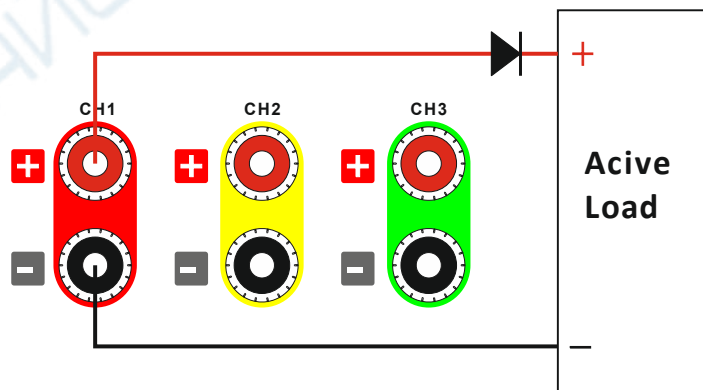


Figure 11 Active load wiring diagram

### 4.3.4 Output Mode Setting

Please press the button below **Mode** on the screen to enter output mode setting. The default is normal (NORM) mode. In normal mode, channel 1, channel 2, and channel 3 output separately and are set individually. The other three optional output modes are parallel (PARALL), series (SERIES), and trace (TRACE) modes. Users can switch to the corresponding mode by pressing the corresponding button below the different modes, as shown in the figure below.

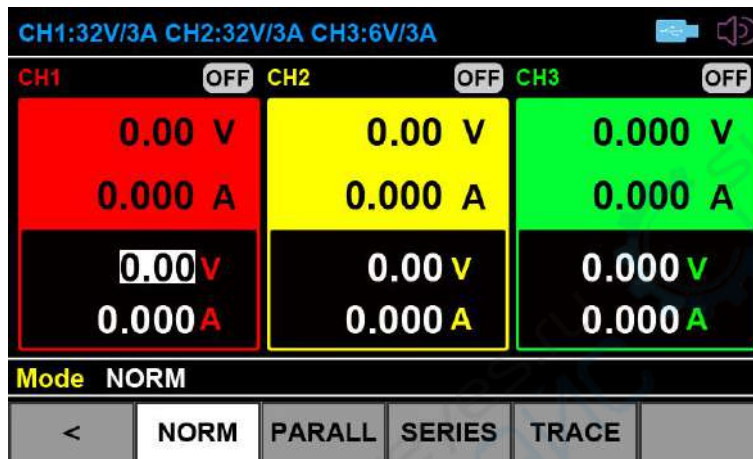


Figure 12 Output Mode Setting

#### 4.3.4.1 Parallel Mode

Please press the button below **PARALL** on the screen and switch to parallel mode.

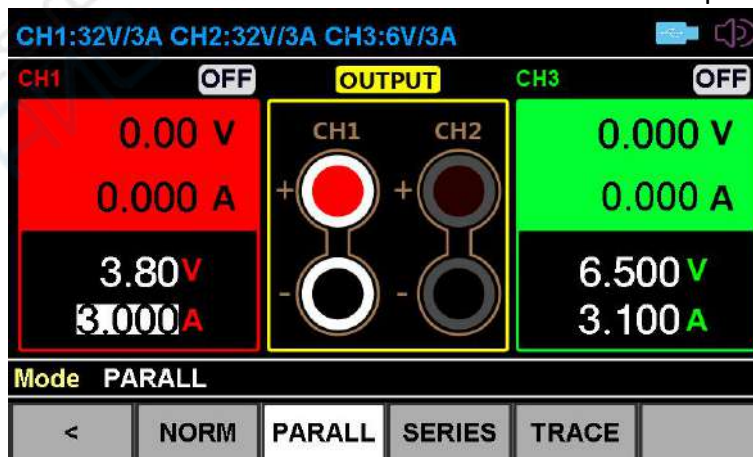


Figure 13 Parallel Mode

In parallel mode, the power supply can output 0-6A for N3411E/N3413E/N3411/N3411P/N3413/N3413P and 0-10A for N3412E/N3412/N3412P. The power supply can output 0-32V for

N3411E/N3412E/N3411/N3411P/N3412/N3412P and 0-60V for N3413E/N3413/N3413P. The parallel connection method is shown in the figure below.

