

# **RIGOL**

## **User's Guide**

# **DP800A Series Programmable Linear DC Power Supply**

**Aug. 2013**  
**RIGOL Technologies, Inc.**



# Guaranty and Declaration

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If you have any problem or requirement when using our products or this manual, please contact **RIGOL**.

E-mail: [service@rigol.com](mailto:service@rigol.com)

Website: [www.rigol.com](http://www.rigol.com)

# Safety Requirement

## General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injury or damage to the instrument and any product connected to it. To prevent potential hazards, please use the instrument only specified by this manual.

### **Use Proper Power Cord.**

Only the power cord designed for the instrument and authorized for use within the local country could be used.

### **Ground The Instrument.**

The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, it is essential to connect the earth terminal of power cord to the Protective Earth terminal before any inputs or outputs.

### **Connect the Probe Correctly.**

If a probe is used, do not connect the ground lead to high voltage since it has the isobaric electric potential as ground.

### **Observe All Terminal Ratings.**

To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your manual for more information about ratings before connecting.

### **Use Proper Overvoltage Protection.**

Make sure that no overvoltage (such as that caused by a thunderstorm) can reach the product, or else the operator might expose to danger of electrical shock.

### **Do Not Operate Without Covers.**

Do not operate the instrument with covers or panels removed.

### **Do Not Insert Anything into the Holes of Fan.**

Do not insert anything into the holes of the fan to avoid damaging the instrument.

### **Use Proper Fuse.**

Please use the specified fuses.

### **Avoid Circuit or Wire Exposure.**

Do not touch exposed junctions and components when the unit is powered.

### **Do Not Operate With Suspected Failures.**

If you suspect damage occurs to the instrument, have it inspected by qualified service personnel before further operations. Any maintenance, adjustment or replacement especially to circuits or accessories must be performed by **RIGOL** authorized personnel.

### **Keep Well Ventilation.**

Inadequate ventilation may cause increasing of temperature or damages to the device. So please keep well ventilated and inspect the intake and fan regularly.

**Do Not Operate in Wet Conditions.**

In order to avoid short circuiting to the interior of the device or electric shock, please do not operate in a humid environment.

**Do Not Operate in an Explosive Atmosphere.**

In order to avoid damages to the device or personal injuries, it is important to operate the device away from an explosive atmosphere.

**Keep Product Surfaces Clean and Dry.**

To avoid the influence of dust and/or moisture in air, please keep the surface of device clean and dry.

**Electrostatic Prevention.**

Operate in an electrostatic discharge protective area environment to avoid damages induced by static discharges. Always ground both the internal and external conductors of the cable to release static before connecting.

**Proper Use of Battery.**

If a battery is supplied, it must not be exposed to high temperature or in contact with fire. Keep it out of the reach of children. Improper change of battery (note: lithium battery) may cause explosion. Use **RIGOL** specified battery only.

**Handling Safety.**

Please handle with care during transportation to avoid damages to buttons, knob interfaces and other parts on the panels.

**Do Not Provide Power for the Active Load.**

In order to avoid the anti-irrigation current which leads to the power control loop out of control and damages the powered device, this power supply can only provide power for the pure load without the current output function.

## Safety Terms and Symbols

**Terms Used in this Manual.** These terms may appear in this manual:



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**WARNING**

Warning statements indicate the conditions or practices that could result in injury or loss of life.

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**CAUTION**

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

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**Terms Used on the Product.** These terms may appear on the Product:

**DANGER** indicates an injury or hazard may immediately happen.

**WARNING** indicates an injury or hazard may be accessible potentially.

**CAUTION** indicates potential damage to the instrument or other property might occur.

**Symbols Used on the Product.** These symbols may appear on the product:



**Hazardous Voltage**



**Safety Warning**



**Protective Earth Terminal**



**Chassis Ground**



**Test Ground**

## Allgemeine Sicherheits Informationen

Überprüfen Sie die folgenden Sicherheitshinweise sorgfältig um Personenschäden oder Schäden am Gerät und an damit verbundenen weiteren Geräten zu vermeiden. Zur Vermeidung von Gefahren, nutzen Sie bitte das Gerät nur so, wie in diesem Handbuch angegeben.

### **Um Feuer oder Verletzungen zu vermeiden, verwenden Sie ein ordnungsgemäßes Netzkabel.**

Verwenden Sie für dieses Gerät nur das für ihr Land zugelassene und genehmigte Netzkabel.

### **Erden des Gerätes.**

Das Gerät ist durch den Schutzleiter im Netzkabel geerdet. Um Gefahren durch elektrischen Schlag zu vermeiden, ist es unerlässlich, die Erdung durchzuführen. Erst dann dürfen weitere Ein- oder Ausgänge verbunden werden.

### **Anschluss eines Tastkopfes.**

Die Erdungsklemmen der Sonden sind auf dem gleichen Spannungspegel des Instruments geerdet. Schließen Sie die Erdungsklemmen an keine hohe Spannung an.

### **Beachten Sie alle Anschlüsse.**

Zur Vermeidung von Feuer oder Stromschlag, beachten Sie alle Bemerkungen und Markierungen auf dem Instrument. Befolgen Sie die Bedienungsanleitung für weitere Informationen, bevor Sie weitere Anschlüsse an das Instrument legen.

### **Verwenden Sie einen geeigneten Überspannungsschutz**

Stellen Sie sicher, daß keinerlei Überspannung (wie z.B. durch Gewitter verursacht) das Gerät erreichen kann. Andernfalls besteht für den Anwender

die Gefahr eines Stromschlages.

### **Nicht ohne Abdeckung einschalten.**

Betreiben Sie das Gerät nicht mit entfernten Gehäuse-Abdeckungen.

### **Betreiben Sie das Gerät nicht geöffnet**

Der Betrieb mit offenen oder entfernten Gehäuseteilen ist nicht zulässig. Nichts in entsprechende Öffnungen stecken (Lüfter z.B.)

### **Passende Sicherung verwenden**

Setzen Sie nur die spezifikationsgemäßen Sicherungen ein.

### **Vermeiden Sie ungeschützte Verbindungen**

Berühren Sie keine unisolierten Verbindungen oder Baugruppen, während das Gerät in Betrieb ist.

### **Betreiben Sie das Gerät nicht im Fehlerfall**

Wenn Sie am Gerät einen Defekt vermuten, sorgen Sie dafür, bevor Sie das Gerät wieder betreiben, dass eine Untersuchung durch qualifiziertes Kundendienstpersonal durchgeführt wird. Jedwede Wartung, Einstellarbeiten oder Austausch von Teilen am Gerät, sowie am Zubehör dürfen nur von **RIGOL** autorisiertem Personal durchgeführt werden.

### **Belüftung sicherstellen**

Unzureichende Belüftung kann zu Temperaturanstiegen und somit zu thermischen Schäden am Gerät führen. Stellen Sie deswegen die Belüftung sicher und kontrollieren regelmäßig Lüfter und Belüftungsöffnungen.

### **Nicht in feuchter Umgebung betreiben**

Zur Vermeidung von Kurzschluß im Geräteinneren und Stromschlag betreiben Sie das Gerät bitte niemals in feuchter Umgebung.

### **Nicht in explosiver Atmosphäre betreiben**

Zur Vermeidung von Personen- und Sachschäden ist es unumgänglich, das Gerät ausschließlich fernab jedweder explosiven Atmosphäre zu betreiben.

### **Geräteoberflächen sauber und trocken halten**

Um den Einfluß von Staub und Feuchtigkeit aus der Luft auszuschließen, halten Sie bitte die Geräteoberflächen sauber und trocken.

### **Schutz gegen elektrostatische Entladung (ESD)**

Sorgen Sie für eine elektrostatisch geschützte Umgebung, um somit Schäden und Funktionsstörungen durch ESD zu vermeiden. Erden Sie vor dem Anschluß immer Innen- und Außenleiter der Verbindungsleitung, um statische Aufladung zu entladen.

### **Die richtige Verwendung des Akkus.**

Wenn eine Batterie verwendet wird, vermeiden Sie hohe Temperaturen bzw. Feuer ausgesetzt werden. Bewahren Sie es außerhalb der Reichweite von Kindern auf. Unsachgemäße Änderung der Batterie (Anmerkung: Lithium-Batterie) kann zu einer Explosion führen. Verwenden Sie nur von RIGOL angegebene Akkus.

### **Sicherer Transport**

Transportieren Sie das Gerät sorgfältig (Verpackung!), um Schäden an Bedienelementen, Anschlüssen und anderen Teilen zu vermeiden.

## Sicherheits Begriffe und Symbole

**Begriffe in diesem Guide. Diese Begriffe können in diesem Handbuch auftauchen:**



### **WARNING**

Die Kennzeichnung WARNING beschreibt Gefahrenquellen die leibliche Schäden oder den Tod von Personen zur Folge haben können.



### **CAUTION**

Die Kennzeichnung Caution (Vorsicht) beschreibt Gefahrenquellen die Schäden am Gerät hervorrufen können.

**Begriffe auf dem Produkt. Diese Bedingungen können auf dem Produkt erscheinen:**

### **DANGER (dt. GEFAHR)**

weist auf eine Verletzung oder Gefährdung hin, die sofort geschehen kann.

### **WARNING (dt. WARNUNG)**

weist auf eine Verletzung oder Gefährdung hin, die möglicherweise nicht sofort geschehen.

### **CAUTION (dt. VORSICHT)**

bedeutet, dass eine mögliche Beschädigung des Instruments oder anderer Gegenstände auftreten kann.

**Symbole auf dem Produkt. Diese Symbole können auf dem Produkt erscheinen:**



**Gefährliches  
pannung**



**Sicherheits-  
Hinweis**



**Schutz-erde**



**Gehäusemasse**



**Erde**

## General Care and Cleaning

### General Care:

Do not store or leave the instrument in where the instrument will be exposed to direct sunlight for long periods of time.

### Cleaning:

Clean the instrument regularly according to its operating conditions. To clean the exterior surface, perform the following steps:

1. Disconnect the instrument from all power sources.
2. Clean the loose dust on the outside of the instrument with a lint- free cloth (with a mild detergent or water). When cleaning the LCD, take care to avoid scarifying it.



### **CAUTION**

To avoid damages to the instrument, do not expose them to liquids which have causticity.

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### **WARNING**

To avoid injury resulting from short circuit, make sure the instrument is completely dry before reconnecting to a power source.

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## Environmental Considerations

The following symbol indicates that this product complies with the applicable European Union requirements according to Directives 2002/96/EC on waste electrical and electronic equipment (WEEE) and batteries.



### Product End-of-Life Handling

The equipment may contain substances that could be harmful to the environment or human health. In order to avoid release of such substances into the environment and harm to human health, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately. Please contact your local authorities for disposal or recycling information.

## DP800A Series Overview

DP800A series is high-performance programmable linear DC power supply. DP800A series which provides clear user interface, superb performance specifications, various analysis functions as well as various communication interfaces can fulfill versatile test requirements.

### Main Features:

#### User-friendly Design:

- 3.5 inches TFT display, can display multiple parameters and states at the same time
- Support Chinese/English interfaces and input methods
- Novel and exquisite industrial design and easy operation
- Provide waveform display function to provide real-time and dynamic display of the output voltage/current waveform, clearly showing the output state and tendency of the instrument in together with the digital display of the voltage, current and power values
- Provide dial display function, indicating the current output state using the dial pointer by simulating the traditional power display mode
- Provide on-line help system for easy acquisition of help information

#### Multiple Safety Protection:

- Provide overvoltage/overcurrent protection function; users can set the overvoltage and overcurrent parameters to realize effective protection of the load
- Provide secondary over-temperature protection function to realize double over-temperature protection of the software and hardware
- Provide intelligent fan speed control function; judge and control the fan speed automatically according to the working condition to effectively reduce the fan noise
- Provide fan failure check and alarm function
- Provide keyboard lock function to avoid misoperation

#### Various Functions and Superb Performance:

- Multi-channel output; up to 200W total output power; the output of each channel can be controlled independently
- Superb load regulation rate and linear regulation rate
- Provide ultra-low output ripples and noise
- Provide timing output function and support infinite and specified number of cycles of output
- Provide output track function and mutual output track function
- Provide Sense function to automatically compensate for the voltage drop caused by the leads between the power supply and the load
- Provide delay on/off output function and support infinite or specified number of cycles of channel on/off toggle

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- Provide built-in digital trigger to realize digital trigger input and trigger output functions
  - Provide built-in on-line analyzer to perform on-line analysis of various statistic parameters
  - Provide built-in monitor to monitor the output according to the user-defined monitor condition
  - Provide built-in recorder to perform background recording of the output state after power-on according to certain record period
  - Provide dedicated preset key to perform one-key reset and one-key recall of the commonly used output voltage and current configurations
  - Support serial and parallel output functions
  - Support on-line self-test and manual calibration functions
  - Provide store and recall function
  - Support voltage and current linear programmable functions

**Complete Interface Configurations and Flexible Control Method:**

- Standard configuration interfaces: USB Host, USB Device, LAN, RS232, Digital I/O, Rear Output Interface (DP811A)
- Support to extend a GPIB interface via the USB-GPIB interface converter (option)
- Support USB storage device storage
- Support SCPI remote command control
- Conform to LXI Core Device 2011 instrument standard
- Provide standard 9 pin RS232 interface with flow control function
- Provide 4-wire digital I/O interface which supports the trigger input/output function

# Document Overview

## **Chapter 1 Quick Start**

Introduce the appearance and dimensions, front panel, rear panel, power connection, power-on inspection and user interface of DP800A.

## **Chapter 2 Front Panel Operations**

Introduce the function and operation method of each key at the front panel of DP800A in detail.

## **Chapter 3 Remote Control**

Introduce how to realize the remote control of the instrument.

## **Chapter 4 Troubleshooting**

Introduce the possible failures and their solutions when using DP800A.

## **Chapter 5 Specifications**

List the specifications of DP800A.

## **Chapter 6 Appendix**

Provide the accessories and options as well as warranty information.

## **Index**

Provide keyword search to quickly locate the desired information.

### **Tip**

For the newest version of this manual, download it from [www.rigol.com](http://www.rigol.com).

## Format Conventions in this Manual

### 1. Button

The function key at the front panel is denoted by the format of “Button Name (Bold) + Text Box” in the manual, for example, **Utility** denotes the “System Auxiliary Function Setting” key.

### 2. Menu

The menu item is denoted in two modes in this manual.

- (1) The menu item can be denoted by the format of “Menu Word (Bold) + Character Shading”, for example, **System** denotes the “System” item under **Utility**.
- (2) The menu item can be denote by the screenshot of the menu key, for example, .

### 3. Operation Step

The next step of the operation is denoted by an arrow “→” in the manual. For example, **Utility** → **System** denotes pressing **Utility** at the front panel and then pressing **System**.

## Content Conventions in this Manual

DP800A series programmable linear DC power supply includes the following models. In this manual, DP831A is taken as an example to illustrate the functions and operating methods of DP800A series.

Model	Channel	Channel Output Voltage/Current
DP831A	3	8V/5A, 30V/2A, -30V/2A
DP832A	3	30V/3A, 30V/3A, 5V/3A
DP821A	2	60V/1A, 8V/10A
DP811A	1	20V/10A (Range 1), 40V/5A(Range 2)

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# Chapter 1 Quick Start

The contents of this chapter are as follows:

- General Inspection
- Appearance and Dimensions
- Front Panel
- Rear Panel
- To Connect to Power
- Power-on Inspection
- To Replace the Fuse
- User Interface
- To Use the Built-in Help System
- Rack Mount Kit Installation

## General Inspection

### 1. Inspect the shipping container for damage

Keep the damaged shipping container or cushioning material until the contents of the shipment have been checked for completeness and the instrument has passed both electrical and mechanical tests.

The consigner or carrier shall be liable for the damage to instrument resulting from shipment. **RIGOL** would not be responsible for free maintenance/rework or replacement of the unit.

### 2. Inspect the instrument

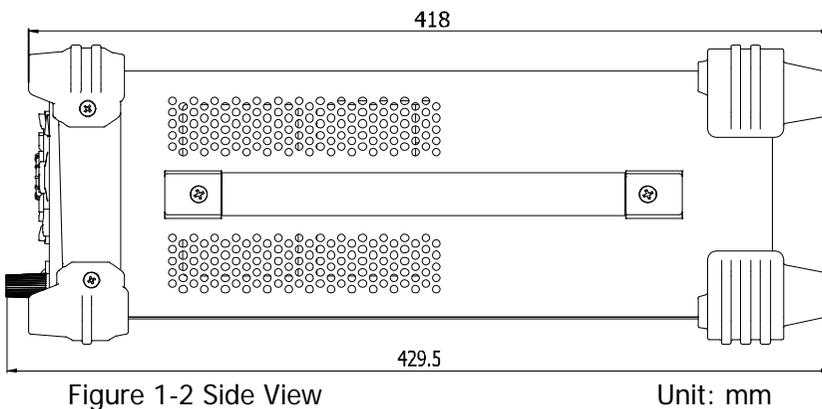
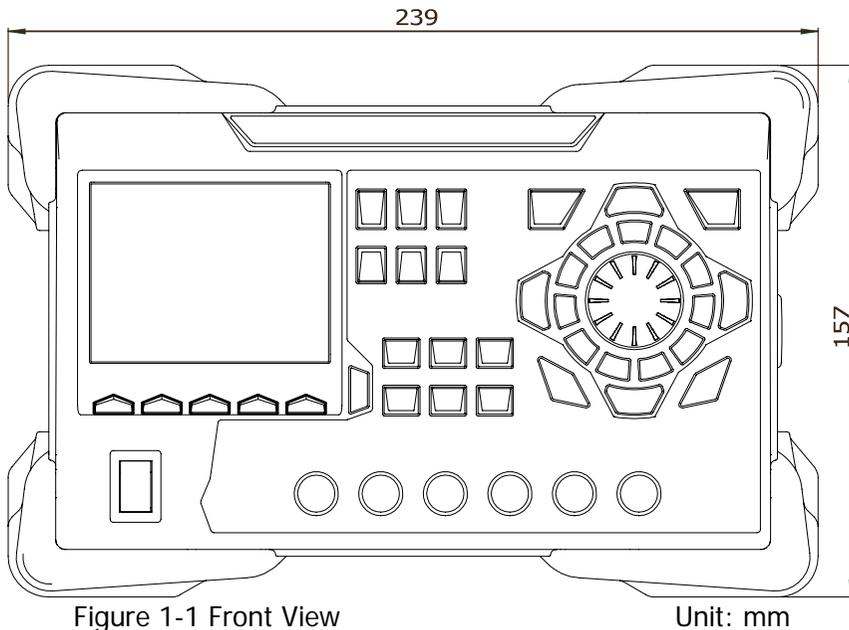
In case of any damage, or defect, or failure, notify your **RIGOL** sales representative.

### 3. Check the accessories

Please check the accessories according to the packing lists. If the accessories are incomplete or damaged, please contact your **RIGOL** sales representative.

## Appearance and Dimensions

For DP800A series, the dimensions of all models are same. But the design of the front and rear panels are not exactly the same (about the differences, please refer to “**Front Panel**” and “**Rear Panel**”). In this section, DP831A is taken as an example to introduce the appearance and dimensions of DP800A series (as shown in Figure 1-1 and Figure 1-2).



# Front Panel

The front panels of different models of DP800A series are shown in the figures below. In this section, DP831A (as shown in Figure 1-3) is taken as an example to introduce the front panels of DP800A series.

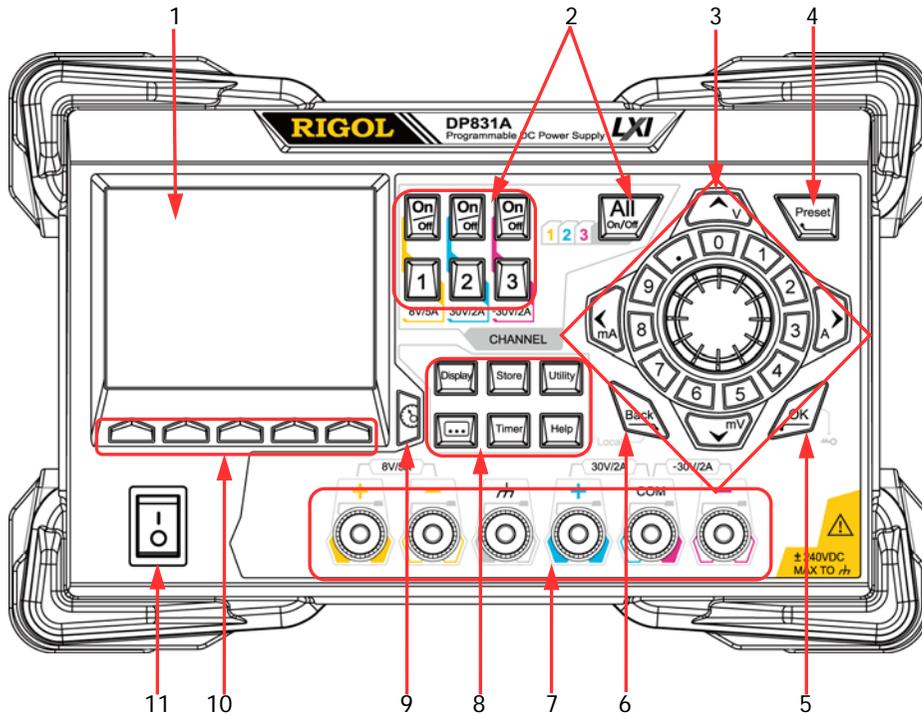


Figure 1-3 DP831A Front Panel

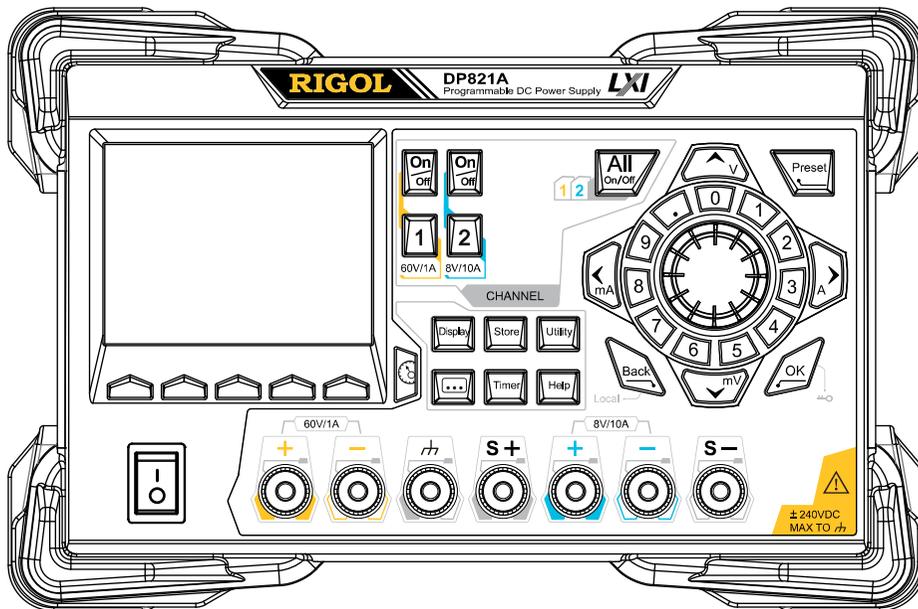


Figure 1-4 DP821A Front Panel

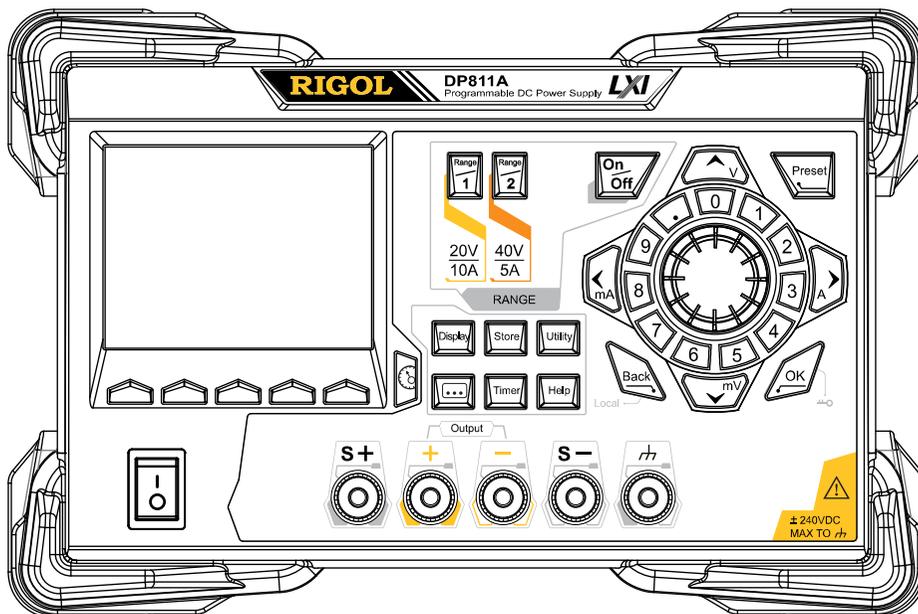


Figure 1-5 DP811A Front Panel

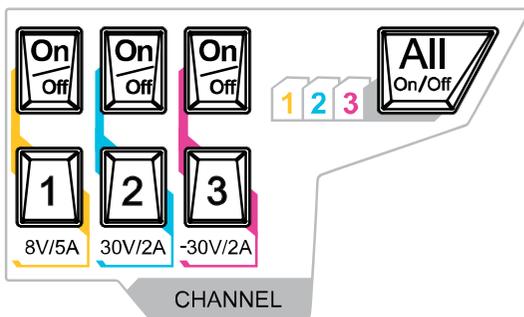
1. LCD

3.5 inches TFT display. It is used to display the system parameter setting, system output state, menu items, prompt messages, etc.

2. Channel (Range) Selection and Output Switch

For the multi-channel model, the function of this part is channel selection and output switch. For the single channel model (DP811A), the function of this part is range selection and output switch.

Multi-channel Model (take DP831A as the example):



Press this key to select CH1 and set the parameters of this channel, such as voltage, current and overvoltage/overcurrent protection.



Press this key to select CH2 and set the parameters of this channel, such as voltage, current and overvoltage/overcurrent protection.



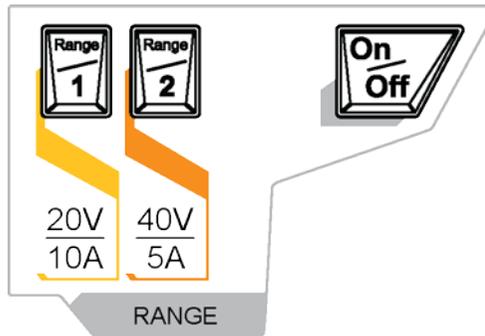
Press this key to select CH3 and set the parameters of this channel, such as voltage, current and overvoltage/overcurrent protection.



Press this key to enable or disable the output of the corresponding channel.



Press this key and the prompt message asking whether to enable the outputs of all the channels will be displayed. Press **OK** to enable the outputs of all the channels. Press this key again, disable the outputs of all the channels.

**Single Channel Model (DP811A):**

Press this key to select the 20V/10A range. Users can set the parameters of the channel, such as voltage, current and overvoltage/overcurrent protection.



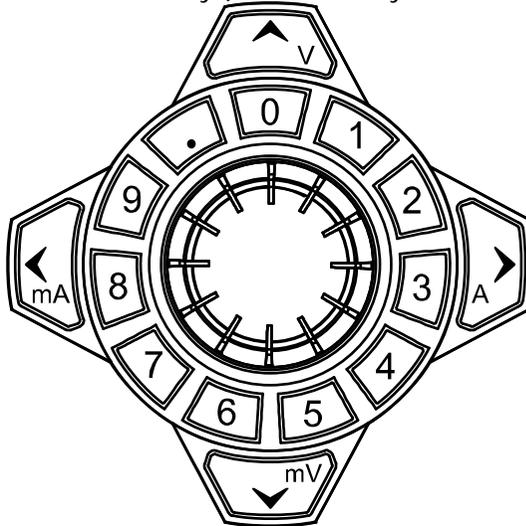
Press this key to select the 40V/5A range. Users can set the parameters of the channel, such as voltage, current and overvoltage/overcurrent protection.



Press this key to enable or disable the output of the channel.

### 3. Parameter Input Area

The parameter input area is as shown in the figure below. This area includes the direction keys (unit selection keys), numeric keyboard and knob.



- (1) Direction keys and unit selection keys  
Direction keys: move the cursor. When setting parameters, use the up/down direction keys to increase or reduce the value at the cursor.  
Unit selection keys: when using the numeric keyboard to input parameters, the keys are used to select the voltage units (V and mV) and the current units (A and mA).
- (2) Numeric Keyboard  
Ring-type numeric keyboard: include numbers 0-9 and the decimal point. Press the corresponding key to input the number.
- (3) Knob  
When setting parameters, rotate the knob to increase or decrease the value of the digit at the cursor.  
When browsing the setting objects (timer parameters, delayer parameters, filename input, etc), rotate the knob to quickly move the cursor.

**4. Preset**

Restore all the settings of the instrument to default values or recall the user-defined channel voltage/current configurations.

**5. OK**

Confirm the parameter setting.

Press and hold this key to lock the front panel keys; at this point,

the front panel keys (except the output on/off key  of each channel) are not available. Press and hold this key again to unlock the front panel keys. When the keyboard lock password is enabled, you need to input the correct password (2012) to unlock the front panel keys.

**6. Back**

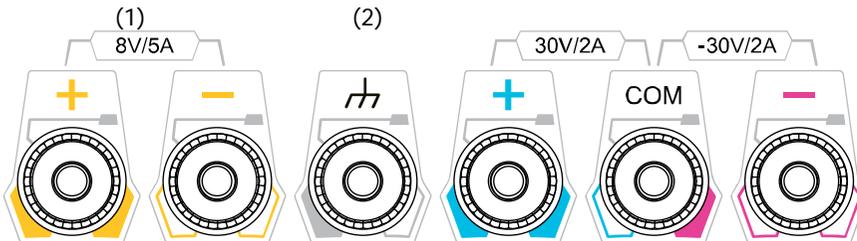
Delete the character currently before the cursor.

When the instrument is in remote mode, press this key to return to local mode.

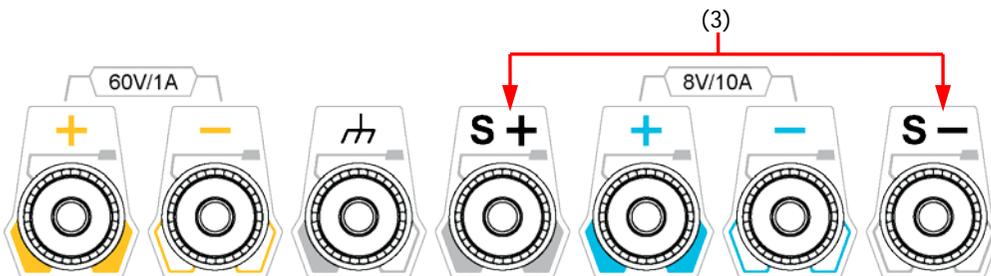
## 7. Output Terminals

For DP800A series, the output terminals of different models are not exactly the same.

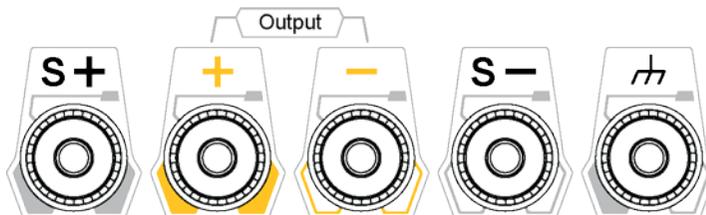
### DP831A:



### DP821A:

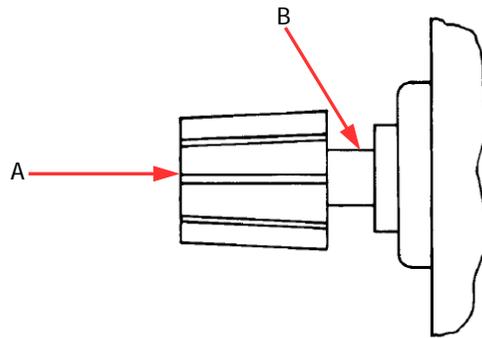


### DP811A:



- (1) Used to output the voltage and current of the channel.
- (2) This terminal is connected to the instrument chassis and ground wire (power cord ground terminal) and is in grounded state.
- (3) Used to sense the actual voltage at the load to compensate the voltage drop caused by the leads between the power supply and the load.

Connection methods of the output terminal:



Method 1:

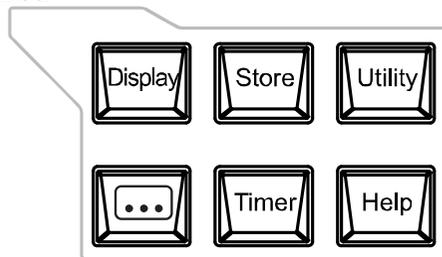
Connect the test lead to A of the output terminal.

Method 2:

Rotate the outer nut of the output terminal counterclockwise and connect the test lead to B of the output terminal; then, rotate the outer nut of the output terminal clockwise. This connection method can eliminate the error caused by the resistance of the output terminal.

**Note:** Connect the positive terminal of the test lead with the (+) terminal of the channel output and connect the negative terminal of the test lead with the (-) terminal of the channel output.

## 8. Function Menu Area



Press this key to enter the display parameter setting interface. Users can set the brightness, contrast, RGB luminance and display mode. Besides, you can also define the start-up interface.



Press this key to enter the file store and recall interface. You can save, read, delete, copy and paste files. The file types available for storage include state file, record file, timer file, delayer file and bitmap file. The instrument supports internal and external storage and recall.



Press this key to enter the system auxiliary function setting menu. Users can set the remote interface parameters, system parameters and print parameters. Besides, users can also calibrate the instrument, view system information, define the recall configuration of **Preset** and install options.



Press this key to enter the advanced function setting interface. Users can set the recorder, analyzer, monitor and trigger parameters.



Press this key to enter the timer and delayer setting interface. Users can set the timer and delayer parameters as well as turn on or off the timer and delayer.



Press this key to open the built-in help system and press the desired key to get the corresponding help information. For detailed introductions, refer to **"To Use the Built-in Help System"**.

## 9. Display Mode Switch/Return to the Main Interface



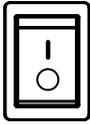
Switch between the current display mode and dial display mode. Besides, when the instrument is in a function interface (any interface under **Timer**, **...**, **Display**, **Store** and **Utility**), press this key to exit the function interface and return to the main interface.

## 10. Menu Keys



The menu keys correspond to the menus above them. Press any menu key to select the corresponding menu.

## 11. Power Switch Key



Turn on or off the instrument.

# Rear Panel

The rear panels of the various models of DP800A series are as shown in the figures below. In this section, DP831A (as shown in Figure 1-6 and Table 1-1) is mainly taken as an example to introduce the rear panels of DP800A series.

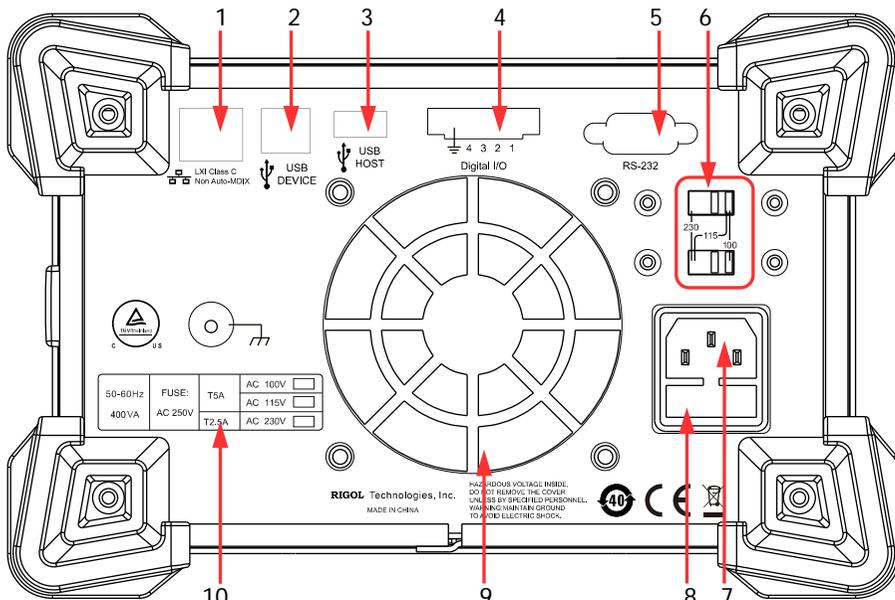


Figure 1-6 DP831A Rear Panel

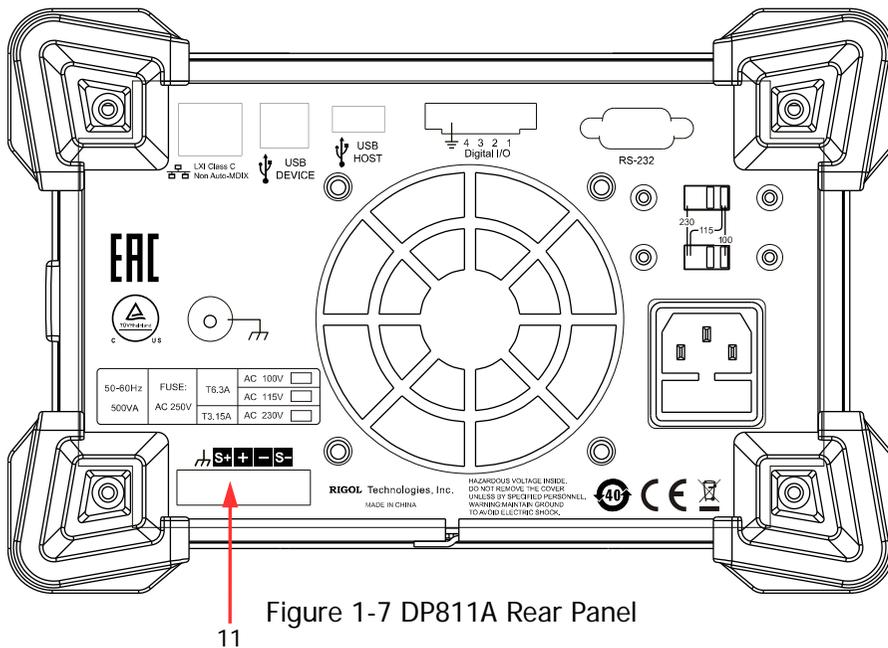


Figure 1-7 DP811A Rear Panel

Table 1-1 DP800A Rear Panel Explanation

No.	Name	Explanation
1	LAN Interface	Connect to the local network via the RJ45 interface
2	USB DEVICE	Connect the instrument (as "slave" device) to external USB device (such as, PC)
3	USB HOST	Connect the instrument (as "host" device) to external USB device (such as, USB storage device)
4	Digital I/O	Digital I/O interface
5	RS232 Interface	Serial communication interface
6	Voltage Selector	Select the specification of the input voltage (100V, 115V, 230V)
7	Power Socket	AC power input interface
8	Fuse	For different models of instrument or when different input voltages are selected, the specifications of the fuses are different
9	Fan	
10	Input Power Requirement	Corresponding relations of the input power frequency, voltage and fuse
11	Output Interface	Only DP811A provides this interface which has the same function as that of the " <b>Output Terminals</b> " at the front panel

**Note:** The "Output Terminals" at the front panel and the "Output Interface" at the rear panel can not output at the same time. Only one of the two ways can be selected to output at any one time (the "Output Terminals" at the front panel has higher accuracy).

## To Connect to Power

### 1. Input power requirement

DP800A series power supply can accept three kinds of AC power supplies: 50Hz–60Hz frequency; 100V, 115V and 230V voltages.

### 2. Check the voltage selector at the rear panel

Before connecting to power, make sure that the setting voltage of the voltage selector at the rear panel matches the input voltage.

### 3. Check the fuse

When the instrument leaves factory, proper fuse is installed. Please check whether the fuse matches the input voltage according to the “Input Power Requirement” at the rear panel.

### 4. Connect the instrument power cord

Connect the instrument to AC power supply using the power cord provided in the accessories.



---

**WARNING**

To avoid electric shock, make sure that the instrument is correctly grounded.

---

## Power-on Inspection

Press the power switch at the front panel, the instrument starts and ePcutes self-test. If the instrument passes the self-test, the welcome interface will be displayed; otherwise, the corresponding self-test failure information (including the top board, bottom board, fan and temperature) will be displayed.

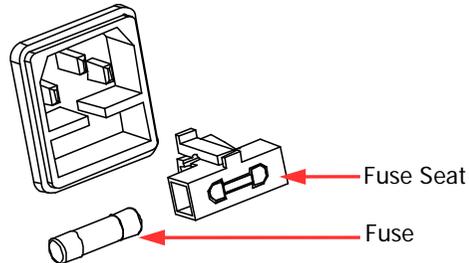
**Tip**

When powering on the instrument after powering off it, make sure that the time interval between the two operations is greater than 5s.

## To Replace the Fuse

To replace the fuse, follow the steps below.

1. Turn off the instrument and remove the power cord.
2. Insert a small straight screwdriver into the slot at the power socket and prize out the fuse seat gently.



3. Adjust the power voltage selector manually to select the correct voltage scale.
4. Take out the fuse and replace it with a specified fuse (for the corresponding relations between the input voltage and fuse specification, refer to the "Input Power Requirement" at the rear panel).



---

### **WARNING**

To avoid personal injuries, cut off the power supply before replacing the fuse; to avoid electric shock or fire, select the proper power supply specification and replace a fuse corresponding to this specification before connecting to power.

---

## User Interface

DP800A series power supply provides three kinds of display modes (normal, waveform and dial). The default is normal and press **Display** → **Disp Mode** to set the display mode to “Waveform” or “Dial”. In this section, DP831A is taken as an example to introduce the interface layout under the normal display mode (as shown in Figure 1-8 and Table 1-2).

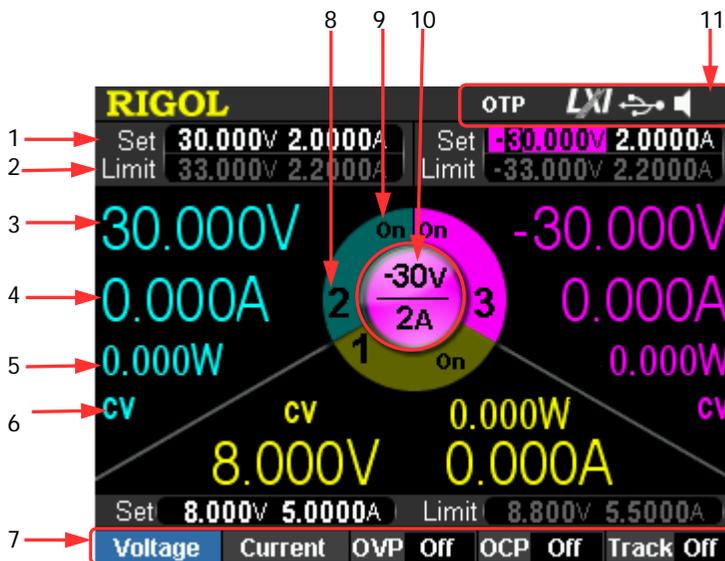


Figure 1-8 DP831A User Interface (Normal)

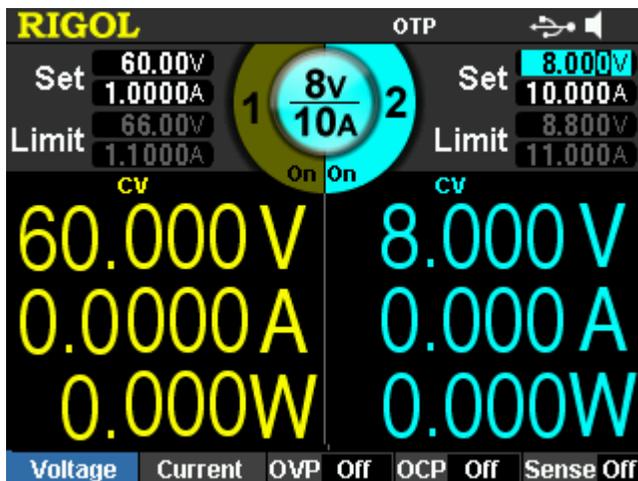


Figure 1-9 DP821A User Interface (Normal)



Figure 1-10 DP811A User Interface (Normal)

Table 1-2 DP800A User Interface Explanation

1	Voltage and current setting values
2	Overvoltage and overcurrent protection setting values
3	Actual output voltage
4	Actual output current
5	Actual output power
6	Channel output mode
7	Menu bar
8	Channel number
9	Channel output status
10	Channel currently selected
11	Status bar. Display the system status labels.  : over-temperature protection is enabled  : the front panel is locked.  : the network is connected.  : USB device is recognized.  : the beeper is enabled.  : the beeper is disabled.  : the instrument is in remote mode.

**Tip**

When the current display mode is "Normal" or "Waveform", press  at the front panel to switch between the current display mode and dial display mode.

## To Use the Built-in Help System

The built-in help system provides help information for any front panel key (except the parameter input area) and menu keys for users to quickly obtain the function prompts of the function keys or menus.

### Obtain the help information of any key

Press **Help** to illuminate it and press the desired key to get the corresponding help information; at the same time, the backlight of **Help** goes off. Press  to exit the help system.

### Built-in help interface

Press **Help** to illuminate it and press **Help** again to open the built-in help interface. Press the up/down direction keys to select the desired help topic and press **View** to view the corresponding help information.

The help topics include:

1. View the last displayed message.
2. View error queue of the remote commands.
3. Get the help information of a key.
4. Storage management.
5. Abbreviations list.
6. Get technical support from **RIGOL**.