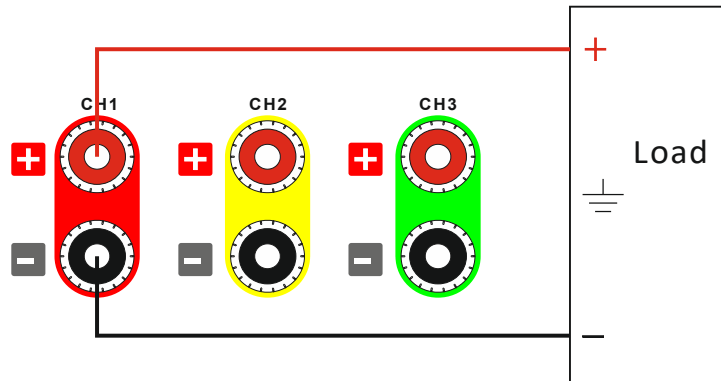


Figure 14 Parallel Mode Wiring Diagram

Steps to set voltage and current in parallel mode:

1. Press or on voltage/current setting area.
2. Input digit by pressing numeric buttons or pressing to move the cursor and rotate to adjust the value.
3. Press or to confirm the setting.

After completing setting, please press . ON icon will show at channel 1 and channel 2. The power supply starts output.

#### 4.3.4.2 Series Mode

Please press the button below **SERIES** on the screen and switch to series mode.

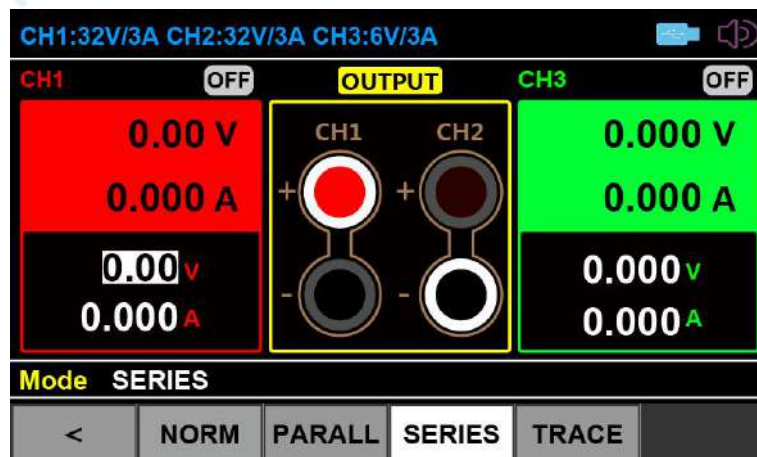


Figure 15 Series Mode

In series mode, the power supply can output 0-64V for N3411E/N3412E/N3411/N3411P/N3412/N3412P and 0-120V for N3413E/N3413/N3413P. The power supply can output 0-3A for N3411E/N3413E/N3411/N3411P/N3413/N3413P and 0-5A for N3412E/N3412/N3412P. The series connection method is shown in the figure below.

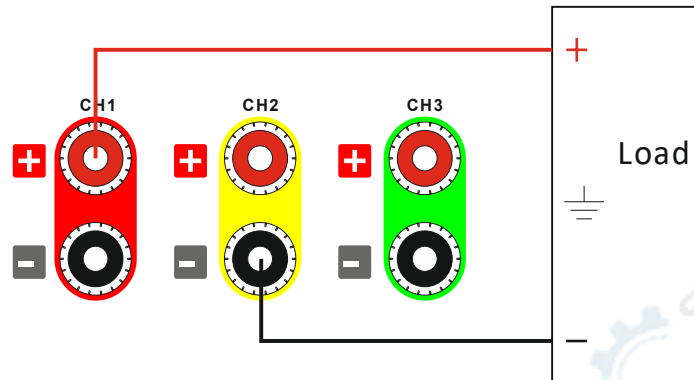










Figure 16 Series Mode Wiring Diagram

Steps to set voltage and current in series mode:

1. Press  or  on voltage/current setting area.
2. Input digit by pressing numeric buttons or pressing   to move the cursor and rotate  to adjust the value.
3. Press  or  to confirm the setting.