## Rack Mount Kit Installation

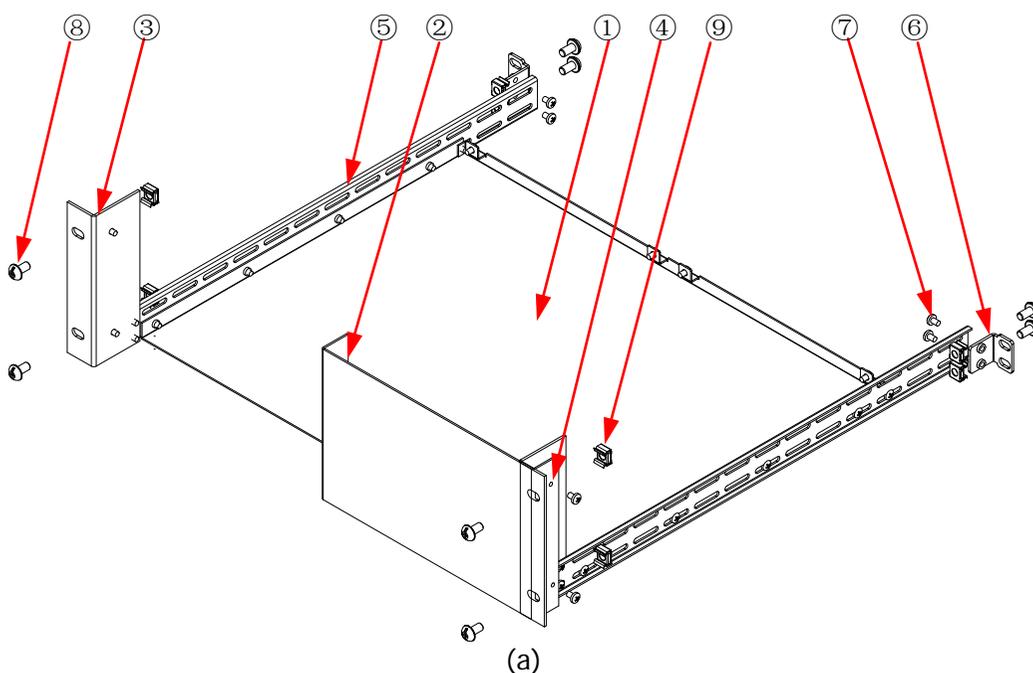
To install this instrument into a standard 19 inches cabinet, please order rack mount kit RM-1-DP800 (for installing single instrument) or RM-2- DP800 (for installing dual instruments) and correctly install them according to this section.

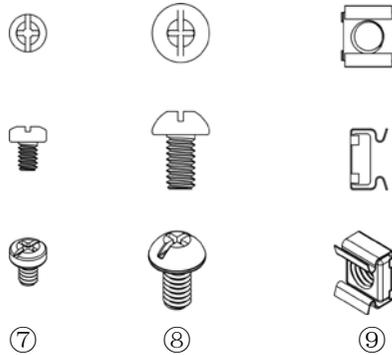
### To Install Single Instrument

#### Kit Parts List

Table 1-3 RM-1-DP800 Kit Parts List

No.	Name	Qty.	Description
①	Rack Support Shelf	1	
②	Front Filler Panel	1	
③	Rack Left Fixing Part	1	
④	Rack Right Fixing Part	1	
⑤	Rack Rail	2	
⑥	Side Beam Fixing Part	2	
⑦	M4 Screw	26	M4X6 Phil-Slot Pan Head Screw
⑧	M6 Screw	8	M6×16 Phil-Slot Pan Head Screw
⑨	M6 Nut	8	M6×5 Lock Blade Square Nut





(b)

Figure 1-11 RM-1-DP800 Kit Parts List

## Installation Tool

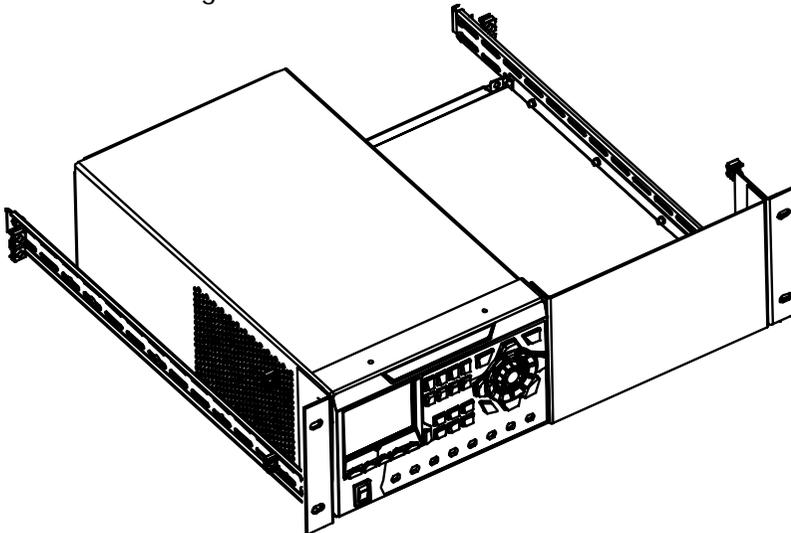
PH2 Phillips Screwdriver (recommended).

## Installation Space

The following requirements must be fulfilled by the machine cabinet in which the instrument is mounted.

- The machine cabinet must be a standard 19-inch one.
- At least 4U (177.8 mm) space should be provided by the machine cabinet.
- The depth inside the machine cabinet should not be less than 463.75 mm.

The instrument after being installed is as shown below.

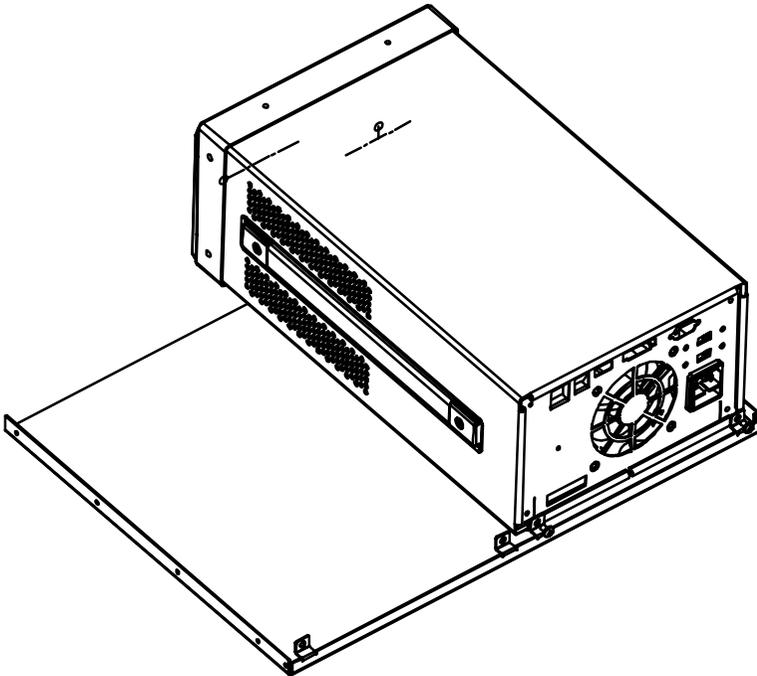


## Installation Procedure

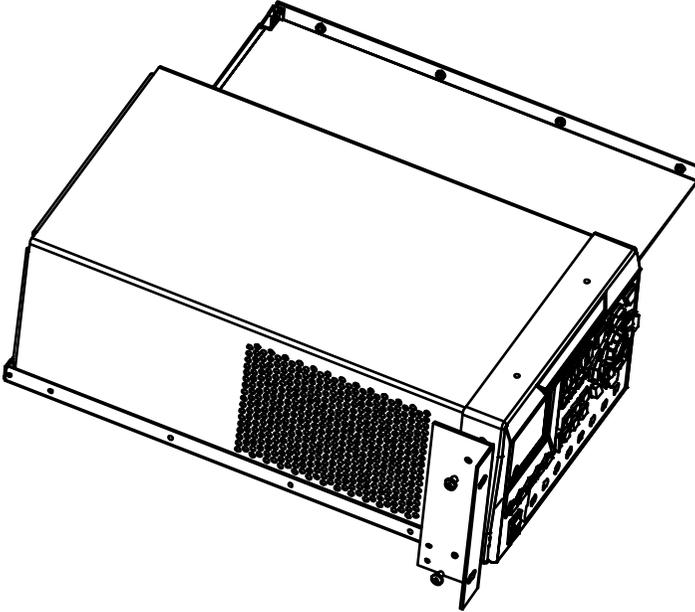
**CAUTION**

Only authorized operator can execute the installation operation. Improper installation might result in damage of the instrument or incorrect installation of the instrument on the rack.

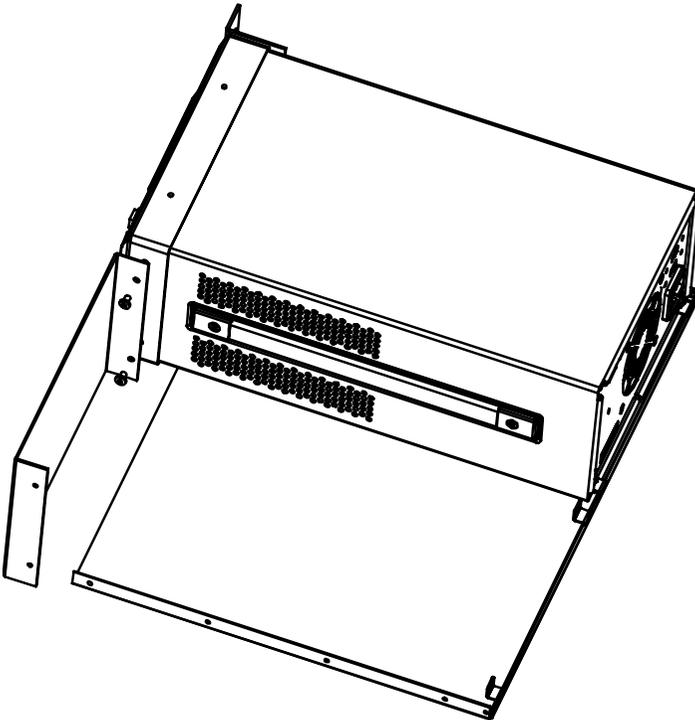
1. Remove the four rubber bumpers at the front and rear panels of the instrument respectively.
2. Fix the instrument on the rack support shelf using two M4 screws.



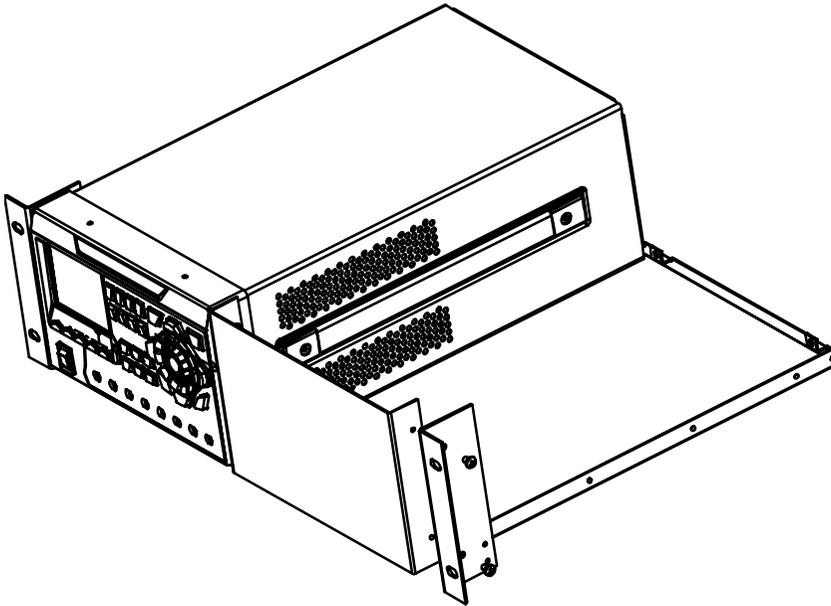
3. Fix the left fixing part at the left of the instrument's front panel using two M4 screws.



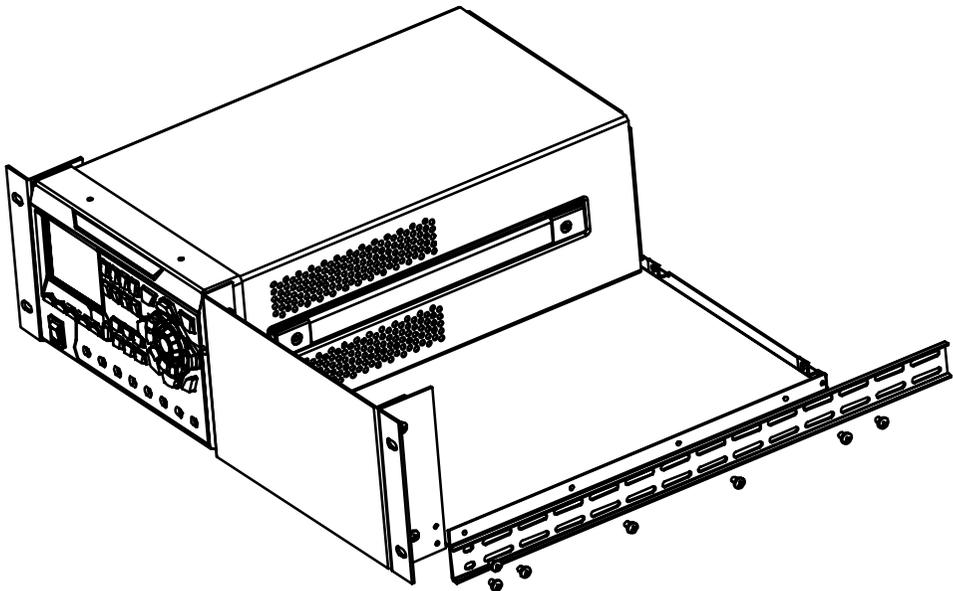
4. Fix the front filler panel at the right of the instrument's front panel using two M4 screws.



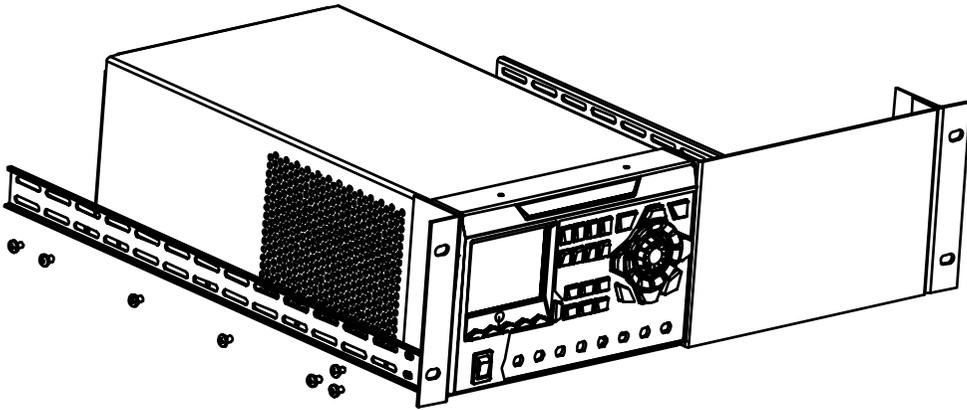
5. Fix the right fixing part at the right of the front filler panel using two M4 screws.



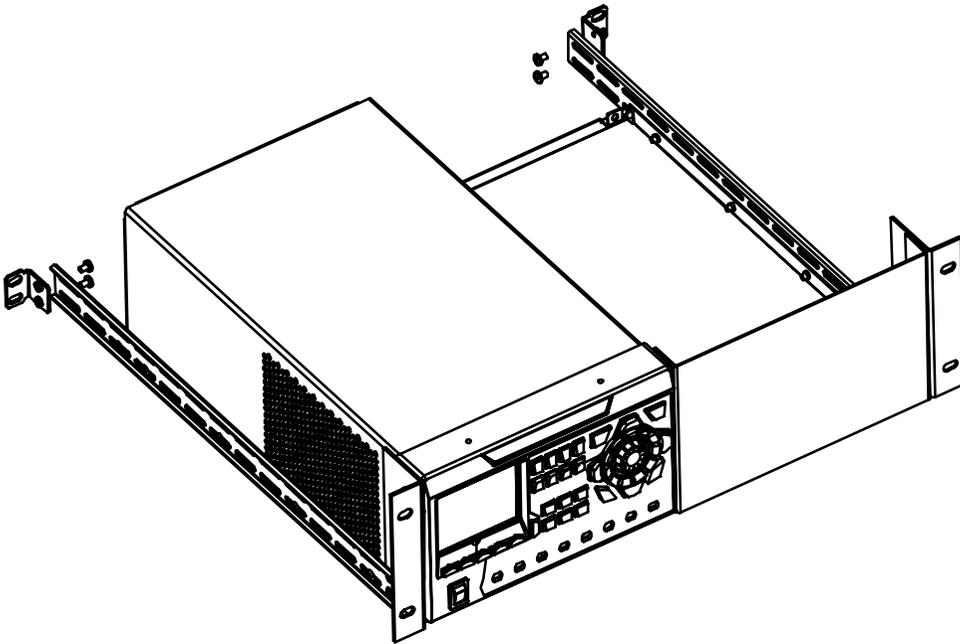
6. Fix one rack rail at the right of the rack support shelf using seven M4 screws.



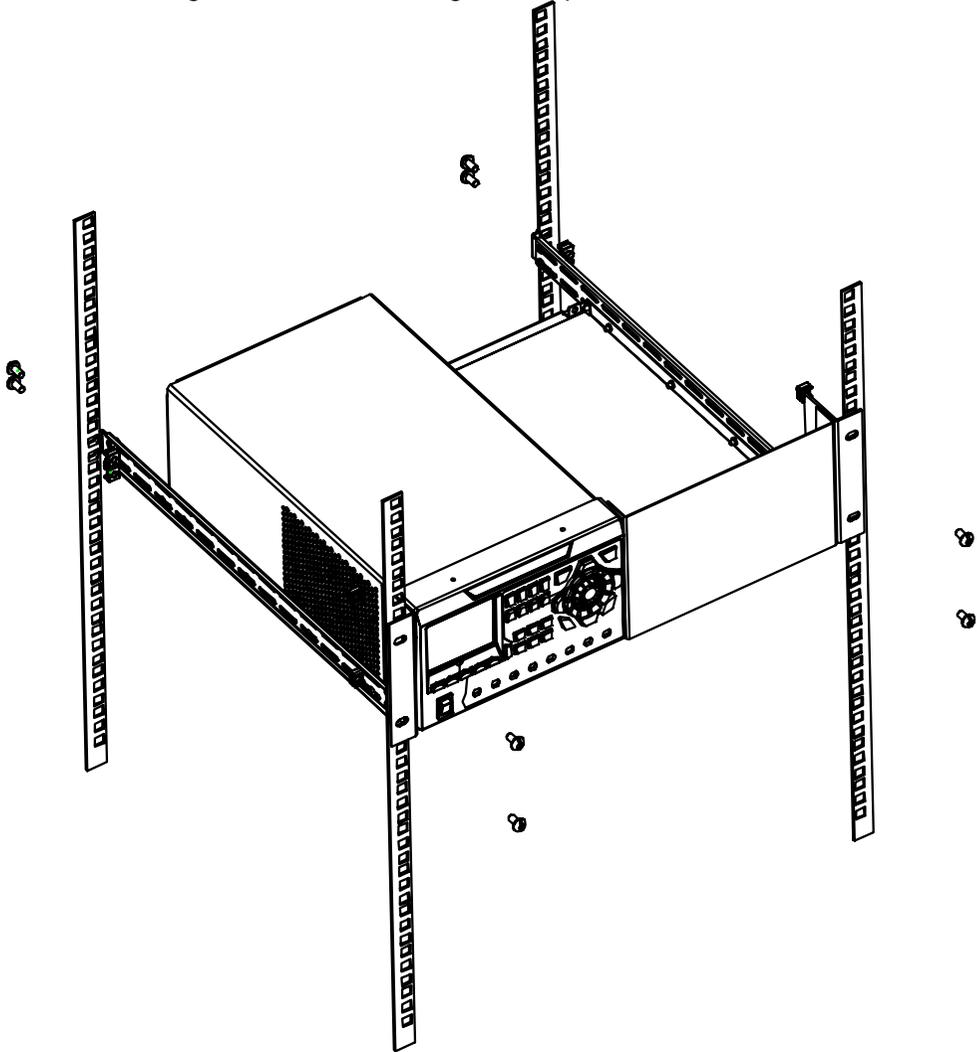
7. Fix the other one rack rail at the left of the rack support shelf using seven M4 screws.



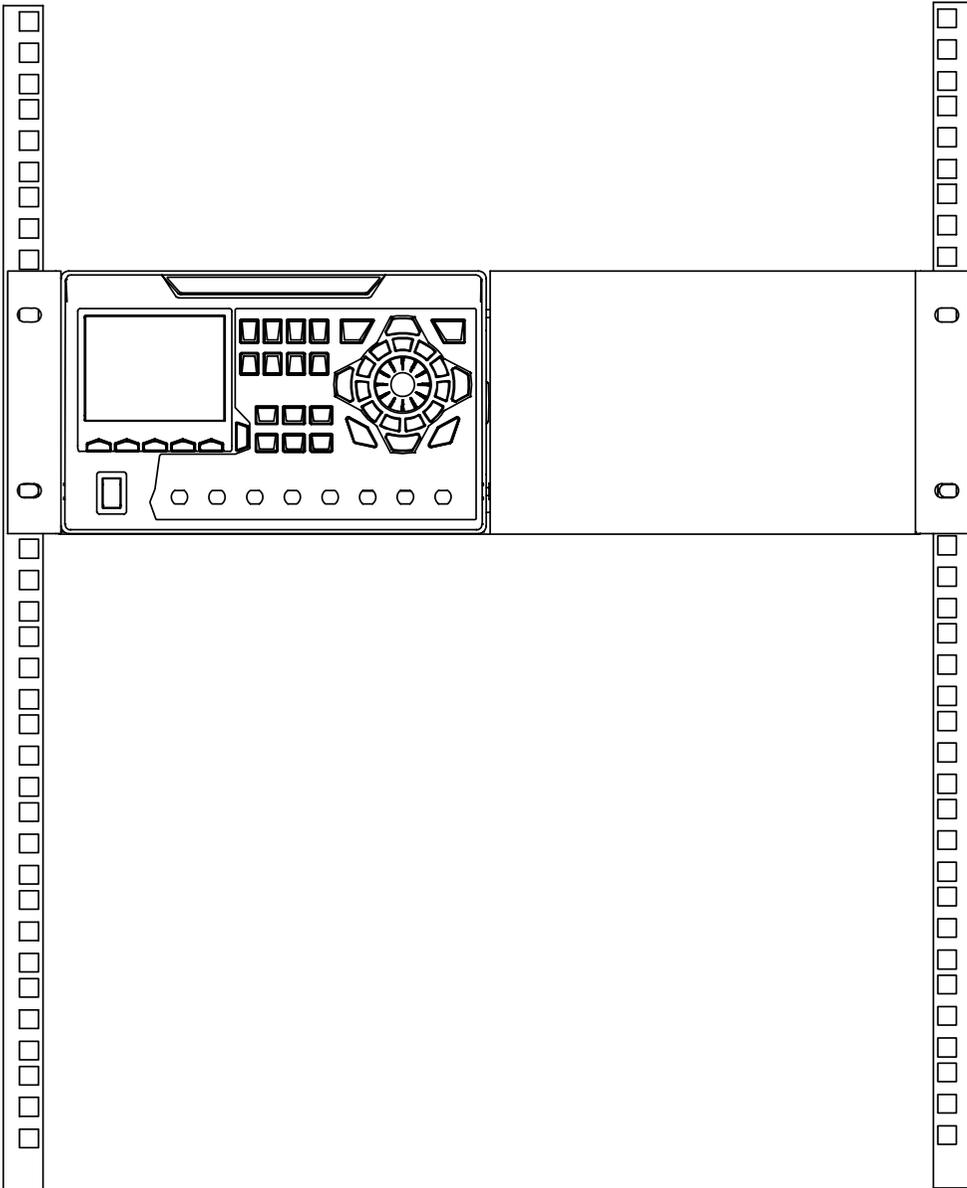
8. Fix the two side beam fixing parts at the tail of the left and right rack rails respectively using four M4 screws.



9. Mount the rack with the instrument fixed to it into a standard 19-inch machine cabinet with eight M6 screws and eight M6 square nuts.



10. The figure of the single instrument after being installed correctly is as shown below.

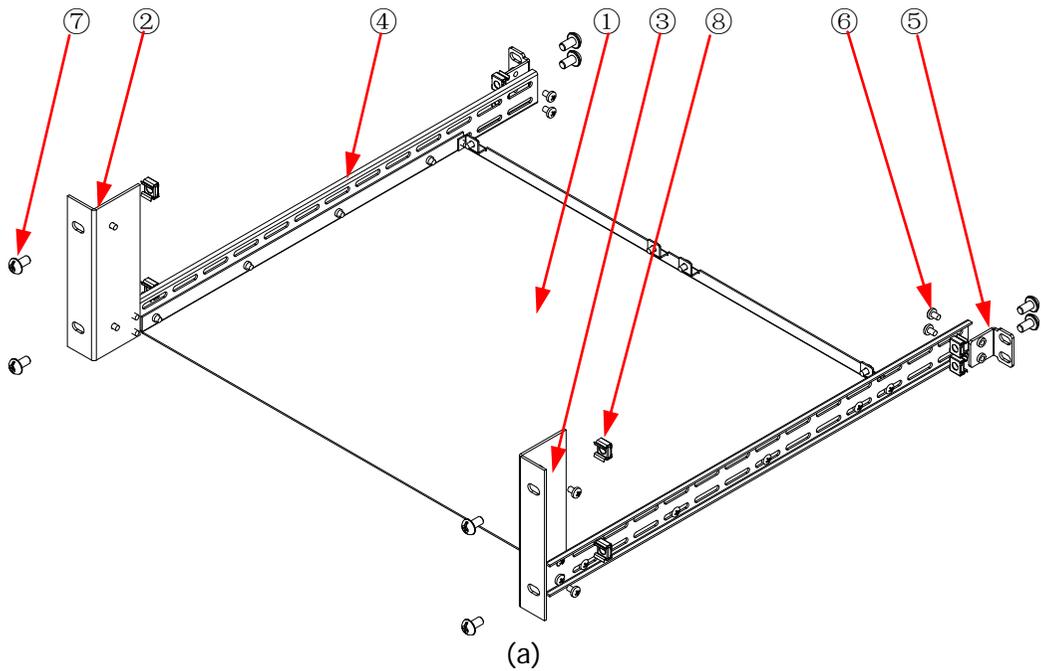


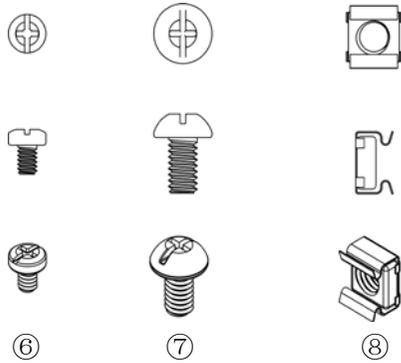
## To Install dual Instruments

### Kit Parts List

Table 1-4 RM-2-DP800 Kit Parts List

No.	Name	Qty.	Description
①	Rack Support Shelf	1	
②	Left Fixing Part	1	
③	Right Fixing Part	1	
④	Rack Rail	2	
⑤	Side Beam Fixing Part	2	
⑥	M4 Screw	26	M4X6 Phil-Slot Pan Head Screw
⑦	M6 Screw	8	M6×16 Phil-Slot Pan Head Screw
⑧	M6 Nut	8	M6×5 Lock Blade Square Nut





(b)

Figure 1-12 RM-2-DP800 Kit Parts List

### Installation Tool

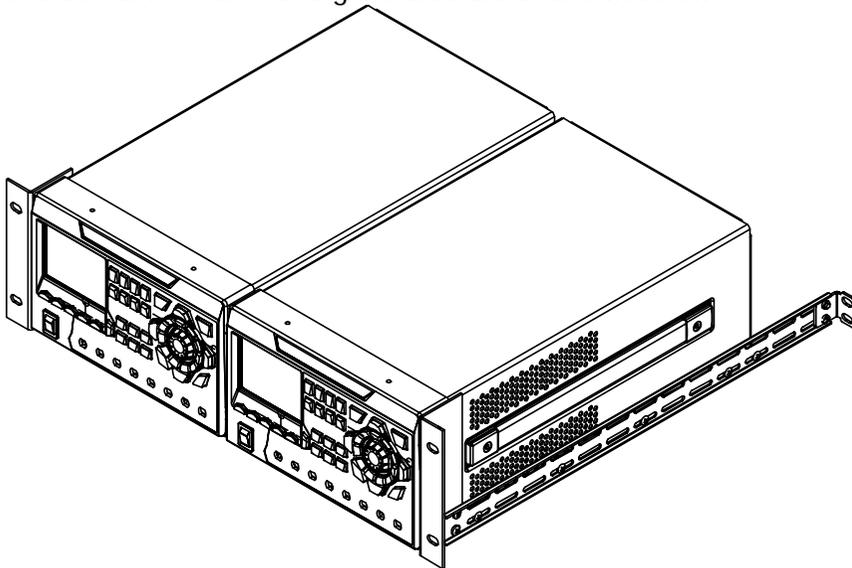
PH2 Phillips Screwdriver (recommended).

### Installation Space

The following requirements must be fulfilled by the machine cabinet in which the instrument is mounted.

- The machine cabinet must be a standard 19-inch one.
- At least 4U (177.8 mm) space should be provided by the machine cabinet.
- The depth inside the machine cabinet should not be less than 463.75 mm.

The instruments after being installed are as shown below.



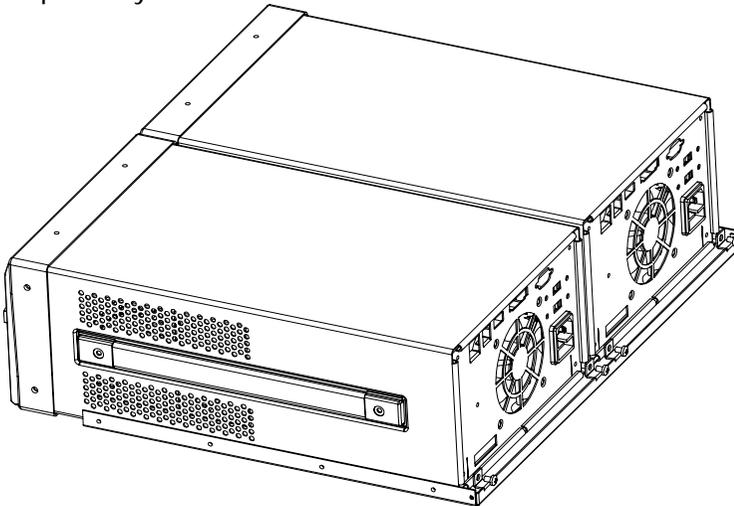
## Installation Procedure



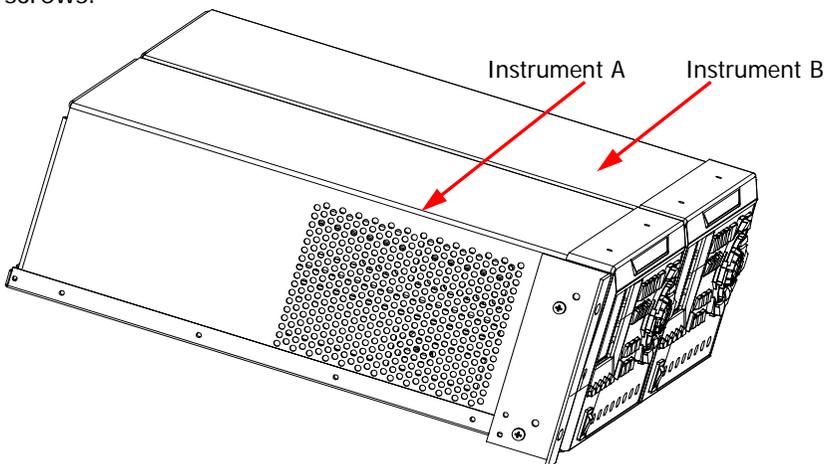
### CAUTION

Only authorized operator can execute the installation operation. Improper installation might result in damage of the instrument or incorrect installation of the instrument on the rack.

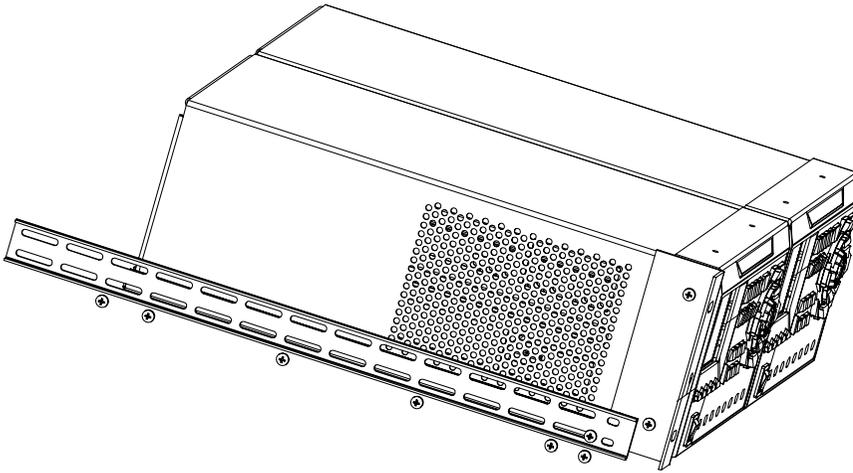
1. Remove the four rubber bumpers at the front and rear panels of the two instruments respectively.
2. Fix the two instruments on the rack support shelf using two M4 screws respectively.



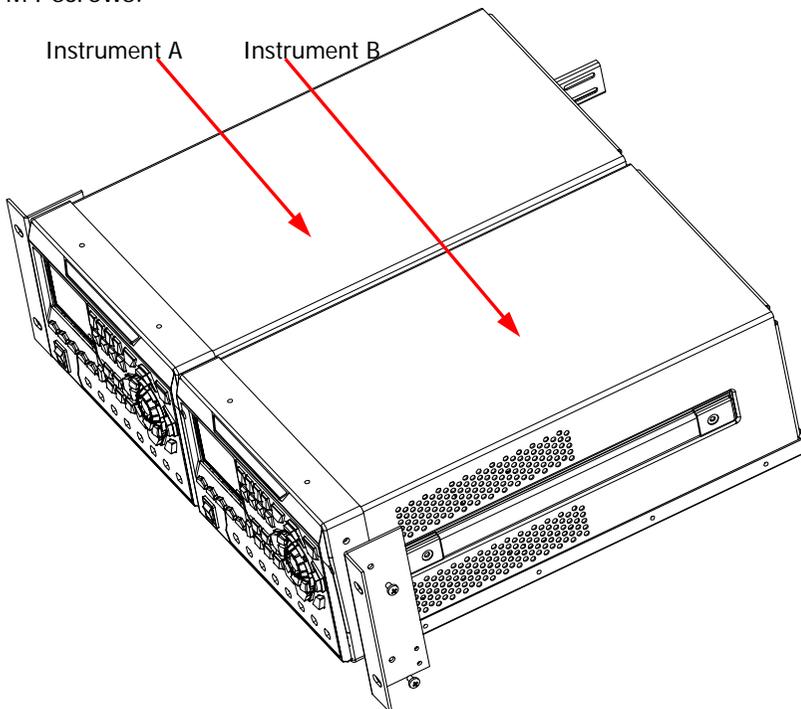
3. Fix the left fixing part at the left of the front panel of instrument A using two M4 screws.



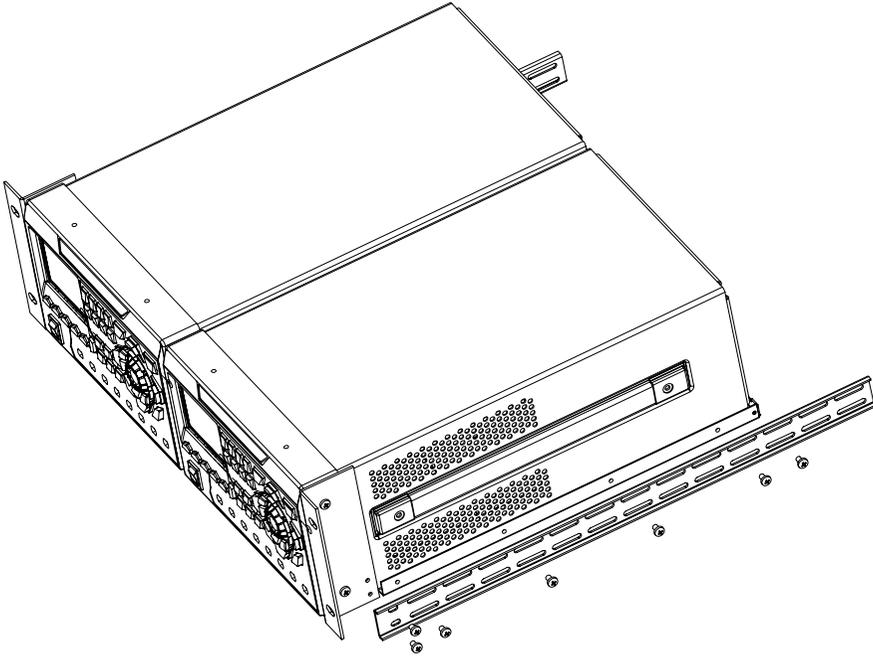
4. Fix one rack rail at the left of the rack support shelf using seven M4 screws.



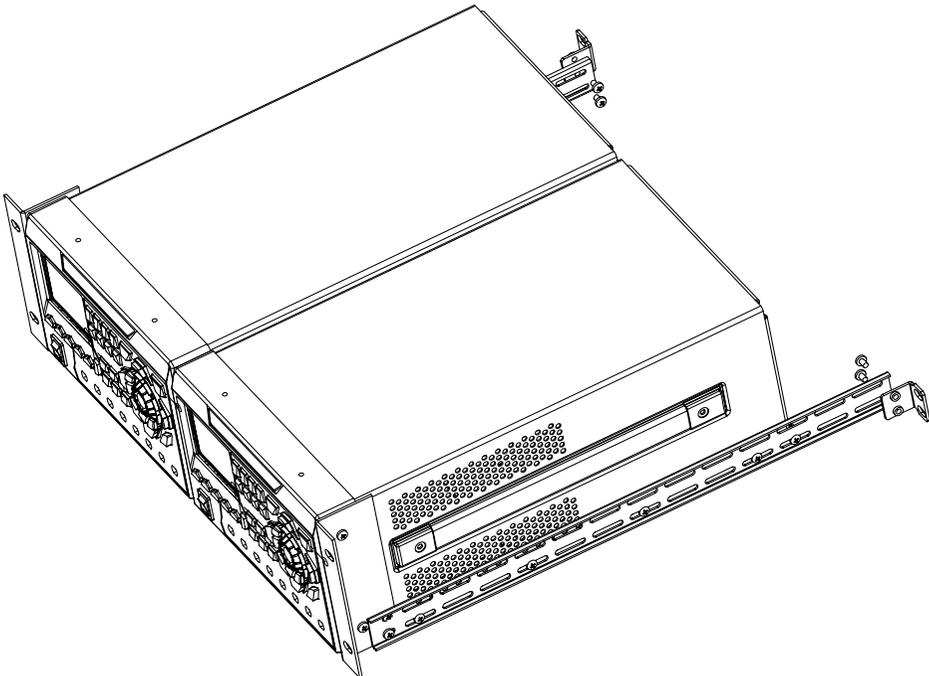
5. Fix the right fixing part at the right of the front panel of instrument B using two M4 screws.



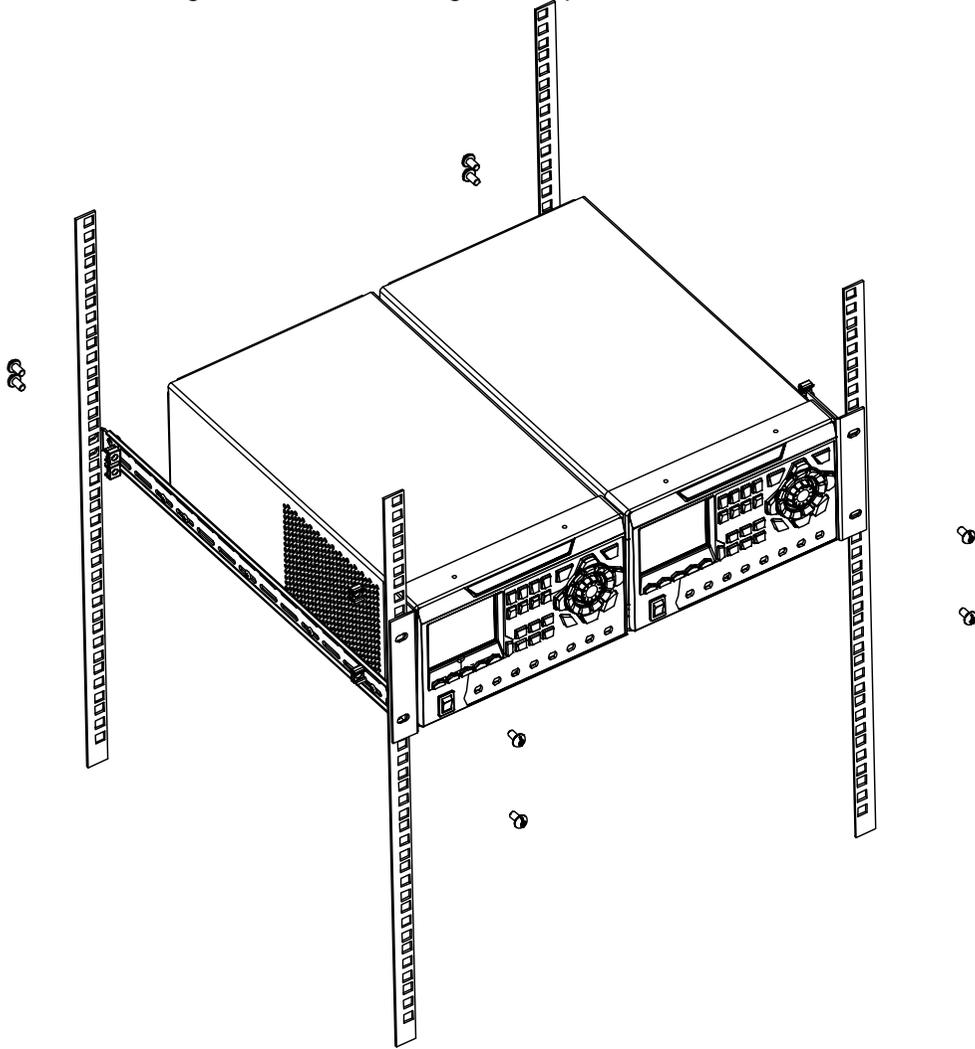
6. Fix the other one rack rail at the right of the rack support shelf using seven M4 screws.



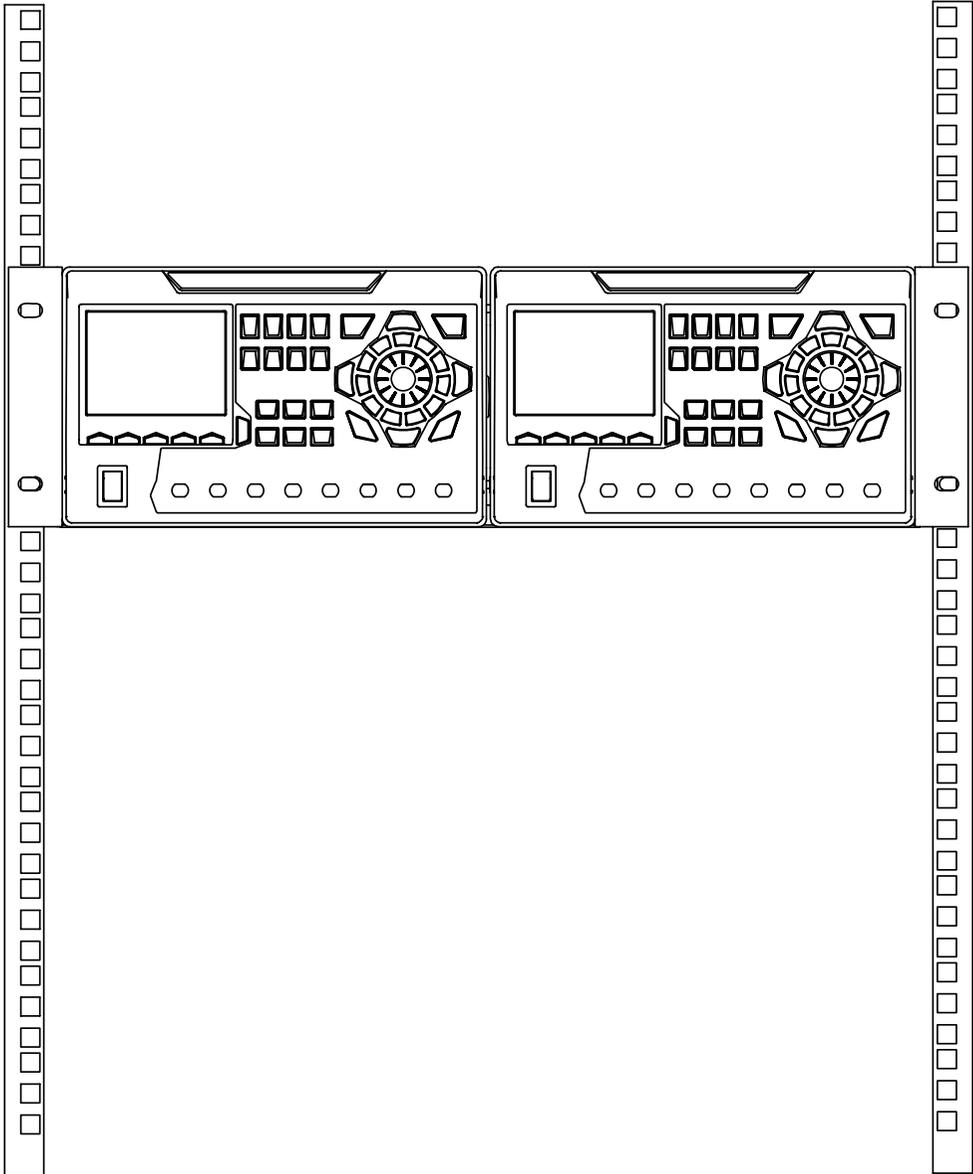
7. Fix the two side beam fixing parts at the tail of the left and right rack rails respectively using four M4 screws.