After completing setting, please press . ON icon will show at channel 1 and channel 2. The power supply starts output.

Note: It is not recommended to use constant current in series mode.

#### 4.3.4.3 Trace Mode

Please press the button below **TRACE** on the screen and switch to trace mode.

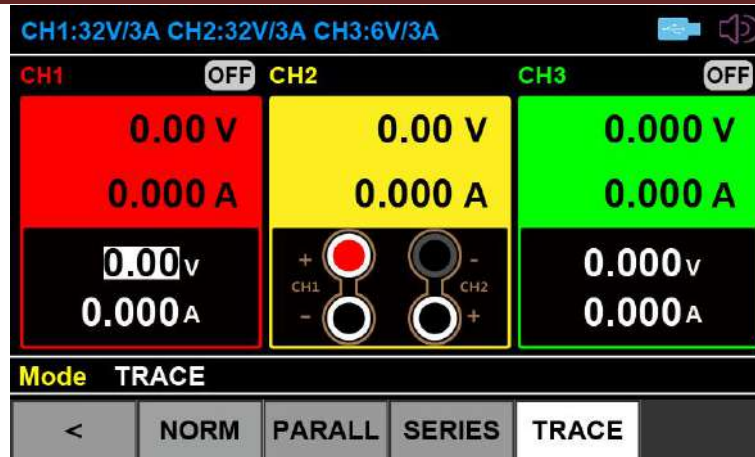


Figure 17 Trace Mode

In trace mode, channel 2 follows channel 1 to output the same value of negative voltage and negative current. Channel 2 trace voltage output can be set to -32V, and current output can be set to -3A, following channel 1. The trace connection method is shown in the figure below.

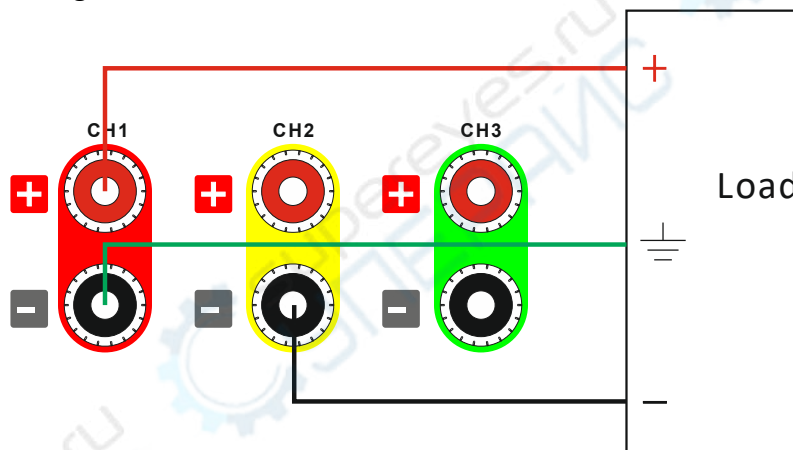


Figure 18 Trace Mode Wiring Diagram

Steps to set voltage and current in trace mode:

1. Press or on voltage/current setting area.
2. Input digit by pressing numeric buttons or pressing to move the cursor and rotate to adjust the value.
3. Press or to confirm the setting.

After completing setting, please press . ON icon will show at channel 1 and channel 2. Channel 2 follows channel 1 to output the same voltage and current in



negative.

### 4.3.5 Configuration

Users can set IP address, baud rate, beeper, sample rate and output position in configuration interface.