8. Mount the rack with the instruments fixed to it into a standard 19-inch machine cabinet with eight M6 screws and eight M6 square nuts.



9. The figure of the dual instruments after being installed correctly is as shown below.





## Chapter 2 Front Panel Operations

The contents of this chapter are as follows:

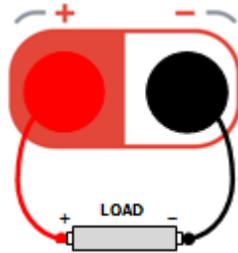
- Constant Voltage Output
- Constant Current Output
- Connect Power Supplies in Series or Parallel
- Track Function
- Sense Work Mode
- Timer and Delayer
- Advanced Functions
- Display Setting
- Store and Recall
- Utility

## Constant Voltage Output

DP800A series power supply provides three output modes: constant voltage output (CV), constant current output (CC) and critical mode (UR). In CV mode, the output voltage equals the voltage setting value and the output current is determined by the load; in CC mode, the output current equals the current setting value and the output voltage is determined by the load; UR is the critical mode between CV and CC. This section introduces the operation method in constant voltage output mode.

### Operation Method:

1. Connect the output terminals  
As shown in the figure below, connect the load to the output terminals of the corresponding channel.



### CAUTION

To avoid damaging the instrument or the device connected to it, pay attention to the polarity when connecting.

2. Turn on the power switch to start the instrument.
3. Select the channel  
Select the proper output channel according to the desired output voltage. Press the corresponding channel selection key; at this point, this channel, its channel number and output state are high-lighted on the screen.
4. Set the voltage  
Method 1  
Press **Voltage** and use the left/right direction keys to move the cursor; then, rotate the knob to set the voltage and the default unit is V. After the bit to be set is selected, you can also use the up/down direction keys to modify the value of the corresponding bit and the default unit is V.

#### Method 2

Press **Voltage** and use the numeric keyboard to input the desired voltage and press the menu key **V** or **mV** or the unit selection key  or  to select the desired unit. Besides, you can also press **OK** to select the default unit V.

During the input, press **Back** to delete the character currently before the cursor and press **Cancel** to cancel the input.

#### Method 3

When the menu key **Current** is selected, you can use the numeric keyboard to input the desired voltage value and press the unit selection key  or  to select the desired unit. During the input, press **Back** to delete the character currently before the cursor and press **Cancel** to cancel the input.

### 5. Set the current

#### Method 1

Press **Current** and use the left/right direction keys to move the cursor; then, rotate the knob to set the current and the default unit is A. After the bit to be set is selected, you can also use the up/down direction keys to modify the value of the corresponding bit and the default unit is A.

#### Method 2

Press **Current** and use the numeric keyboard to input the desired current value and press the menu key **A** or **mA** to select the desired unit. After inputting the

desired current value, you can also press the unit selection key  or  to select the desired unit. Besides, you can also press **OK** to select the default unit A. During the input, press **Back** to delete the character currently before the cursor and press **Cancel** to cancel the input.

#### Method 3

When the menu key **Voltage** is selected, you can use the numeric keyboard to input the desired current value and press the unit selection key  or  to select the desired unit. During the input, press **Back** to delete the character currently before the cursor and press **Cancel** to cancel the input.

### 6. Set the overcurrent protection

Press **OCP** to set the proper overcurrent protection value. For the setting method, refer to “**Set the current**”. Press **OCP** again to enable the overcurrent protection function and the output will be turned off automatically when the actual output current is greater than the overcurrent protection value.

### 7. Turn on the output

Turn on the output of the corresponding channel and the actual output voltage, output current, output power as well as the output mode (CV) are high-lighted in the user interface.

**WARNING**

To avoid electric shock, please turn on the output switch after the output terminals are correctly connected.

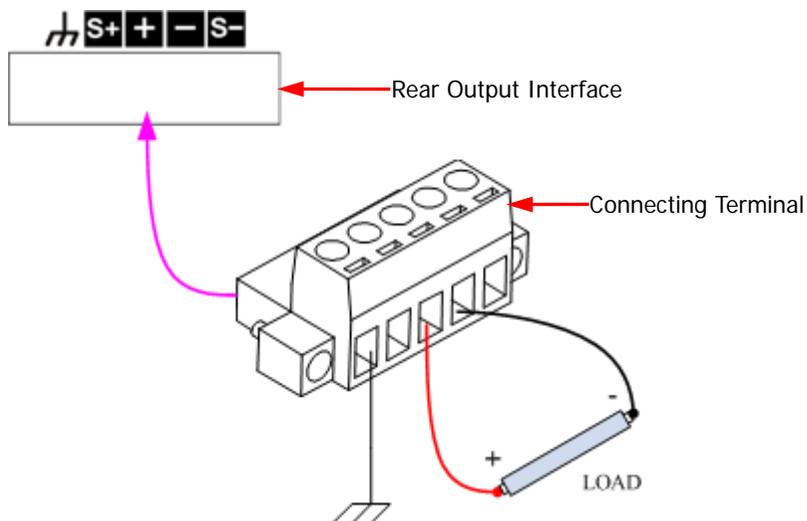
**CAUTION**

When the fan stops, the channel switch can not be turned on; otherwise, "The fan stops, stop the output!" will be displayed.

## 8. Check the output mode

In constant voltage output mode, the output mode displayed should be "CV"; if "CC" is displayed, you can increase the current setting value properly and the power supply will switch to CV mode automatically.

Besides, DP811A also provides output interface at the rear panel for constant voltage output. As shown in the figure below, the load is connected to the output interface at the rear panel for constant via a connecting terminal.

**Connection Steps:**

1. Connect the load to the corresponding position of the connecting terminal correctly according to the figure above. Note the polarity when connecting.
2. Insert the connecting terminal to the output interface at the rear panel of the instrument correctly according to the figure above. Note the corresponding relationship between the connecting terminal and the output interface when inserting.

**Caution:** The output terminals at the front panel and the output interface at the rear panel can not output at the same time. You can only select one of the two ways to output at any one time (the former has higher output accuracy than the latter).

**Tip**

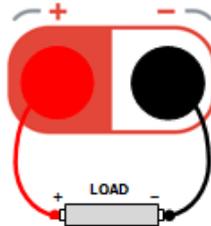
In CV output mode, when the load current is greater than the current setting value, the power supply will switch to CC output mode automatically. At this point, the output current equals the current setting value and the output voltage reduces proportionally.

## Constant Current Output

In constant current output mode, the output current equals the current setting value and the output voltage is determined by the load. This section introduces the operation method in constant current output mode.

### Operation Method:

1. Connect the output terminals  
As shown in the figure below, connect the load to the output terminals of the corresponding channel.



### CAUTION

To avoid damaging the instrument or the device connected to it, pay attention to the polarity when connecting.

2. Turn on the power switch to start the instrument.
3. Select the channel  
Select the proper output channel according to the desired output current. Press the corresponding channel selection key; at this point, this channel, its channel number and output state are high-lighted in the center of the screen.
4. Set the voltage  
Please refer to "**Set the voltage**" in "Constant Voltage Output" to set the desired voltage.
5. Set the current  
Please refer to "**Set the current**" in "Constant Voltage Output" to set the desired current.
6. Set the overvoltage protection  
Press **OVP** to set the proper overvoltage protection value. For the setting method, refer to "**Set the voltage**" in "Constant Voltage Output". Press **OVP** again to enable the overvoltage protection function and the output will be turned off automatically when the actual output voltage is greater than the overvoltage protection value.

7. Turn on the output  
Turn on the output of the corresponding channel and the actual output voltage, output current, output power as well as the output mode (CC) are high-lighted in the user interface.

**Warning**

To avoid electric shock, please turn on the output switch after the output terminals are correctly connected.

**CAUTION**

When the fan stops, the channel switch can not be turned on; otherwise, "The fan stops, stop the output!" will be displayed.

8. Check the output mode  
In constant current output mode, the output mode displayed should be "CC"; if "CV" is displayed, you can increase the voltage setting value properly and the power supply will switch to CC mode automatically.

Besides, DP811A also provides output interface at the rear panel for constant current output. For the detailed connection method, please refer to the introduction in "**Constant Voltage Output**".

**Caution:** The output terminals at the front panel and the output interface at the rear panel can not output at the same time. You can only select one of the two ways to output at any one time (the former has higher output accuracy than the latter).

**Tip**

In CC output mode, when the load voltage is greater than the voltage setting value, the power supply will switch to CV output mode automatically. At this point, the output voltage equals the voltage setting value and the output current reduces proportionally.

## Connet Power Supplies in Series or Parallel

Two or more isolated channels of one power supply or multiple power supplies can be connected in series or parallel to provide higher voltage or current.

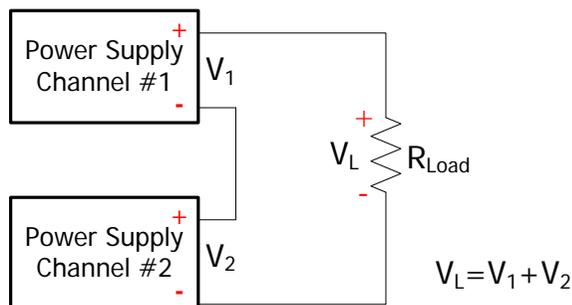
**Note:** Only the isolated channels can be connected in series or parallel.

For DP831A, any two of the three channels can be connected in series. CH1 and CH2 or CH3 can be connected in parallel but CH2 and CH3 cannot be connected in parallel. For DP832A, CH1 and CH2 or CH3 can be connected in series or parallel but CH2 and CH3 cannot be connected in series or parallel. For DP821A, CH1 and CH2 can be connected in series or parallel. The multiple channels belonging to different power supplies can also be connected in series or parallel.

**Note:** When connecting the power supplies in series or parallel, the corresponding parameter settings must meet the safety requirements.

### Connet Power Supplies in Series

The power supplies connected in series can provides higher output voltage which is the sum of the channels output voltage. When connecting power supplies in series, set the same current setting value and overcurrent protection value for each channel. The connection method is shown in the figure below (take connecting two channels in series as the example).



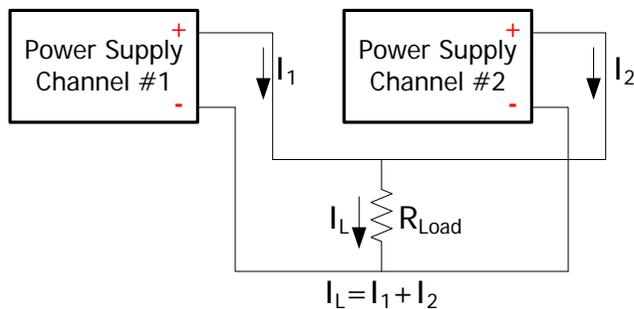
#### Operation Method:

1. Connect the load to the power supplies correctly according to the figure above. Note the polarity when connecting.
2. According to the introduction in "**Constant Voltage Output**", set proper voltage, current and overcurrent protection value for each channel (the current setting and the overcurrent protection value of the two channels must be the same respectively) and open the output of the two channels.

**Note:** Make sure that all channels work in CV (constant voltage) mode. If one of the channels works in CC (constant current) mode, the other channels will enter unregulated state in which the output is not predictable.

## Connect Power Supplies in Parallel

The power supplies connected in parallel can provide higher output current which is the sum of the output current of each channel. When connecting power supplies in parallel, you can set the parameters of each channel separately. The connection method is shown in the figure below (take connecting two channels in parallel as the example).



### Operation Method:

1. Connect the load to the power supplies correctly according to the figure above. Note the polarity when connecting.
2. The power supplies can work in CV or CC mode according to the need of the load. Please refer to the introduction in "**Constant Voltage Output**" or "**Constant Current Output**" to set proper parameters for each channel and open the output of the two channels.

**Note:** The channels may work in CV or CC mode based on the load in actual application.

## Track Function

Some of the DP800A channels support the output track function (as shown in the table below).

Model	CH1	CH2	CH3
DP831A	Not support	Support	Support
DP832A	Support	Support	Not support

For the two channels supporting track function, when the track function of one channel (the tracked channel) is enabled, the voltage setting value of the other channel (the tracking channel) will change accordingly when the voltage setting value of this channel is changed. By default, the track function is disabled and it is usually used to provide symmetric voltage for the calculation amplifier or other circuits.

### Operation Method (take DP831A for example):

1. Turn on the power switch to start the instrument.
2. Enable the track function  
Select CH2 and press **Track** to enable the track function. At this point, the track status label  is displayed in the CH2 area in the user interface.
3. Set the voltage  
Press **Voltage** to set proper voltage. At this point, the voltage of CH3 changes accordingly. For example, set the voltage of CH2 to +5V and the voltage of CH3 will change to -5V automatically.
4. Disable the track function  
Select CH2 and press **Track** to disable the track function.

Besides, the two channels supporting the track function also support mutual track function. When the track function of the both channels are enabled, if the voltage setting value of any channel is changed, the voltage setting value of the other one will change accordingly.

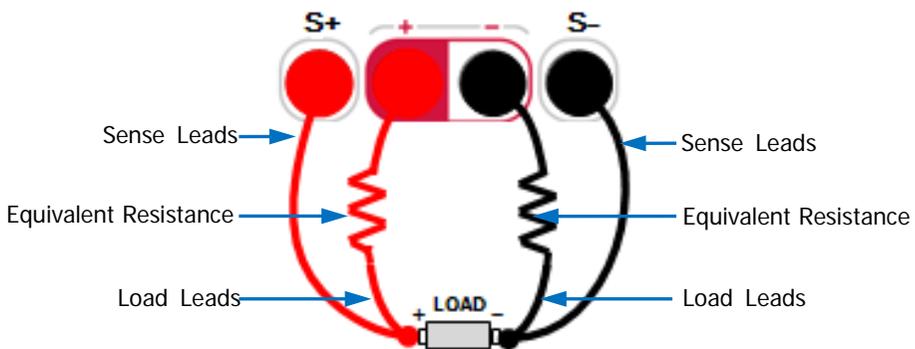
#### Tip

- The track function and the mutual track function only track the voltage setting value and the actual output voltage will not be affected.
- When the track function is enabled, the voltage of the tracking channel cannot be set.
- When the mutual track function is enabled, the voltage of the both channels can be set.

## Sense Work Mode

As the DP821A (CH2) and DP811A can provide 10 A output current, the voltage drop in the load leads must not be neglected. In order to ensure the accuracy of the voltage drop while outputting a high current, the DP821A (CH2) and DP811A provide Sense (remote sense) work mode. In this mode, the voltage is sensed at the load rather than at the power supply's output terminals. It allows the system to automatically compensate the voltage drop in the load leads so as to ensure the specified output value can be consistent with the value received by the load.

The Sense connection method at the front panel is shown in the figure below.



### NOTE

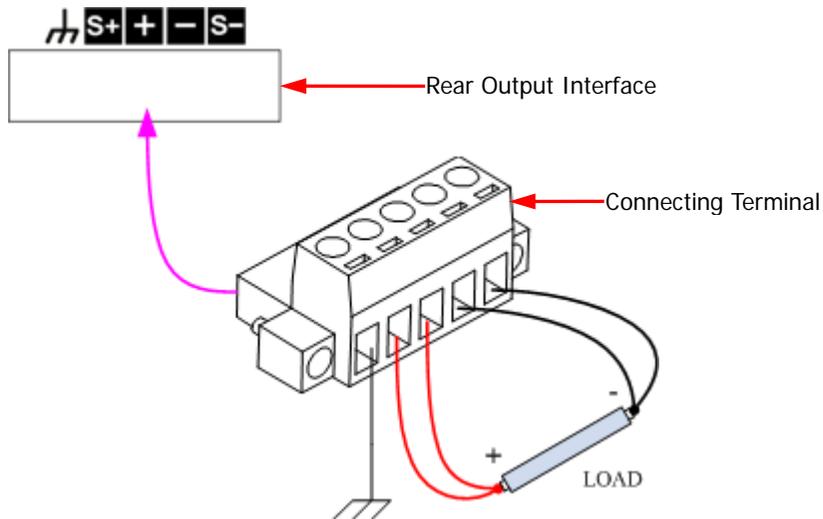
- When outputting a high current, the load leads should be as short as possible, and it would be best if the two leads can twist together in order to obtain a better output characteristic.
- Please use a twisted-pair as the Sense lead as possible as you can and the leads should not be twisted with the load leads.

### Operation Steps:

1. Connect the output terminals and Sense terminals at the front panel to both the ends of the load. Note the polarity when connecting.
2. DP821A: After the CH2 (8V/10A) is selected, press the front panel key **Sense** to enable the Sense function.

DP811A: After the desired range is selected, press the front panel key **Sense** to enable the Sense function.

Besides, DP811A also provides output interface at the rear panel for Sense work mode. The Sense connection method at the rear panel is shown in the figure below.



### Operation Steps:

1. Connect the load to the corresponding position of the connecting terminal correctly according to the figure above. Note the polarity when connecting.
2. Insert the connecting terminal to the output interface at the rear panel of the instrument correctly according to the figure above. Note the corresponding relationship between the connecting terminal and the output interface when inserting.
3. After the desired range is selected, press the front panel key **Sense** to enable the Sense function.

**Caution:** The output terminals at the front panel and the output interface at the rear panel can not work in Sense mode at the same time. You can only select one of the two ways to enable the Sense function at any one time (the former has higher output accuracy than the latter).

## Timer and Delayer

DP800A provides the timer and delayer functions.

When the timer is enabled, the instrument outputs the preset voltage and current values (at most 2048 groups). Users can set the number of output groups of the timer as well as the voltage, current and timing time of each group. Besides, the instrument provides various built-in output templates and users can select and edit the template as well as create timer parameters based on the template. The instrument will output according to the parameters currently created.

When the delayer is enabled, the instrument enables or disables the output according to the preset state and delay time (at most 2048 groups). Users can set the number of output groups of the delayer as well as the state and delay time of each group.

Users can store the edited timer parameters (timer file, with the suffix "\*.RTF") and delayer parameters (delay file, with the suffix "\*.RDF") in internal or external memory and recall them when required.

Press **Timer** to illuminate it. The timer and delayer setting interface is displayed.

1. **Timer Set:** To Set the Timer Parameters
2. **Timer:** To Enable the Timer
3. **Delay Set:** To Set the Delayer Parameters
4. **Delayer:** To Enable the Delayer

### Tip

The timer function and delayer function are mutually exclusive. When the timer is enabled, **Delayer** is grayed out and disabled; when the delayer is enabled, **Timer** is grayed out and disabled.

## To Set the Timer Parameters

Press **Timer** → **Timer Set** to enter the timer parameter setting interface as shown in the figure below. The channel currently selected is displayed in the status bar. Press the channel selection keys at the front panel to switch channel. This interface provides timer parameter preview; the horizontal axis represents time and the vertical axis represents voltage and current; users can view the values on the current page of the parameter list.

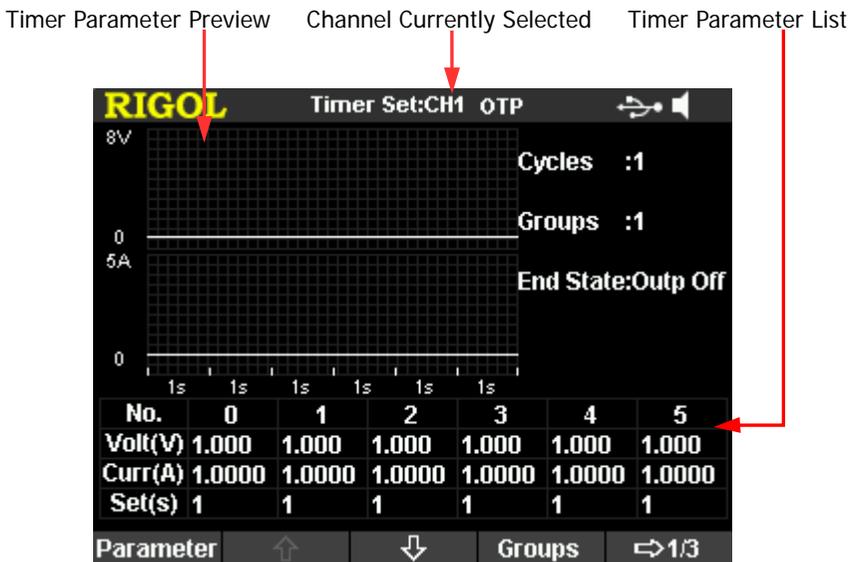


Figure 2-1 Timer Parameter Setting Interface

### Number of Groups

The number of groups is defined as the number of groups of preset voltage and current values that the power supply outputs in each cycle. Press **Groups** and use the numeric keyboard or left/right direction keys and knob to input the value. The range is from 1 to 2048.

## Number of Cycles

The number of cycles is defined as the number of times that the instrument performs timing output according to the preset voltage and current. Press **Cycles** to set the number of cycles to "Infinite" or use the numeric keyboard or left/right direction keys and knob to input the value. The range is from 1 to 99999.

### Tip

- The total number of groups in each timing output = the number of groups × the number of cycles
- The power supply will terminate the timer function when the total number of groups of outputs is finished. At this point, the state of the power supply depends on the setting of **End State**.

## End State

The end state refers to the state of the instrument after it finishes outputting the total number of groups of voltage and current values when the number of cycles is a specified value. Press **End State** to select "Outp Off" or "Last".

- Outp Off: the instrument turns off the output automatically after finishing the output.
- Last: the instrument stops at the output state of the last group after finishing the output.

Note: When the number of cycles is set to "Infinite", the end state is invalid.

## To Manually Edit the Timer Parameters

You can edit the timer parameters manually. Press **Parameter** and use the numeric keyboard or left/right direction keys or knob to select the number (No.) in the timer parameter list, use the up/down direction keys to select the voltage (Volt), current (Curr) and time (Set) of the current group respectively and use the numeric keyboard or left/right direction keys and knob to input the desired value. Use the same method to set the parameters of the other groups.

You need to set the parameters of number 0 to number **(P-1)**; wherein, **P** is the number of output groups currently set. Only 6 groups of parameters can be displayed on each page of the timer parameter list and you can press  or  to view and set the parameters of the other groups. This interface provides timer parameter preview; the horizontal axis represents time and the vertical axis represents voltage and current; users can view the values on the current page of the parameter list.

## To Edit the Timer Parameters using Templet

The instrument provides various built-in output templets and users can select and edit the templet as well as create timer parameters based on the templet. The instrument will output according to the parameters currently created.

Press **Timer** → **Timer Set** and press **Templet** to open the templet edit menu.

### 1. Select the editing object

Press **Edit Obj** to select "Voltage" or "current".