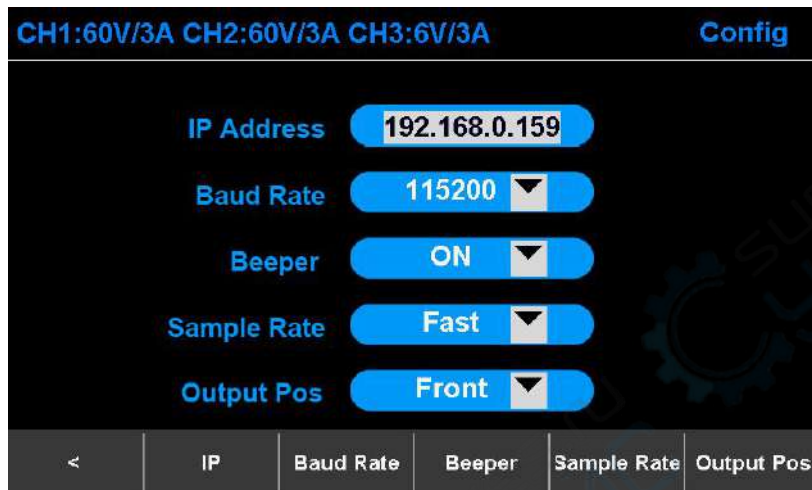
















Figure 19 Configuration Interface

Steps to set parameters under **Config**:

1. Press button below **Config** on the screen to enter configuration interface.
2. Press button below **IP** on the screen.
3. Press  or  on IP address setting area.
4. Input digit by pressing numeric buttons or pressing   to move the cursor and rotate  to adjust the value.
5. Press  or  to confirm the setting.
6. Press buttons below **Baud Rate/Beeper/Sample Rate/Output Pos** separately.
7. Press  or  on Baud Rate/Sound/Sample Rate/Output Pos setting area.
8. Press   or rotate  to select the required parameter.
9. Press  or  to confirm the setting.

Note: Output Pos is for output wiring position. The options are front and rear.










### 4.3.6 Timer

After the timer function is turned on, at this time users start output of the power supply, the countdown starts on the interface. When the time is up, the power supply shuts off the output. The time accuracy is 1s. In the power output state, the countdown is still workable with timer function turned off. Every time a channel output is turned on, the countdown will start again.



Figure 20 Timer Setting

Steps to set parameters under **Timer**:

1. Press > to find more functions.
2. Press button below **Timer** on the screen to enter timer interface.
3. Press button below **Second** on the screen.
4. Press  or  on time setting area.
5. Input digit by pressing numeric buttons or pressing   to move the cursor and rotate  to adjust the value.
6. Press  or  to confirm the setting.
7. Press button below **Timer**.
8. Press  or  on Timer setting area.

9. Press or rotate to select the required state.

10. Press or to confirm the setting.

### 4.3.7 SEQ

Please press to find more functions and press button below **SEQ** on the screen.

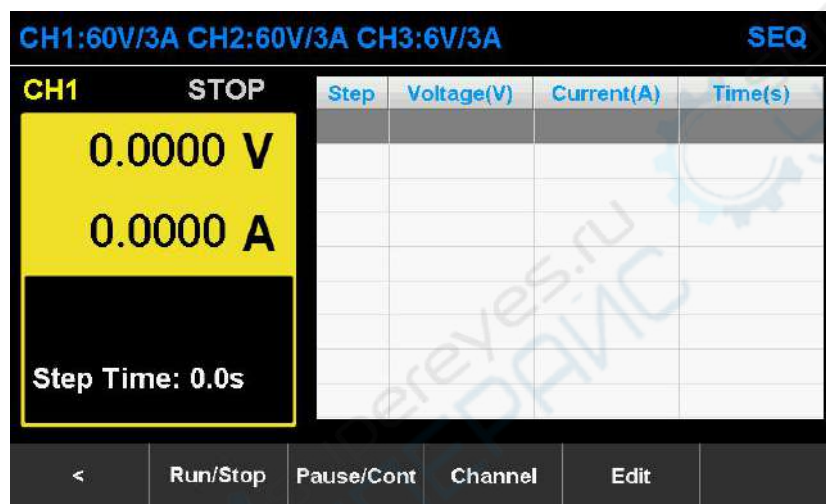


Figure 21 SEQ Interface

- Run/Stop
- Pause/Cont: pause or continue
- Channel: channel switch
- Edit: SEQ file edit

### 4.3.8 SEQ Edit

Please press button below **Edit** on the screen under SEQ interface.





Figure 22 SEQ Edit

- Add

The operation steps can be added by pressing button below Add on the screen. It supports maximum 500 steps. The setting procedure is as follows.

Rotate or press to move cursor to **Step** → Press or → Input digits

by numeric buttons → Press or to confirm setting.

- Delete: delete the present step
- Clear: clear all steps
- Save/Load: save or download

Please press button below **Save/Load** on the screen to enter SEQ Load interface.

Please rotate or press to move to the required parameter. There are four parameters: Operation, Position, File name and Start Load.



Figure 23 SEQ Load

- Operation: two options- Load or Save
- Position: select the storage position for Save/Load. Options are Ext Disk( USB flash drive) and Inter N(N3410, N for 0-9).
- File name: set file name
- Start Load

After N3410 is turned on, the device will load the file saved in this location to the local location.

### 4.3.9 Graph

Please press  $\triangleright$  to find more functions and press button below **Graph** on the screen.

The Graph interface can display the real-time graph of voltage and current of the specific channel, as shown in the figure below.

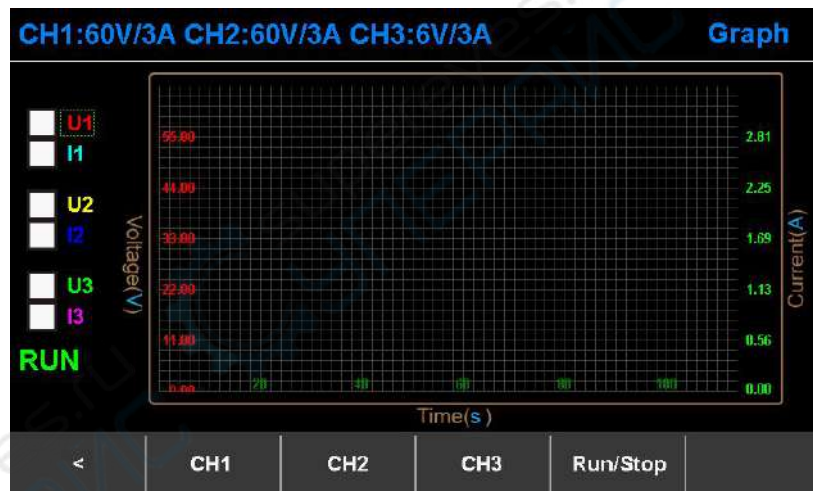


Figure 24 Graph Interface

- CH1/CH2/CH3: set displaying or concealing the graph for specific channel
- Run/Stop

## 5 Maintenance and Self-inspection

### 5.1 Regular Maintenance

#### Clean the Device

Please wipe lightly the device with a dry or slightly wet cloth, and do not wipe the inside of it. Make sure the power is disconnected before cleaning.

 **Warning: Disconnect power before cleaning.**

### 5.2 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 N3410 series should be calibrated once a year.

## 6 Main Technical Data

### Attention:

The measurement accuracy is identified by the following three conditions: within one year after calibration, operation temperature between 18°C and 28°C, and the relative humidity up to 80%.

Please warm up the device for half hour to ensure the measurement accuracy.