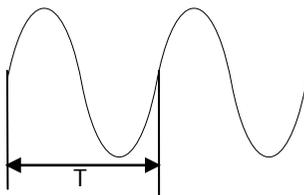
- **Voltage**: when it is selected, press **Current** and use the numeric keyboard or direction keys and knob to set the current value. Then, select the templet and edit the templet parameters. The interface displays the voltage preview.
- **Current**: when it is selected, press **Voltage** and use the numeric keyboard or direction keys and knob to set the voltage value. Then, select the templet and edit the templet parameters. The interface displays the current preview.

### 2. Select the templet

Press **Type** to select the desired templet, including Sine, Pulse, Ramp, Stair Up, Stair Dn, StairUpDn, Exp Rise and Exp Fall.

- **Sine**

The Sine waveform is as shown in the figure below. The instrument determines the Sine amplitude according to the maximum and minimum currently set and determines the Sine period according to the total number of points (denoted by **P**) and the time interval currently set, thus determining the Sine waveform. When creating parameters, the instrument draws **P** values from the preset Sine waveform according to the current time interval.

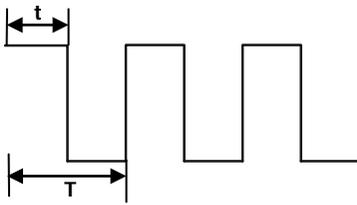


- **Pulse**

The Pulse waveform is as shown in the figure below. The timer parameters created from Pulse waveform only contain two groups of numbers.

The first group: the amplitude (voltage or current) is determined by the high level set; the time equals the pulse width currently set.

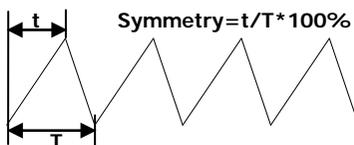
The second group: the amplitude (voltage or current) is determined by the low level set; the time equals the period currently set minus the pulse width currently set.

**Tip**

When Pulse is selected, if you want to output more than 2 groups of timer parameters, you can output the timer parameters created from the Pulse templet repeatedly by increasing the number of cycles.

- **Ramp**

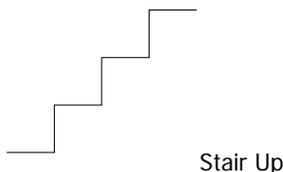
The Ramp waveform is as shown in the figure below. The instrument determines the amplitude of the Ramp according to the maximum and minimum currently set, determines the period according to the total number of points (denoted by **P**) and the time interval currently set and determines the Ramp waveform according to the symmetry (denoted by **Sym**) currently set. When creating parameters, the instrument draws  $\text{int}(P * \text{Sym})$ <sup>[1]</sup> values from the rising edge of the preset Ramp waveform at the same time interval and draws  $P - \text{int}(P * \text{Sym})$  values from the falling edge of the preset Ramp waveform at the same time interval. The timing time is determined by the time interval currently set.



**Note**<sup>[1]</sup>:  $\text{int}(P * \text{Sym})$  refers to rounding  $P * \text{Sym}$  (discard the decimal part).

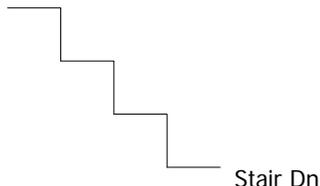
- **Stair Up**

The Stair Up waveform is as shown in the figure below. The instrument determines the Stair Up waveform according to the maximum (denoted by **MAX**), minimum (denoted by **MIN**), total number of points (denoted by **P**,  $P \geq 10$ ) and time interval currently set and creates **P** parameters from **MIN** to **MAX** at the step of  $(\text{MAX} - \text{MIN}) / (P - 1)$ . The timing time is determined by the time interval currently set.



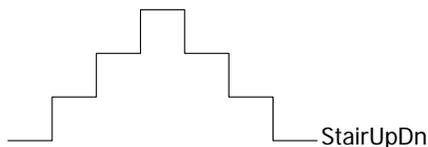
- **Stair Dn**

The Stair Dn waveform is as shown in the figure below. The instrument determines the Stair Dn waveform according to the maximum (denoted by **MAX**), minimum (denoted by **MIN**), total number of points (denoted by **P**) and time interval currently set and creates **P** parameters from **MIN** to **MAX** at the step of  $(\text{MAX}-\text{MIN})/(\text{P}-1)$ . The timing time is determined by the time interval currently set.



- **StairUpDn**

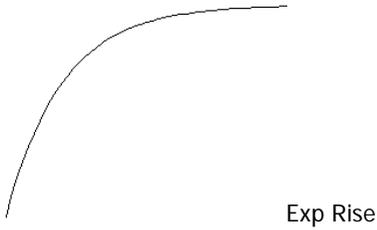
The StairUpDn waveform is as shown in the figure below. The instrument determines the StairUpDn waveform according to the maximum (denoted by **MAX**), minimum (denoted by **MIN**), total number of points (denoted by **P**) and time interval currently set and creates **P** parameters. When **P** is an odd number, the value increase from **MIN** to **MAX** at the step of  $(\text{MAX}-\text{MIN})/\text{int}(\text{P}/2)$ <sup>[1]</sup> and then reduces to **MIN** at the same step. When **P** is an even number, the value increases from **MIN** to **MAX** at the step of  $(\text{MAX}-\text{MIN})/\{\text{int}(\text{P}/2)-1\}$  and then reduces to **MIN** at the step of  $(\text{MAX}-\text{MIN})/\text{int}(\text{P}/2)$ . The timing time is determined by the time interval currently set.



**Note**<sup>[1]</sup>:  $\text{int}(\text{P}/2)$  indicates rounding  $\text{P}/2$ .

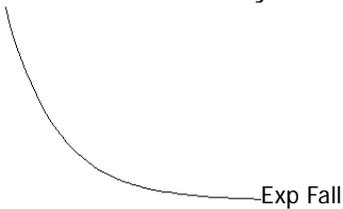
- **Exp Rise**

The Exp Rise waveform is as shown in the figure below. The instrument determines the Exp Rise waveform according to the maximum (denoted by **MAX**), minimum (denoted by **MIN**), total number of points (denoted by **P**), time interval and rise index (denoted by **RiseIndex**) currently set. The waveform function is  $(\text{MAX}-\text{MIN}) * [1 - e^{-i * \text{RiseIndex}/\text{P}}]$ ; wherein, **i** is independent variable and creates **P** groups of parameters from 0 to  $(\text{P}-1)$ . The timing time is determined by the time interval currently set.



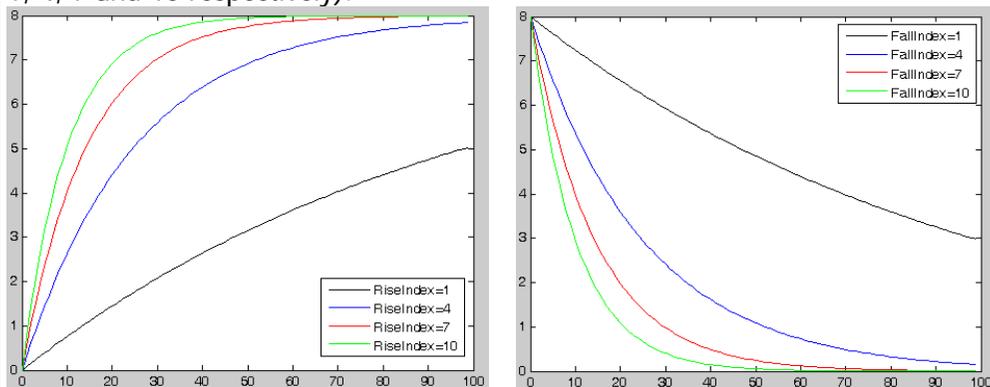
- **Exp Fall**

The Exp Fall waveform is as shown in the figure below. The instrument determines the Exp Fall waveform according to the maximum (denoted by **MAX**), minimum (denoted by **MIN**), total number of points (denoted by **P**), time interval and fall index (denoted by **FallIndex**) currently set. The waveform function is  $(MAX-MIN) * e^{-i * FallIndex / P}$ ; wherein, **i** is independent variable and creates P groups of parameters from 0 to (**P-1**). The timing time is determined by the time interval currently set.



### Note

When the templet currently selected is Exp Rise or Exp Fall, the timer parameters created cannot reach the maximum or minimum due to the characteristic of the exponential function. The range of the timer parameters created is related to the rise index or fall index currently set. The larger the rise index or fall index is, the larger the range of the timer parameters will be, as shown in the figures below (maximum=8, minimum=0, total number of points=100, rise index/fall index are 1, 4, 7 and 10 respectively).



### 3. Edit the templet parameters

After selecting the desired templet, set the templet parameters. For different templates, the parameters to be set are different as shown in Table 2-1.

Table 2-1 Templet Parameters

Templet	Parameter
Sine	Max Value, Min Value, Points, Interval, Inverted
Pulse	Hi Level, Lo Level, Width, Period, Inverted
Ramp	Max Value, Min Value, Points, Interval, Symmetry, Inverted
Stair Up	Max Value, Min Value, Points, Interval
Stair Dn	Max Value, Min Value, Points, Interval
StairUpDn	Max Value, Min Value, Points, Interval
Exp Rise	Max Value, Min Value, Points, Interval, Rise Index
Exp Fall	Max Value, Min Value, Points, Interval, Fall Index

- **Max Value**  
Set the maximum voltage or current of the templet currently selected. The range is related to the channel currently selected.
- **Min Value**  
Set the minimum voltage or current of the templet currently selected. The range is related to the channel currently selected. The minimum cannot be greater than the maximum currently set.
- **Points**  
The total number of points refers to the number of groups of timer parameters created using the templet currently selected. The range is from 10 to 1048.

When the total number of points (denoted by **P**) and the current number of output groups (denoted by **G**) are different, **P** groups of parameters will be created using the templet and then, the number of output groups will change to **P** automatically.

- **Interval**  
The interval refers to the time required for the instrument to output each group of timer parameters created using the templet currently selected and the range is from 1s to 99999s.
- **Inverted**  
When the templet currently selected is Sine, Pulse or Ramp, if **Inverted** is enabled, the instrument will first turn the preset waveform upside down and then create timer parameters.

- **Hi Level**  
When the templet currently selected is Pulse, set the high level of the Pulse and the range is related to the channel currently selected.
- **Lo Level**  
When the templet currently selected is Pulse, set the low level of the Pulse and the range is related to the channel currently selected. The low level should not be greater than the high level currently set.
- **Width**  
When the templet currently selected is Pulse, set the pulse width of the Pulse (namely the duration of high level within a period). The range is from 1 to (Period-1) and the unit is second.
- **Period**  
When the templet currently selected is Pulse, set the period of the Pulse and the range is from 2s to 99999s.

**NOTE**

The actual range of the period is related to the width currently setted.  
The actual range is from (Width+1) to 99999s.

- **Symmetry**  
When the templet currently selected is Ramp, set the symmetry of the Ramp (namely the ratio of the duration of the rising edge within a period to the whole period) and the range is from 0% to 100%.
  - **Rise Index**  
When the templet currently selected is ExpRise, set the rise index of the ExpRise and the range is from 0 to 10.
  - **Fall Index**  
When the templet currently selected is ExpFall, set the fall index of the ExpFall and the range is from 0 to 10.
- 4. Create the timer parameters**  
After setting all the parameters, press **Construct** to construct the timer parameters. The timer parameters constructed are displayed in the timer parameter list as shown in Figure 2-1.

## Save and Read

You can store the timer parameters edited manually or created using the templet in internal or external memory and recall them when required.

### 1. Save

After editing the timer parameters, press **Save** to enter the store and recall interface, the file type is fixed at `*.rtf` and please save the file according to the introduction in **“Store and Recall”**.

### 2. Read

Press **Read** to enter the store and recall interface, the file type is fixed at `*.rtf` and please read the desired file according to the introduction in **“Store and Recall”**. Users can edit the timer file read.

## To Enable the Timer

After setting the timer parameters, return to the timer and delayer setting interface and press **Timer** to enable the timing output. The timing output interface is as shown in the figure below.

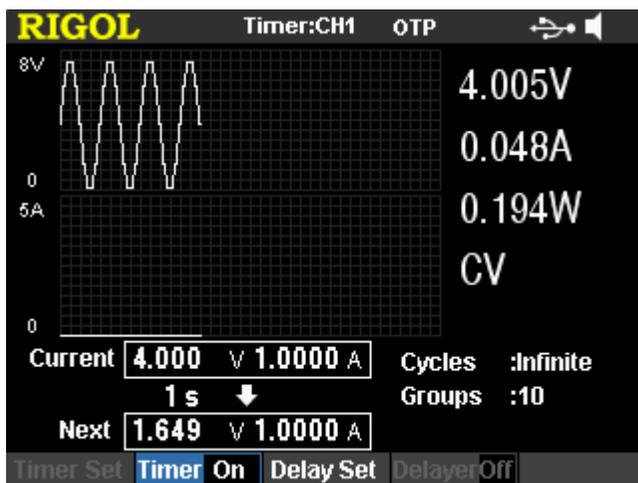


Figure 2-2 Timing Output Interface

### Tip

- Enabling the timer will change the output value of the channel; make sure that the change in the output value will not affect the device connected to the power supply before enabling the timer.
- The timing output is valid only when both the timer and the channel output are turned on.
- When the timer is enabled, the timer parameters cannot be modified and **Delayer** is grayed out and disabled.

## To Set the Delayer Parameters

Press **Timer** → **Delay Set** to enter the delayer parameter setting interface as shown in the figure below. The channel currently selected is displayed in the status bar. Press the channel selection keys to switch channel. This interface provides delayer parameter preview. Users can view the values on the current page of the delayer parameter list. High level indicates turning on the output and low level indicates turning off the output.

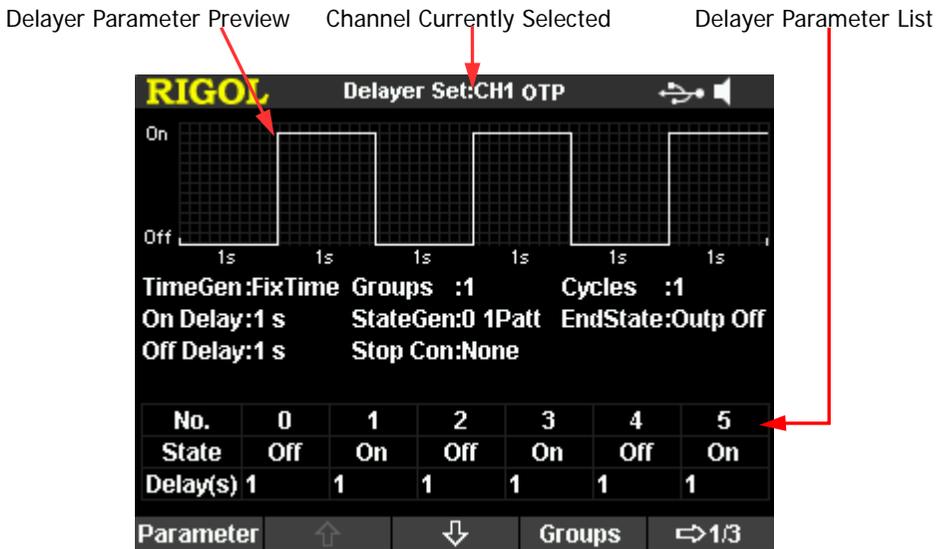


Figure 2-3 Delayer Parameter Setting Interface

### Number of Groups

The number of groups refers to the number of times that the instrument turns on or off the output according to the preset state. Press **Groups** and use the knob or direction keyboard to input the value. The range is from 1 to 2048.

### Number of Cycles

The number of cycles refers to the number of times that the instrument performs delay output according to the preset state. Press **Cycles** to set the number of cycles to "Infinite" or use the knob or numeric keyboard to input the value and the range is from 1 to 99999.

**Tip**

- The total number of groups in each delay output = the number of groups × the number of cycles
- The power supply will terminate the delayer function when the total number of groups of delays is finished. At this point, the state of the power supply depends on the setting of **End State**.

**End State**

The end state refers to the state of the instrument when the delayer stops. Press **End State** to select "Outp On", "Outp Off" or "Last".

- Outp On: the instrument turns on the output automatically.
- Outp Off: the instrument turns off the output automatically.
- Last: the instrument stops at the output state of the last group.

**To Edit the Delayer Parameters Manually**

You can edit the delayer parameters manually. Press **Parameter** and use the numeric keyboard or left/right direction keys or knob to select the number (No.) in the delayer parameter list, use the up/down direction keys to select the state (State) and time (Delay) of the current group respectively. After selecting the state (State), press **OK** to switch to the desired state and after selecting the time (Delay), use the numeric keyboard or left/right direction keys and knob to input the desired value. Use the same method to set the parameters of the other groups.

You need to set the parameters of number 0 to number **(P-1)**; wherein, **P** is the number of output groups currently set. Only 6 groups of parameters can be displayed on each page of the delayer parameter list and you can press  or  to view and set the parameters of the other groups. This interface provides delayer parameter preview and users can view the values on the current page of the delayer parameter list. High level indicates turning on the output and low level indicates turning off the output.

**To Generate State Automatically**

Press **Timer** → **Delay Set** → **State Gen** to select "0 1 Patt" or "1 0 Patt".

- 0 1 Patt: the state is set to "Off" and "On" alternately.
- 1 0 Patt: the state is set to "On" and "Off" alternately.

## To Generate Time Automatically

### 1. Select the generation method

Press **Timer** → **Delay Set** → **Time Gen** → **Method** to select the desired generation method.

- **FixTime**  
Users can set the duration of the “On” or “Off” state.
- **Increase**  
The duration is generated in monotonic increase mode. Users can set the base value and step.
- **Decline**  
The duration is generated in monotonic decline mode. Users can set the base value and step.

### 2. On Delay/Off Delay

When the time generation method is “FixTime”, users can set the duration of the “On” or “Off” state.

On Delay: set the duration of the “On” state and the range is from 1s to 99999s;

Off Delay: set the duration of the “Off” state and the range is from 1s to 99999s.

### 3. Base Val and Step

When the time generation method is “Increase” or “Decline”, set the base value and step of time generation. The two fulfills the relation: time base value + number of output groups\*step ≤99999s.

## Stop Condition

The instrument monitors the output voltage, current and power during delay output. You can set a condition and the instrument stops the delay output when state that fulfills this condition is detected.

Press **Timer** → **Delay Set** → **Stop Con** to set the stop condition to “None”, “< Voltage”, “> Voltage”, “< Current”, “> Current”, “< Power” or “> Power”. After selecting the desired condition, use the numeric keyboard or left/right direction keys and knob to input the desired value.

### Save and Read

You can save the delayer parameters edited manually or generated automatically in internal or external memory and recall them when required.

#### 1. Save

After finishing editing the delayer parameters, press **Save** to enter the store and recall interface, the file type is fixed at `*.rdf` and please save the file according to the introduction in **“Store and Recall”**.

#### 2. Read

Press **Read** to enter the store and recall interface, the file type is fixed at `*.rdf` and please read the desired file according to the introduction in **“Store and Recall”**. Users can edit the delay file read.

### To Enable the Delayer

After setting the delayer parameters, return to the timer and delayer setting interface and press **Delayer** to enable the delay output. The delay output interface is as shown in the figure below.

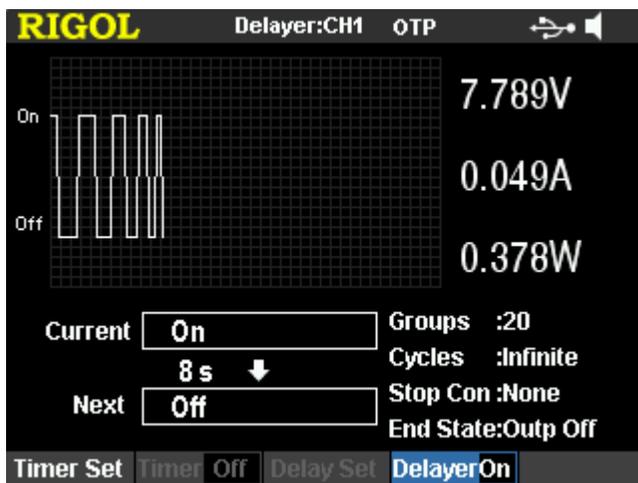


Figure 2-4 Delay Output Interface

#### Tip

- Enabling the delayer will change the output state of the channel. Please make sure that the change of the output state will not affect the devices connected to the power supply before enabling the delayer.
- When the delayer is enabled, the delayer parameters cannot be modified and **Timer** is grayed out and disabled.

## Advanced Functions

DP800A provides various advanced functions, including the recorder, analyzer, monitor and trigger. Press  to open the advanced function setting interface.

1. **Recorder:** record the output state of each channel and store the record file.
2. **Analyzer:** analyze the record file saved.
3. **Monitor:** monitor the output of each channel and turn off the output, display the corresponding prompt message or sound the beeper when the monitor condition is met.
4. **Trigger:** the rear panel provides a digital I/O interface which supports trigger input and trigger output.
  - **Trigger Input:** the data lines of the digital I/O interface receive external trigger signal. The source under control (namely the output channel) turns on the output, turns off the output or inverts the output state when the preset trigger condition is met.
  - **Trigger Output:** the data lines of the digital I/O interface output the level or square signal when the output of the control source (namely the output channel) meets the preset trigger condition.

## Recorder

When the recorder is enabled, users can record the current state of the instrument and if analyzer is installed, users can also analyze the file recorded.

Press  → **Recorder** to open the recorder setting interface. You can turn on or off the recorder function, set the record period and select the store destination.

### 1. Switch

Press **Switch** to turn on or off the recorder and the default is "Off". When the recorder is turned on, the record period and destination cannot be set. The instrument samples and records the output of each channel according to the current record period. When the recorder is turned off, the current record is finished and the instrument prompts you to save the file recorded (press **OK** to save the file).

**Note:** During the record, make sure that the output of each channel is enabled; otherwise, the record data will be 0.

### 2. Record Period

The record period is the time interval at which the instrument samples and records the output of each channel when the recorder is turned on. Before turning on the recorder, please set the record period. Press **Period** and use the numeric keyboard or left/right direction keys and knob to set the record period of the recorder. The range is from 1s to 99999s and the default is 1s.

### 3. Destination

Before turning on the recorder, please select the store destination. Press **Dest** to enter the store and recall interface and the file type is fixed at "\*.rof". You can store the file recorded in internal or external memory. After selecting the desired destination, press **Save**, input the desired filename and press **OK** (for the detailed operations, refer to the introduction in "**Store and Recall**"). After finishing the record, the instrument stores the record file with the specified filename to the specified destination.

## Analyzer

The analyzer can analyze the file recorded and provides the analysis results, including the number of group, median, mode as well as the average, variance, range, minimum, maximum and mean deviation of the voltage, current or power of different channel.

Press  → **Analyzer** to open the analyzer setting interface. You can open the record file stored, set the analyzer parameters, execute the analysis and view the analysis results.

### 1. Open the File

Press **Open File** to enter the store and recall interface, the file type is fixed at "\*.rof", select the desired record file and press **Read**. At this point, the current time and start time are the **record period** of the file opened. When the **groups** of the file opened is less than or equal to 2048, the end time is the maximum record time of the file opened (the product of the **groups** and **record period** of the file opened). When the **groups** of the file opened is greater than 2048, the end time is the product of the **record period** of the file opened and 2048.

The following operations are valid only when valid record file is opened.

### 2. Set the Parameters

#### ● Start Time

Press **Start Time** and use the knob or numeric keyboard to set the start time of the current analysis file. The range is from the **record period** of the file opened to the **end time**.

#### ● End Time

Press **End Time** and use the knob or numeric keyboard to set the end time of the current analysis file. When the **groups** of the file opened is less than or equal to 2048, the range is from the **start time** to the maximum record time of the file opened (the product of the **groups** and **record period** of the file opened). When the **groups** of the file opened is greater than 2048, the range is from the **start time** to the product of the **record period** of the file opened and 2048.

### 3. Execute the Analysis

After opening the record file and setting the start time and end time, press **Analyze** and the instrument will start to analyze according to the current setting.

### 4. View the Analysis Results

#### ● Analysis object

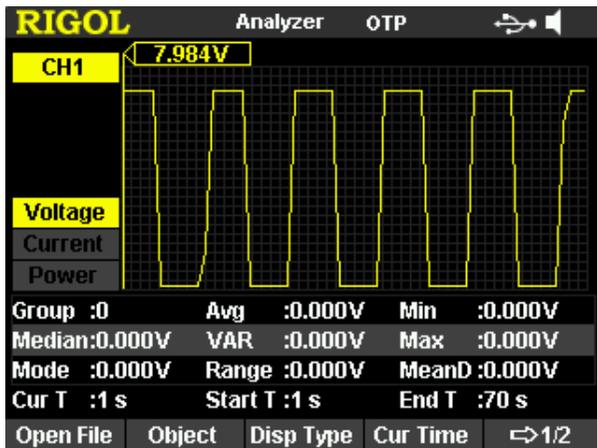
After executing the analysis operation, press **Object** to select voltage, current, power or all and the analysis results of the object currently

selected will be displayed at the bottom of the screen. When "All" is selected, press  or  to switch the current analysis object and view the corresponding analysis results.

- **Display Type**

After opening the record file and setting the start time and end time, the data between the start time and end time in the record file currently opened will be displayed in both figure and table forms on the screen. Press **Disp Type** continuously to switch between figure and table forms.

**Figure:** display the voltage, current and power of the current record file in figure form (the voltage, current or power corresponding to the current time is displayed above the figure) and each group of measurement values of each object are connected in linear interpolation mode, clearly showing the variation tendency. You can press **Object** to switch among voltage, current and power.



**Table:** display each group of voltage, current and power of the current record file in table form.

RIGOL Analyzer OTP				
CH1	Time	Voltage	Current	Power
	1 s	7.984V	0.049A	0.387W
	2 s	7.984V	0.049A	0.387W
	3 s	7.984V	0.049A	0.387W
	4 s	7.984V	0.049A	0.387W
	5 s	7.984V	0.049A	0.387W
	6 s	0.000V	0.048A	0.000W
	7 s	0.000V	0.048A	0.000W
Group :0	Avg	:0.000V	Min	:0.000V
Median:0.000V	VAR	:0.000V	Max	:0.000V
Mode :0.000V	Range	:0.000V	MeanD	:0.000V
Cur T :1 s	Start T	:1 s	End T	:70 s
Open File	Object	Disp Type	Cur Time	↔1/2

- **Current Time**

Use the knob or numeric keyboard to quickly locate each group of data of the current record file between the start time and end time. If the current display mode is figure, the interface will locate the current data using cursor line in the same color of the current analysis channel (the voltage, current or power corresponding to the current time is displayed above the figure). The range is from the **start time** to the **end time**.

**Tip**

You can switch the channel to be analyzed by pressing the channel selection keys.

## Monitor

The monitor can monitor the current output state of the instrument. When the user-defined monitor condition is met, the instrument executes the corresponding operation according to the setting in “**Stop Mode**”.

Press  → **Monitor** to open the monitor setting interface. The status bar shows the channel currently selected. Press the channel selection keys at the front panel to switch the channel.

**Note:** The instrument can monitor the output states of multiple channels simultaneously.

### 1. Monitor Condition

The monitor condition can be any logic combination of the voltage, current and power and users can also set the voltage, current and power values.

Press **Condition** and use the direction keys and  to set the desired monitor condition.

### 2. Voltage

Press **Voltage** and use the numeric keyboard or direction keys and knob to set the voltage in the monitor condition.

### 3. Current

Press **Current** and use the numeric keyboard or direction keys and knob to set the current in the monitor condition.

### 4. Power

Press **Power** and use the numeric keyboard or direction keys and knob to set the power in the monitor condition.

### 5. Stop Mode

Press **Stop Mode**, use the direction keys and  to set the stop mode (“Output Off”, “Warning” and “Beeper”) and multiple modes can be selected. When the channel output state meets the monitor condition set, the instrument will turn off the output, display the corresponding prompt message or sound the beeper according to the stop mode selected.

### 6. Switch

Press **Switch** to turn on or off the monitor function.

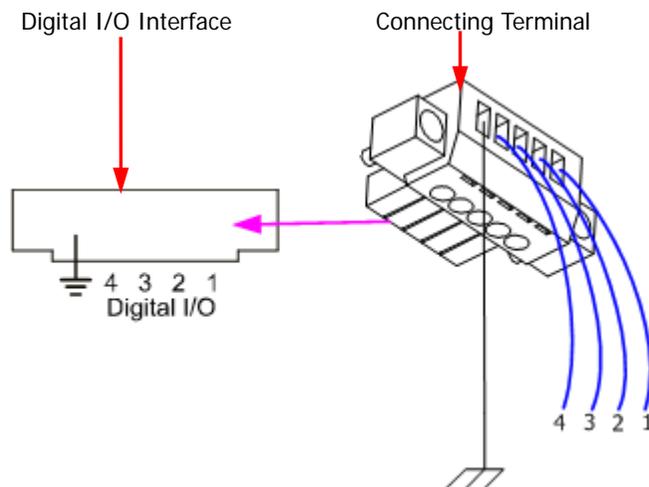
## Trigger

DP800A provides a digital I/O interface at the rear panel. It supports trigger input and trigger output.

- **Trigger Input:**  
The data lines of the digital I/O interface receive external trigger signal. The source under control (namely the output channel) turns on the output, turns off the output or inverts the output state when the preset trigger condition is met.
- **Trigger Output:**  
The data lines of the digital I/O interface output level or square signal when the output of the control source (namely the output channel) meets the preset trigger condition.

The 4 data lines are mutually independent and can be used as trigger input line or trigger output line separately.

The trigger connection method is shown in the figure below.



### Connection Steps:

1. Connect the leads to the connecting terminal according to the figure above. Note the corresponding relationship when connecting.
2. Insert the connecting terminal to the digital I/O interface at the rear panel according to the figure above. Note the corresponding relationship between the connecting terminal and the digital I/O interface when inserting.

Press **[...]** → **Trigger** to open the trigger setting interface as shown in the figure below. Press **Trig** to select “In” or “Out” to switch between the trigger input and trigger output setting interfaces and the default is trigger input.



Figure 2-5 Trigger Setting Interface

### Trigger Input

When signal that meets the current trigger type is inputted on the specified data line, the instrument will turn on or off the output of the specified source under control or toggle the output state of the specified source under control according to the setting in output response.

Press **[...]** → **Trigger** → **Trig** to select “In” to enter the interface as shown in Figure 2-5.

#### 1. Data Line

Press **Data Line** to switch between D0, D1, D2 and D3 and the data line currently selected will be highlighted in the screen. Users can set the trigger conditions of the four data lines respectively.

#### 2. Source under Control

Press **Ctrled Src** to select one or more channels as the source under control.

#### 3. Trigger Type

Press **Trig Type** to select to trigger on the rising edge, falling edge, high level or low level of the input signal.

**NOTE**  
For the input signal, High Level: 2.5V~3.3V; Low Level : 0V~0.8V; Noise Margin: 0.4V.

#### 4. Output Response

Press **Outp Resp** to set the output response type.

- Output On: when the trigger condition is met, turn on the output of the channel currently selected as the source under control.
- Output Off: when the trigger condition is met, turn off the output of the channel currently selected as the source under control.
- Output Toggle: when the trigger condition is met, toggle the output state of the channel currently selected as the source under control.

#### 5. Sensitivity

Press **Sensitivity** to switch the sensitivity between high, middle and low.

Selecting relatively lower trigger sensitivity can avoid mis-trigger at the noise.

#### 6. Enable

Press **Enable** to enable or disable the trigger input. When it is enabled, the instrument triggers when the input signal meets the trigger condition set.

### Trigger Output

When the output of the specified control source meets the trigger condition, the specified data line outputs level or square waveform according to the setting of the output signal.

Press  → **Trigger** → **Trig** to select "Out" to open the trigger output setting interface as shown in the figure below.



Figure 2-6 Trigger Output Setting Interface

#### 1. Data Line

Press **Data Line** to switch between D0, D1, D2 and D3 and the data line currently selected will be highlighted in the screen. Users can set the trigger

conditions of the four data lines respectively.

## 2. Control Source

Press **Ctrl Src** to select any channel as the control source.

## 3. Trigger Condition

Press **Condition** to open the trigger condition setting interface as shown in the figure below and users can set the condition under which the instrument triggers.

- Output Trig: the instrument triggers when the output of the control source is turned on or off. Press **Outp Trig** and use the up/down direction keys to select "OutpClose" or "OutpOpen".
- Voltage Trig: the instrument triggers when the output voltage of the control source meets the trigger condition set. Press **Volt Trig**, use the up/down direction keys to select ">", "<" or "=" and use the numeric keyboard or left/right direction keys or knob to set the corresponding voltage value.
- Current Trig: the instrument triggers when the output current of the control source meets the trigger condition set. Press **Curr Trig**, use the up/down direction keys to select ">", "<" or "=" and use the numeric keyboard or left/right direction keys or knob to set the corresponding current value.
- Power Trig: the instrument triggers when the output power of the control source meets the trigger condition set. Press **PowerTrig**, use the up/down direction keys to select ">", "<" or "=" and use the numeric keyboard or left/right direction keys or knob to set the corresponding power value.
- Auto Trig: when the trigger output is enabled, the instrument triggers automatically.

## 4. Output Signal

Press **Signal** to switch the signal type of the trigger output between "Level" and "Square". When "Level" is selected, the output high level is 2.6V~3.5V and the output low level is 0V~0.4V. When "Square" is selected, press **Period** to set the square period and the range is from 100 $\mu$ s to 2.500000s; press **Duty** to set the duty cycle of the square waveform and the range is from 10% to 90%.

## 5. Polarity

Press **Polarity** to set the polarity of the trigger output signal.

- Positive: output the signal selected in **Signal** when the trigger condition is met.
- Negative: turn the signal selected in **Signal** upside down and then output the signal when the trigger condition is met.

## 6. Enable

Press **Enable** to enable or disable the trigger output. When it is enabled, the instrument triggers when the output signal of the control source meets the trigger condition set.

## Display Setting

Press **Display** at the front panel to enter the interface as shown in the figure below. You can set the screen brightness, contrast, RGB luminance and display mode. Besides, you can also define the start-up interface.

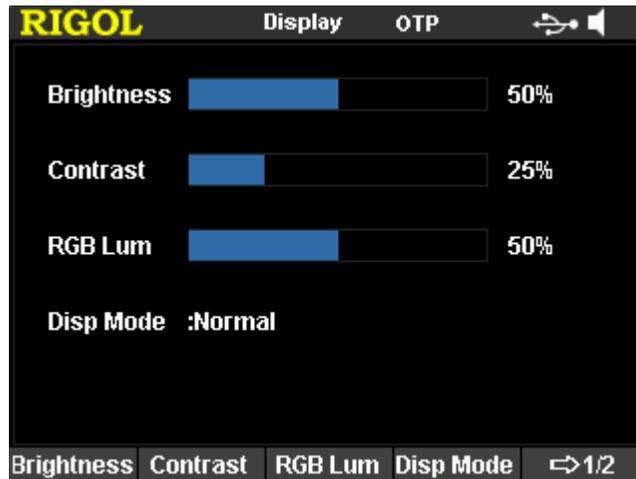


Figure 2-7 Display Setting Interface

### Brightness

Press **Display** → **Brightness** and use the knob or left/right direction keys or numeric keyboard to set the brightness of the screen. The range is from 1% to 100% and the default is 50%. This setting is stored in the non-volatile memory and will not be affected by reset.

### Contrast

Press **Display** → **Contrast** and use the knob or left/right direction keys or numeric keyboard to set the contrast of the screen. The range is from 1% to 100% and the default is 25%. This setting is stored in the non-volatile memory and will not be affected by reset.

### RGB Luminance

Press **Display** → **RGB Lum** and use the knob or left/right direction keys or numeric keyboard to set the RGB luminance of the screen. The range is from 1% to 100% and the default is 50%. This setting is stored in the non-volatile memory and will not be affected by reset.

## Display Mode

Press **Display** → **Disp Mode** to set the display mode to “Normal”, “Waveform” or “Dial”.

- Normal: display the voltage, current and power values of all the channels in number form.
- Waveform: display the voltage, current and power values of the channel currently selected in waveform and digital forms.
- Dial: display the voltage, current and power values of the channel currently selected in dial and digital forms.

**Tip**

When the current display mode is “Normal” or “Waveform”, press  at the front panel to switch between the current display mode and dial display mode.

## User-defined Start-up Interface

DP800A allows users to define the start-up interface. You can store the content to be displayed in an USB storage device in BMP format. Insert the USB storage device into the USB HOST interface at the rear panel of the power supply, select the desired BMP file and set the coordinate of the file in the interface.

Press **Display** → **CustomGUI** to enter the interface as shown in the figure below.



Figure 2-8 User-defined Start-up Interface

- **Open File:**  
Press **Open File**, the instrument enters the store and recall interface and please select the desired BMP file.

**Note:** The internal memory does not support BMP file and please store the content to be displayed in an USB storage device in BMP format. Besides, the size of the picture cannot exceed 320×56 pixels.

- **Coordinate:** set the coordinate of the picture selected in the interface.  
Note: The coordinate set is the coordinate of the upper-left corner of the picture in the interface.

You can display the picture selected in Area 1 and Area 2 as shown in Figure 2-8. Wherein, the coordinate range of Area 1 is from (0,0) to (320,55) and the coordinate range of Area 2 is from (0,145) to (320,220).

Press **Coordinate** and use the numeric keyboard or knob to set the coordinate.

- **Preview:** after selecting the desired bitmap file and setting the coordinate, press **Preview** to preview the user-defined start-up interface. Press any key to exit the preview interface.
- **Save:** save the start-up interface defined and the instrument will display this interface at the next start-up.
- **Boot UI:** switch the current start-up interface to the default start-up interface (as shown in Figure 2-8) or the user-defined start-up interface.

## Store and Recall

DP800A allows users to store various kinds of files in internal or external memory and to recall the files stored when required.

DP800A provides an internal non-volatile memory (C disk) and an external memory (D disk, it is available when an USB storage device is detected at the USB HOST interface at the rear panel).

### 1. C Disk

Provide 10 state file storage locations (STATE 1 to STATE 10), 10 record file storage locations (REC 1 to REC 10), 10 timer file storage locations (TIMER 1 to TIMER 10) and 10 delay file storage locations (DELAY 1 and DELAY 10). Users can store the state file, record file, timer file and delay file in C disk.

### 2. D Disk

When USB storage device is detected at the USB HOST interface at the rear panel, users can store state file, record file, timer file and delay file in the USB storage device, copy the files in C disk to the USB storage device and the number of files can be stored depends on the storage space of the USB storage device.

Besides, you can store the desired content in an USB storage device in BMP format and define it as the start-up interface according to the introduction in "User-defined Start-up Interface".

Press **Store** at the front panel to enable the store and recall function and the store and recall interface is as shown in the figure below.



Figure 2-9 Store and Recall Interface

## Browser

Press **Store** → **Browser** to move the cursor to the directory or file area and then use the knob or up/down direction keys to select the desired directory or file.

## File Type

Press **Store** → **Type** to select the desired file type (including state file, record file, timer file, delay file, bitmap file and all files).

### 1. State File

Store the instrument working state in *“.rsf”* format in internal or external memory. At most 10 instrument states can be stored in the internal memory.

The state file stores the current system state, including the voltage, current, OVP, OCP and track function of each channel as well as the system parameters.

### 2. Record File

When the recorder is enabled, the instrument records the current output state, voltage, current and power of each channel and store them in *“.rof”* format in internal or external memory. At most 10 record files can be stored in the internal memory.

### 3. Timer File

Store the edited timer parameters (the voltage, current and time values of each group of parameters) in *“.rtf”* format in internal or external memory. At most, 10 timer files can be stored in the internal memory.

### 4. Delay File

Store the delayer parameters set (the state and time of each group of parameters) in *“.rdf”* format in internal or external memory. At most, 10 delay files can be stored in the internal memory.

### 5. Bitmap File

You can browse the *“.bmp”* format bitmap files under the current directory. As *“.bmp”* format bitmap files cannot be stored in C disk, the right side of the store and recall interface is blank when the file type is set to *“.bmp”* and the current directory is C disk.

### 6. All File

Display all the files and folders under the directory currently selected. When this menu is selected, the save operation is not available.

## Save

1. Press **Store** → **Type** to select the desired file type.  
Note: The save operation is available only when the file type is `*.rsf`. The `*.rtf` and the `.rdf` files can be saved separately by pressing **Timer** → **Timer Set** → **Save** and **Timer** → **Delay Set** → **Save** and the `*.rof` file is saved automatically in the specified path when you close the recorder.
2. Press **Store** → **Browser** to switch the cursor to the file area and use the knob or up/down direction keys to select the storage location of the file. Press **Save** to open the filename input interface as shown in the figure below.

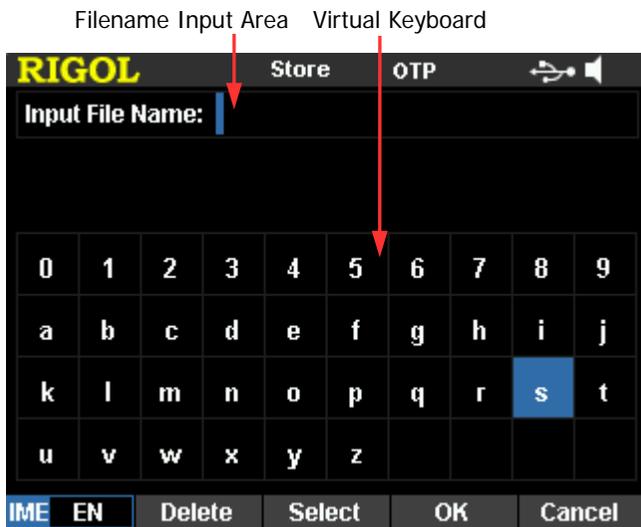


Figure 2-10 Filename Input Interface (English)

3. Input the filename: press **IME** to select "CH" or "EN". Press **.** in the numeric keyboard to switch between English uppercase and lowercase and switch to lowercase before selecting Chinese input method.
  - English Input (including number input)  
Use the knob to select the desired character in the "Virtual Keyboard" and press **Select** to select this character; the character selected is displayed in the "Filename Input Area". Use the same method to input all the characters in the filename. The length of the filename cannot exceed 9 characters. You can press **Delete** to delete the character currently at the left of the cursor in the "Filename Input Area".
  - Chinese Input  
Use the knob to select the desired character in the "Virtual Keyboard" and press **Select** to select this character; the character selected is displayed in

the “Pinyin Input Area” (at this point, you can press **0** in the numeric keyboard to directly input the English characters in the “Pinyin Input Area”). After inputting the pinyin of a Chinese character, select the number of the desired Chinese character using the numeric keyboard in the “Chinese Character Selection Area” (if the desired Chinese character is not displayed currently, use the up/down direction keys to turn to the previous or next page) and the Chinese character selected is displayed in the “Filename Input Area”. Use the same method to input all the Chinese characters in the filename. You can press **Delete** to first delete the character in the “Pinyin Input Area” and then delete the Chinese character currently at the left of the cursor in the “Filename Input Area”.

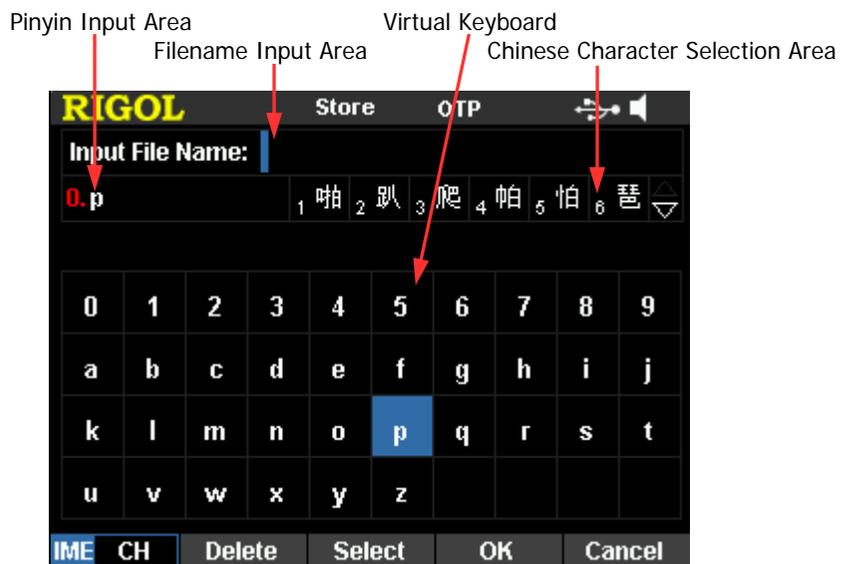


Figure 2-11 Filename Input Interface (Chinese)

4. After inputting the filename in the filename input interface, press **OK** and the instrument stores the file with the specified filename in the specified file type under the directory currently selected. If the storage location selected already contains file, the instrument will prompt whether to overwrite the original file and press **OK** or **Cancel** to finish or give up the save operation.

## Read

1. Press **Store** → **Type** to select the desired file type.  
Note: The read operation is available only when the file type is "\*.rsf" or "All File".  
The "\*.rtf" and the "\*.rdf" files can be read separately by pressing **Timer** → **Timer Set** → **Read** and **Timer** → **Delay Set** → **Read** and the "\*.rof" file can be read by pressing **...** → **Analyzer** → **Open File**.
2. Press **Browser** to switch the cursor to the directory area and select the directory of the file to be read; press **Browser** again to switch to the file area and select the file to be read.
3. Press **Read**, the instrument read the file currently selected. If the current location does not contain a valid file, the corresponding prompt message will be displayed. For state file, the instrument returns to the main interface after the file is successfully read; for other types of files, the instrument returns to the corresponding function interface after the file is successfully read.

## Delete

Delete the files under C disk and D disk as well as the empty folders under D disk.

1. Press **Browser** to move the cursor to the directory area and select the directory of the file to be deleted; press **Browser** again to switch to the file area or the empty folder area and select the file or empty folder to be deleted.
2. Press **Delete** and the prompt message asking whether to delete the file will be displayed. Press **OK** to delete the file or empty folder currently selected.

## Copy

You can only copy the files in C disk to D disk.

1. Press **Browser** to move the cursor to the directory area and select C disk; press **Browser** again to switch to the file area and select the file to be copied.
2. Press **Copy** and the instrument copies the file currently selected.