Table 8

Model	N3411/N3411P		N3412/N3412P	
Channel	CH1/CH2	CH3	CH1/CH2	CH3
Voltage	32V	6V	32V	6V
Current	3A	3A	5A	3A
Series Mode-Voltage	64V	N/A	64V(5A)	N/A
Parallel Mode-Current	6A	N/A	10A	N/A
Total Power	210W		338W	
Setting Resolution-Voltage	0.1mV	1mV	0.1mV	1mV
Setting Resolution-Current	0.1mA	1mA	0.1mA	1mA
Setting Accuracy-Voltage (23±5°C)	<0.01%+ 10mV	<0.03%+ 10mV	<0.01%+ 10mV	<0.03%+ 10mV
Setting Accuracy-Current (23±5°C)	<0.05%+ 5mA	<0.05%+ 10mA	<0.05%+ 10mA	<0.05%+ 10mA
Setting Temperature Coefficient	30ppm/°C			
Readback Resolution-Voltage	0.1mV	1mV	0.1mV	1mV
Readback Resolution-Current	0.1mA	1mA	0.1mA	1mA
Readback Accuracy-Voltage (23±5°C)	<0.01%+ 10mV	<0.03%+ 10mV	<0.01%+ 10mV	<0.03%+ 10mV
Readback Accuracy-Current (23±5°C)	<0.05%+ 5mA	<0.05%+ 10mA	<0.05%+ 10mA	<0.05%+ 10mA
Readback Temperature Coefficient	30ppm/°C			
Long-term Stability	≤50ppm/1000h			
Voltage Ripple Noise (20Hz~ 20MHz)	≤5mVp-p	≤10mVp-p	≤5mVp-p	≤10mVp-p
Voltage Ripple Noise (20Hz~ 20MHz)	≤1mVrms			
Current Ripple Noise (20Hz~ 20MHz)	≤3mArms			
Dynamic Characteristics				
Voltage Rise Time (no load)	20ms	20ms	20ms	20ms

(10%-90%F.S. Variation Time)				
Voltage Rise Time (full load) (10%-90%F.S. Variation Time)	50ms	21ms	50ms	21ms
Voltage Fall Time (no load) (90%-10%F.S. Variation Time)	400ms	200ms	400ms	200ms
Voltage Fall Time (full load) (90%-10%F.S. Variation Time)	45ms	13ms	45ms	13ms
Transient Recovery Time	≤1ms			
Line Regulation-Voltage	≤0.01%+1mV	≤0.01%+3mV	≤0.01%+1mV	≤0.01%+3mV
Line Regulation-Current	≤0.01%+1mA	≤0.02%+3mA	≤0.01%+3mA	≤0.02%+3mA
Load Regulation-Voltage	≤0.01%+3mV			
Load Regulation-Current	≤0.01%+3mA	≤0.02%+3mA	≤0.01%+3mA	≤0.02%+3mA
<b>DVM Measurement (For N3411P/N3412P Only)</b>				
Channels	1CH			
Voltage Range	±600V/±60V/±6V			
Measurement Resolution	5½ bits			
Measurement Accuracy	0.01%+0.01%F.S.			
Measurement Frequency	4Hz			
Input Impedance	10MΩ			
Terminal	Pluggable terminal			
Temperature Coefficient (0~40℃)	20ppm/℃			
<b>Others</b>				
Isolation (Output to Ground)	500V DC			
Communication Response Time	≤5ms			
Interface	LAN/RS232			
AC Input	Single phase, please refer to the voltage mark at the rear panel.			
Temperature	Operating temperature: 0℃-40℃, storage temperature: -20℃~60℃			
Operating Environment	Altitude <2000m, relative humidity: 5%-90%RH(non-condensing), atmospheric pressure: 80-110kPa			
Net Weight	Approx. 9kg		Approx. 11kg	
Dimension	2U, 88.0(H)*214.0(W)*398.0(D)mm		2U, 88.0(H)*214.0(W)*446.0(D)mm	

Table 9

Model	N3413/N3413P	
Channel	CH1/CH2	CH3
Voltage	60V	6V
Current	3A	3A
Series Mode-Voltage	120V(3A)	N/A
Parallel Mode-Current	6A(60V)	N/A
Total Power	378W	
Setting Resolution-Voltage	0.1mV	1mV
Setting Resolution-Current	0.1mA	1mA
Setting Accuracy-Voltage (23±5℃)	<0.02%+20mV	<0.03%+10mV
Setting Accuracy-Current (23±5℃)	<0.05%+5mA	<0.05%+10mA
Setting Temperature Coefficient	30ppm/℃	
Readback Resolution-Voltage	0.1mV	1mV
Readback Resolution-Current	0.1mA	1mA
Readback Accuracy-Voltage (23±5℃)	<0.02%+20mV	<0.03%+10mV
Readback Accuracy-Current (23±5℃)	<0.05%+5mA	<0.05%+10mA
Readback Temperature Coefficient	30ppm/℃	
Long-term Stability	≤50ppm/1000h	
Voltage Ripple Noise (20Hz~20MHz)	≤10mVp-p	≤10mVp-p
Voltage Ripple Noise (20Hz~20MHz)	≤1mVrms	
Current Ripple Noise (20Hz~20MHz)	≤3mArms	
Dynamic Characteristics		
Voltage Rise Time (no load) (10%-90%F.S. Variation Time)	20ms	20ms
Voltage Rise Time (full load) (10%-90%F.S. Variation Time)	50ms	21ms
Voltage Fall Time (no load) (90%-10%F.S. Variation Time)	800ms	200ms
Voltage Fall Time (full load) (90%-10%F.S. Variation Time)	45ms	13ms
Transient Recovery Time	≤1ms	
Line Regulation-Voltage	≤0.01%+1mV	≤0.01%+3mV
Line Regulation-Current	≤0.01%+3mA	≤0.02%+3mA
Load Regulation-Voltage	≤0.01%+3mV	
Load Regulation-Current	≤0.01%+6mA	≤0.02%+3mA
DVM Measurement (For N3413P Only)		



Channels	1CH
Voltage Range	±600V/±60V/±6V
Measurement Resolution	5½ bits
Measurement Accuracy	0.01%+0.01%F.S.
Measurement Frequency	4Hz
Input Impedance	10MΩ
Terminal	Pluggable terminal
Temperature Coefficient (0~40℃)	20ppm/℃
<b>Others</b>	
Isolation (Output to Ground)	500V DC
Communication Response Time	≤5ms
Interface	LAN/RS232
AC Input	Single phase, please refer to the voltage mark at the rear panel.
Temperature	Operating temperature: 0℃-40℃, storage temperature: -20℃~60℃
Operating Environment	Altitude <2000m, relative humidity: 5%-90%RH(non-condensing), atmospheric pressure: 80-110kPa
Net Weight	Approx. 11kg
Dimension	2U, 88.0(H)*214.0(W)*446.0(D)mm

Table 10

Model	N3411E		N3412E	
Channel	CH1/CH2	CH3	CH1/CH2	CH3
Voltage	32V	6V	32V	6V
Current	3A	3A	5A	3A
Series Mode-Voltage	64V	N/A	64V(5A)	N/A
Parallel Mode-Current	6A	N/A	10A	N/A
Total Power	210W		338W	
Setting Resolution-Voltage	10mV	1mV	10mV	1mV
Setting Resolution-Current	1mA			
Setting Accuracy-Voltage (23±5℃)	<0.01%+ 20mV	<0.03%+ 10mV	<0.01%+ 20mV	<0.03%+ 10mV
Setting Accuracy-Current (23±5℃)	<0.05%+10mA		<0.05%+ 20mA	<0.05%+ 10mA
Setting Temperature Coefficient	50ppm/℃			
Readback Resolution-Voltage	10mV	1mV	10mV	1mV
Readback Resolution-Current	1mA			
Readback Accuracy-Voltage (23±5℃)	<0.01%+ 20mV	<0.03%+ 10mV	<0.01%+ 20mV	<0.03%+ 10mV

Readback Accuracy-Current (23±5°C)	<0.05% + 10mA		<0.05% + 20mA	<0.05% + 10mA
Readback Temperature Coefficient	50ppm/°C			
Long-term Stability	≤50ppm/1000h			
Voltage Ripple Noise (20Hz~ 20MHz)	≤5mVp-p	≤10mVp-p	≤5mVp-p	≤10mVp-p
Voltage Ripple Noise (20Hz~ 20MHz)	≤1mVrms			
Current Ripple Noise (20Hz~ 20MHz)	≤3mArms			
<b>Dynamic Characteristics</b>				
Voltage Rise Time (no load) (10%-90%F.S. Variation Time)	20ms	20ms	20ms	20ms
Voltage Rise Time (full load) (10%-90%F.S. Variation Time)	50ms	21ms	50ms	21ms
Voltage Fall Time (no load) (90%-10%F.S. Variation Time)	400ms	200ms	400ms	200ms
Voltage Fall Time (full load) (90%-10%F.S. Variation Time)	45ms	13ms	45ms	13ms
Transient Recovery Time	≤1ms			
Line Regulation-Voltage	≤0.01%+1mV	≤0.01%+3mV	≤0.01%+1mV	≤0.01%+3mV
Line Regulation-Current	≤0.01%+1mA	≤0.02%+3mA	≤0.01%+3mA	≤0.02%+3mA
Load Regulation-Voltage	≤0.01%+3mV			
Load Regulation-Current	≤0.01%+3mA	≤0.02%+3mA	≤0.01%+3mA	≤0.02%+3mA
<b>Others</b>				
Isolation (Output to Ground)	500V DC			
Communication Response Time	≤5ms			
Interface	LAN/RS232			
AC Input	Single phase, please refer to the voltage mark at the rear panel.			
Temperature	Operating temperature: 0°C-40°C, storage temperature: -20°C~60°C			
Operating Environment	Altitude <2000m, relative humidity: %-90%RH(non-condensing), atmospheric pressure: 80-110kPa			
Net Weight	Approx. 9kg		Approx. 11kg	
Dimension	2U, 88.0(H)*214.0(W)*398.0(D)mm		2U, 88.0(H)*214.0(W)*446.0(D)mm	



**Table 11**

<b>Model</b>	<b>N3413E</b>	
Channel	CH1/CH2	CH3
Voltage	60V	6V
Current	3A	3A
Series Mode-Voltage	120V(3A)	N/A
Parallel Mode-Current	6A(60V)	N/A
Total Power	378W	
Setting Resolution-Voltage	10mV	1mV
Setting Resolution-Current	1mA	
Setting Accuracy-Voltage (23±5℃)	<0.02%+40mV	<0.03%+10mV
Setting Accuracy-Current (23±5℃)	<0.05%+10mA	
Setting Temperature Coefficient	50ppm/℃	
Readback Resolution-Voltage	10mV	1mV
Readback Resolution-Current	1mA	
Readback Accuracy-Voltage (23±5℃)	<0.02%+40mV	<0.03%+10mV
Readback Accuracy-Current (23±5℃)	<0.05%+10mA	
Readback Temperature Coefficient	50ppm/℃	
Long-term Stability	≤50ppm/1000h	
Voltage Ripple Noise (20Hz~20MHz)	≤10mVp-p	≤10mVp-p
Voltage Ripple Noise (20Hz~20MHz)	≤1mVrms	
Current Ripple Noise (20Hz~20MHz)	≤3mArms	
<b>Dynamic Characteristics</b>		
Voltage Rise Time (no load) (10%-90%F.S. Variation Time)	20ms	20ms
Voltage Rise Time (full load) (10%-90%F.S. Variation Time)	50ms	21ms
Voltage Fall Time (no load) (90%-10%F.S. Variation Time)	800ms	200ms
Voltage Fall Time (full load) (90%-10%F.S. Variation Time)	45ms	13ms
Transient Recovery Time	≤1ms	
Line Regulation-Voltage	≤0.01%+1mV	≤0.01%+3mV
Line Regulation-Current	≤0.01%+3mA	≤0.02%+3mA
Load Regulation-Voltage	≤0.01%+3mV	
Load Regulation-Current	≤0.01%+6mA	≤0.02%+3mA
<b>Others</b>		

Isolation (Output to Ground)	500V DC
Communication Response Time	≤5ms
Interface	LAN/RS232
AC Input	Single phase, please refer to the voltage mark at the rear panel.
Temperature	Operating temperature: 0°C-40°C, storage temperature: -20°C~60°C
Operating Environment	Altitude <2000m, relative humidity: 5%-90%RH(non-condensing), atmospheric pressure: 80-110kPa
Net Weight	Approx. 11kg
Dimension	2U, 88.0(H)*214.0(W)*446.0(D)mm

Note 1: For other specifications, please contact NGI.

Note 2: All specifications are subject to change without notice.