## Paste

You can only paste the files under C disk to D disk.

1. Copy a file according to the introduction in "**Copy**".
2. Press **Browser** to switch to the directory area and select D disk.
3. Press **Paste**, the instrument pastes the file copied to the current directory and the corresponding prompt message is displayed when the file is successfully pasted.

## Utility

Press **Utility** at the front panel to enter the interface as shown in the figure below. This interface displays the current system parameters.



Figure 2-12 Utility Interface

1. **I/O Config:** set the LAN, RS232 and GPIB (option, extended using the USB to GPIB interface converter) interface parameters.
2. **System:** set the system parameters, such as the beeper and screen saver.
3. **Sys Info:** view system information, such as the device model and serial number.
4. **Language:** set the system language.
5. **Test/Cal:** view the self-test information and calibrate the instrument manually.
6. **Print Set:** print the screen content into the USB storage device.
7. **Preset:** users can define the setting recalled by **Preset** at the front panel.
8. **Option:** install the option or view the current option installation information of the instrument.

## I/O Configuration

DP800A supports USB, LAN, RS232 and GPIB (option, extended using the USB to GPIB interface converter) interfaces, via which you can control DP800A remotely. When the LAN, RS232 or GPIB interface is selected for remote control, please first set the interface parameters.

Press **Utility** → **I/O Config** to open the interface setting menu to set the LAN, RS232 and GPIB interface parameters.

### To Set the LAN Parameters

Before using the LAN interface, use the network cable to connect the instrument to the PC or the network of the PC. Press **Utility** → **I/O Config** → **LAN** to open the LAN parameter setting interface as shown in the figure below. You can view the network status and configure the network parameters.

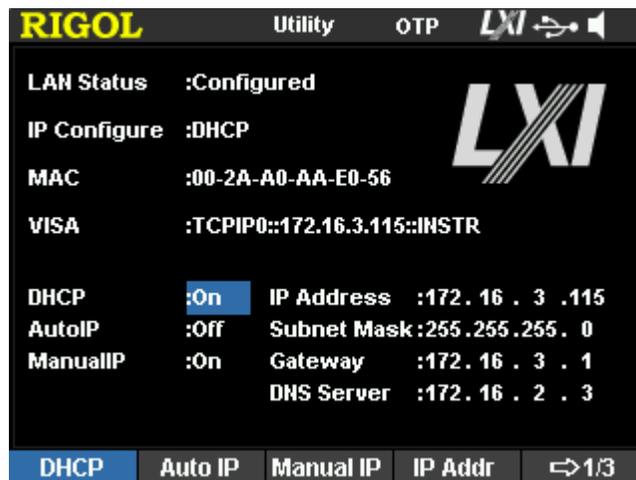


Figure 2-13 LAN Parameter Setting Interface

#### 1. LAN Status

- **Configured:** the network is successfully connected.
- **Disconnect:** the network is not connected or the network connection fails.

#### 2. IP Configuration Mode

There are three IP configuration modes: DHCP, Auto IP and Manual IP. If the current LAN status is "Disconnect", nothing is displayed behind "IP Configure:". In different IP configuration mode, the configuration mode of the network parameters (such as the IP address) is different.

- **DHCP:** in this mode, the DHCP server in the current network assigns network parameters (such as the IP address) for the instrument. Press

**DHCP** to select "On" or "Off" to enable or disable the DHCP configuration mode. By default, the DHCP configuration mode is "On".

- **Auto IP:** in this mode, the instrument acquires the IP address from 169.254.0.1 to 169.254.255.254 and subnet mask 255.255.0.0 according to the current network configuration automatically. Press **Auto IP** to select "On" or "Off" to enable or disable the auto IP configuration mode. By default, the auto IP configuration mode is "On".

Note: When the DHCP and auto IP configuration modes are enabled at the same time, the instrument uses the DHCP configuration mode. Therefore, to use the auto IP configuration mode, **DHCP** should be set to "Off".

- **Manual IP:** in this mode, users define the network parameters (such as the IP address). Press **Manual IP** to select "On" or "Off" to enable or disable the manual IP configuration mode. By default, the manual IP configuration mode is "Off".

Note: When all the three configuration modes are set to "On", the priority order of parameter configuration is "DHCP", "Auto IP" and "Manual IP".

Therefore, to use the manual IP configuration mode, **DHCP** and **Auto IP** should be set to "Off".

#### Tip

- When all the three configuration modes are set to "On", the priority order of parameter configuration is "DHCP", "Auto IP" and "Manual IP".
- The three IP configuration modes cannot all be set to "Off" at the same time.

### 3. MAC Address

The MAC (Media Access Control) address is also called hardware address and is used to define the location of the network device. For a power supply, the MAC address is unique and is usually used to recognize the instrument when assigning IP address for the instrument. The MAC address (48 bits, namely 6 bytes) is usually expressed in hexadecimal form, for example, 00-2A-A0-AA-E0-56.

### 4. VISA Descriptor

VISA (Virtual Instrument Software Architecture) is an advanced application programming interface developed by NI (National Instrument) and is used to communicate with various instrument buses. It uses the same method to communicate with the instrument regardless of the type of the instrument interface (GPIB, USB, LAN/Ethernet or RS232). The instrument communicating with it via the GPIB, USB, LAN/Ethernet or RS232 interface is called "Resource".

VISA descriptor is the resource name and describes the accurate name and location of the VISA resource. If the LAN interface is currently used to communicate with the instrument, the VISA descriptor is :TCPIP0::172.16.3.115::INSTR.

## 5. Set the IP Address

Please acquire a valid IP address from your network administrator firstly and set the IP address manually in manual IP configuration mode.

The format of the IP address is nnn.nnn.nnn.nnn; wherein, the first nnn ranges from 1 to 223 (except 127) and the other three range from 0 to 255.

Press **IP Addr** and use the numeric keyboard and direction keys to input the desired IP address. This setting is stored in the non-volatile memory and the instrument will load the IP address set automatically at the next power-on if **DHCP** and **Auto IP** are set to "Off".

## 6. Set the Subnet Mask

Please acquire a valid subnet mask from your network administrator firstly and set the subnet mask manually in manual IP configuration mode.

The format of the subnet mask is nnn.nnn.nnn.nnn; wherein, the range of nnn is from 0 to 255.

Press **Sub Mask** and use the numeric keyboard and direction keys to input the desired subnet mask. This setting is stored in the non-volatile memory and the instrument will load the subnet mask set automatically at the next power-on if **DHCP** and **Auto IP** are set to "Off".

## 7. Set the Gateway

Please acquire a valid gateway address from your network administrator firstly and set the gateway manually in manual IP configuration mode.

The format of the gateway is nnn.nnn.nnn.nnn; wherein, the first nnn ranges from 1 to 223 (except 127) and the other three range from 0 to 255.

Press **Gateway** and use the numeric keyboard and direction keys to input the desired gateway address. This setting is stored in the non-volatile memory and the instrument will load the gateway address set automatically at the next power-on if **DHCP** and **Auto IP** are set to "Off".

## 8. Set the DNS Server

Please acquire a valid DNS server address from your network administrator firstly and set the DNS (Domain Name Service) address manually in manual IP configuration mode.

The format of the DNS address is nnn.nnn.nnn.nnn; wherein, the first nnn ranges from 1 to 223 (except 127) and the other three range from 0 to 255.

Press **DNS Serv** and use the numeric keyboard and direction keys to input the desired address. This setting is stored in the non-volatile memory and the

instrument will load the server address set automatically at the next power-on if **DHCP** and **Auto IP** are set to "Off".

#### 9. Default Configuration

Press **Def Cfg** and the prompt message "Restore LAN to default?" will be displayed; press **OK** to restore the network parameters to default values. At this point, the DHCP and auto IP configuration modes are enabled and the manual IP configuration mode is disabled.

#### 10. Current Configuration

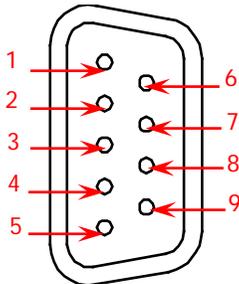
Press **Cur Cfg** to view the MAC address, current network parameters and network status information of the instrument.

#### 11. Apply the Setting

Press **Apply** to apply the network parameters currently set.

## To Set the RS232 Parameters

Connect the RS232 interface to the PC or data terminal equipment (DTE) using RS232 cable and set the interface parameters (baud rate, parity bit, etc.) that match the PC or terminal equipment. At this point, you can control the instrument remotely.



RS232 Interface

Pin	Name	Definition
1	DCD	Data Carrier Detect
2	TXD	Transmitted Data
3	RXD	Received Data
4	DTR	Data Terminal Ready
5	SGND	Signal Ground
6	DSR	Data Set Ready
7	CTS	Clear To Send
8	RTS	Request To Send
9	RI	Ring Indicator

Press **Utility** → **I/O Config** → **RS232** to open the RS232 parameter setting interface.

### 1. Baud Rate

Press **Baudrate** to select the desired baud rate (4800, 7200, 9600, 14400, 19200, 38400, 57600, 115200 or 128000, the unit is Baud).

### 2. Data Bit

Press **Data Bit** to select the desired data bit (5, 6, 7 or 8).

### 3. Stop Bit

Press **Stop Bit** to select the desired stop bit (1 or 2).

### 4. Parity Bit

Press **Parity Bit** to select the desired parity mode ("None", "Odd" or "Even").

### 5. Hardware Flow Control

Press **Flow Ctrl** to enable or disable the hardware flow control. This power supply uses RTS/CTS hardware flow control mode. The instrument monitors the status of the CTS pin. When the status is "True", the instrument sends data; when the status is "False", the instrument stops sending data. The instrument sets the CTS pin to "False" when the input buffer area is almost full and sets the CTS pin to "True" when the input buffer area is available again.

## To Set the GPIB Address

Before using the GPIB interface, use the USB to GPIB interface converter to extend the GPIB interface and then use the GPIB cable to connect the instrument and PC.

Press **Utility** → **I/O Config** → **GPIB** and use the numeric keyboard or direction keys and knob to set the desired address. It can be any integer from 0 to 30 and the default is "2". The selected address is stored in the non-volatile memory.

## System Setting

### Power-on Setting

Select the instrument configuration (“Default” or “Last”) the instrument uses at power-on and the default is “Default”.

- Last: use the system configuration before the last power-off.
- Default: use the factory setting (except those parameters that are not affected by reset). For details, refer to Table 2-2.

Press **Utility** → **System** → **Power On** to select the desired configuration type. This setting is stored in the non-volatile memory and will not be affected by reset.

### Over-temperature Protection

Press **Utility** → **System** → **OTP** to enable or disable the over-temperature protection (OTP) function. When the OTP function is enabled, the instrument turns off the output automatically when the temperature inside the instrument reaches the limit.

### Beeper

Press **Utility** → **System** → **Beeper** to enable or disable the beeper. When the beeper is enabled, the instrument generates prompt sound during front panel operation or when error occurs during remote operation.

### Screen Saver

Press **Utility** → **System** → **Scrn Svr** to enable or disable the screen saver function. When the screen saver function is enabled, the instrument will enter the screen saver mode automatically after standing by for 25 minutes and will enter the black screen state after another 12.5 minutes.

## Keyboard Lock

DP800A allows users to lock the front panel keys to avoid the danger caused by misoperation. Press **Utility** → **System** → **KeyLock** to enable or disable the keyboard lock password. When the keyboard lock password is disabled, press and hold **OK** to lock the front panel keys; at this point, all the front panel keys (except the output on/off key  ) are not available; press and hold this key again to unlock the front panel keys. When the keyboard lock password is enabled, users need to input the correct password to unlock the front panel keys (2012).

## System Information

Press **Utility** → **Sys Info** to view the system information of the instrument, including the model, serial number and digital board version.

## System Language

DP800A supports various system languages.

Press **Utility** → **Language** to select the desired language. This setting is stored in the non-volatile memory and will not be affected by reset.

## Test/Calibration

Press **Utility** → **Test/Cal** to view the calibration state, calibration time and self-test information (include the top board, bottom board, fan and temperature).

Besides, press **Utility** → **Test/Cal** → **ManualCal** and input the correct password to enter the manual calibration interface. At this point, you can perform calibration on the instrument. A default password is assigned to the instrument when it left factory. To acquire the password, please contact **RIGOL**. If you already know the password, you can modify the password (press **Password** and modify the password according to the interface prompts).

### Note

The recommended calibration interval is 1 year. The instrument is calibrated before leaving factory. Calibration by users themselves is not recommended and if calibration is required, please contact **RIGOL**.

## Print

You can store the screen content as a picture file in the USB storage device.

1. Insert the USB storage device into the USB HOST interface at the rear panel. When the USB storage device is detected,  is displayed in the status bar and the corresponding prompt message is displayed.
2. Press **Utility** → **Print Set** → **Print** and the countdown label (5s) is displayed at the left of the status bar. Switch the instrument to the desired interface within the specified time and the instrument stores the screen content in ".bmp" format in the USB storage device. After that, the corresponding prompt message is displayed.

When no USB storage device is currently detected, press **Print** and the message "USB storage device does not exist." will be displayed.

## Preset Setting

Press **Utility** → **Preset** to define the setting recalled by **Preset** at the front panel. Pressing **Preset** can restore the instrument to factory setting or recall the user-defined settings according to the setting of **Preset**.

### Restore to factory setting

Press **Utility** → **Preset** to enter the interface as shown in the figure below and by default, "Default" is selected; at this point, pressing **Preset** at the front panel will restore the instrument to factory setting as shown in Table 2-2. Press **Preset Key** repeatedly to switch between the default and 4 groups of user-defined settings. For details, refer to the introduction in "**Recall the user-defined setting**".

CH1	CH2	CH3
Voltage, Current		
0.000V	00.000V	-00.000V
5.0000A	2.0000A	2.0000A
OVP, OCP		
8.800V	33.000V	-33.000V
5.5000A	2.2000A	2.2000A
Track		
	Off	Off
OTP		
On		

Figure 2-14 Preset Value Type Selecting Interface

Table 2-2 Factory Setting

Parameter	Factory Setting			
	DP831A	DP832A	DP821A	DP811A
<b>Channel Parameters</b>				
CH1 Voltage/Current Setting Values	0.000V/5.0000A	00.000V/3.000A	00.00V/1.0000A	00.000V/05.0000A
CH2 Voltage/Current Setting Values	00.000V/2.0000A	00.000V/3.000A	0.000V/10.000A	
CH3 Voltage/Current Setting Values	-00.000V/2.0000A	0.000V/3.000A		
CH1 Voltage/Current Limits	8.800V/5.5000A	33.000V/3.300A	66.00V/1.1000A	22.000V/11.0000A
CH2 Voltage/Current Limits	33.000V/2.2000A	33.000V/3.300A	8.800V/11.000A	
CH3 Voltage/Current Limits	-33.000V/2.2000A	5.500V/3.300A		
CH1 OVP/OCF State	Off/Off	Off/Off	Off/Off	Off/Off
CH2 OVP/OCF State	Off/Off	Off/Off	Off/Off	
CH3 OVP/OCF State	Off/Off	Off/Off		
CH1 Track On/Off	None	Off	None	None
CH2 Track On/Off	Off	Off	None	
CH3 Track On/Off	Off	None		
CH1 Output On/Off	Off	Off	Off	Off
CH2 Output On/Off	Off	Off	Off	
CH3 Output On/Off	Off	Off		
CH1 Sense On/Off	None	None	None	Off
CH2 Sense On/Off	None	None	Off	
Currently Selected Channel (Range)	CH1	CH1	CH1	Range 1
<b>Display</b>				
Brightness*	50%			
Contrast*	25%			
RGB Luminance*	50%			
Display Mode	Normal			

<b>System Setting</b>	
Language*	Chinese
Power-on Setting*	Default
Print Destination	USB Disk
Print Copies	1
Print Format	BMP
Print Invert	Yes
Print Color	Grayscale
OTP	On
Beeper	On
Screen Saver	Off
Keyboard Lock*	Off
Preset Key	Default
<b>I/O Configuration*</b>	
GPIO Address	2
<b>RS232</b>	
Baud Rate	9600
Data Bit	8
Stop Bit	1
Parity Bit	None
Hardware Flow Control	Off
<b>LAN</b>	
DHCP	On
Auto IP	On
Manual IP	Off

<b>Timer</b>		
Channel	CH1	
Timer On/Off	Off	
Output Groups	1	
Timer Parameters	Volt: 1V; Curr: 1A; Set: 1s	
Cycles	1	
End State	Output Off	
Templet	Sine	
<b>Sine</b>		
Edit Object	Voltage	
Current Value	0A	
Max Value	1V	
Min Value	0V	
Points	10	
Interval	1s	
Inverted	Off	
<b>Delayer</b>		
Channel	CH1	
Delayer On/off	Off	
Output Groups	1	
Delayer Parameter	State: Off, On (alternately)	
Cycles	1	
End State	Output Off	
State Generation	0 1Patt	
Time Generation	FixTime	
FixTime	On Delay	1s
	Off Delay	1s

Increase/ Decline	Base Value	1s
	Step	1s
Stop Condition		None
<b>Recorder</b>		
Recorder Switch		Off
Record Period		1s
Destination		C:\REC 10:RIGOL.ROF
<b>Analyzer</b>		
Channel		CH1
Analysis Object		Voltage
Display		Curve
Current Time		1s
Start Time		1s
End Time		2s
Group		0
Median		0.000V
Mode		0.000V
Average		0.000V
Variance		0.000V
Range		0.000V
Min Value		0.000V
Max Value		0.000V
Mean Deviation		0.000V
<b>Monitor</b>		
Channel		CH1

Monitor Switch	Off	
Monitor Condition	>Volt	
Voltage	Half of the rated value of the CH1	Half of the rated value of the Range 1
Current	Half of the rated value of the CH1	Half of the rated value of the Range 1
Power	The product of the voltage and current above	
Stop Mode	Output Off, Warning, Beeper	
<b>Trigger</b>		
Trig	In	
<b>Trigger Input</b>		
Data Line	D0	
Source under Control	CH1	
Trigger Type	Rise Edge	
Output Response	Output Off	
Sensitivity	Low	
Enable	No	
<b>Trigger Output</b>		
Data Line	D0	
Control Source	CH1	
Trigger Condition	Output Off	
Output Signal	Level	
Square	Period	1s
	Duty	50%
Polarity	Positive	

Enable	No
<b>Store</b>	
Browser	Directory
Directory	C:/
File	The first file
File Type	*.rsf

Note\*: These parameters are not affected by restarting the instrument when “Default” is selected in **Utility** → **System** → **Power On**.

## Recall the user-defined setting

In the interface as shown in Figure 2-14, press **Preset Key** to select and set the 4 groups of user-defined settings. At this point, pressing **Preset** at the front panel will recall the specified setting.

Press **Preset Key** to enter the interface as shown in Figure 2-15 (user-defined setting 1 is selected in the interface). The instrument setting is displayed in the interface. At this point, pressing **Preset** at the front panel will recall the corresponding setting.

Default		1	2	3	4	user1
CH1		CH2	CH3			
Voltage, Current						
1.500V	0.5000A	03.300V	1.0000A	-05.000V	1.0000A	
OVP, OCP						
8.800V	5.5000A	33.000V	2.2000A	-33.000V	2.2000A	
Track						
		Off		Off		
OTP						
On						
Preset Key	Voltage	Current	OVP	Off		⇐1/3

Figure 2-15 User-defined Setting Interface

You can modify the parameters of the user-defined setting currently selected.

- Press the channel selection key at the front panel to select the desired channel.
- Press the menu key to modify the voltage, current, OVP, OCP, track and OTP parameters.
- You can restore the user-defined parameters modified to default values by pressing **Default** in the last menu page in the interface as shown in Figure 2-15.

You can also rename the 4 groups of user-defined settings (the default names are user1 to user4) and the name is displayed at the upper-right corner of the interface as shown in Figure 2-15. Press **Preset Key** and use the left/right direction keys and knob to edit the name.

## Option

Press **Utility** → **Option** to enter the option interface and you can view the option installation information. Press **Install** to enter the filename input interface, the input method is fixed at "EN", input the correct serial number and press **OK**.

**Note:** For DP800A series power supply, the six functions listed in the option interface are standard functions and users do not need to install.

## Chapter 3 Remote Control

DP800A series power supply can be controlled remotely via the following two modes.

### User-defined programming

Users can program and control the instrument by using the SCPI (Standard Commands for Programmable Instruments) commands. For more information about the commands and programming, refer to the Programming Guide.

### Use PC software provided by RIGOL or other manufacturers

Users can use the PC software **Ultra Sigma** of **RIGOL, Measurement & Automation Explorer** of **NI** (National Instruments Corporation) or **Agilent IO Libraries Suite** of **Agilent** (Agilent Technologies, Inc.) to send commands to control the instrument remotely.

This power supply can communicate with PC through USB, LAN, RS232 and GPIB (with the USB to GPIB interface converter provided by **RIGOL**) instrument buses. This chapter will give a detailed introduction of how to use **Ultra Sigma** to control the power supply (take DP831A as an example) remotely through various interfaces. For the **Ultra Sigma** software, please contact **RIGOL** salesmen or technical support.

The contents of this chapter are as follows:

- Remote Control via USB
- Remote Control via LAN
- Remote Control via GPIB
- Remote Control via RS232

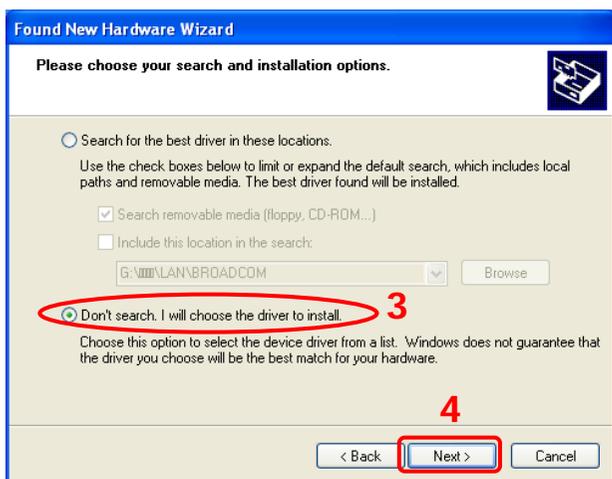
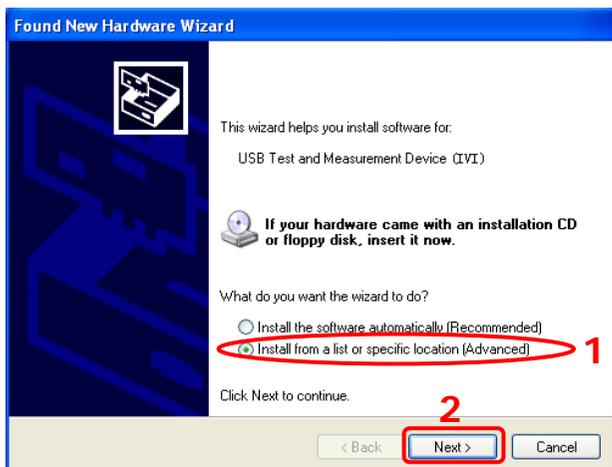
# Remote Control via USB

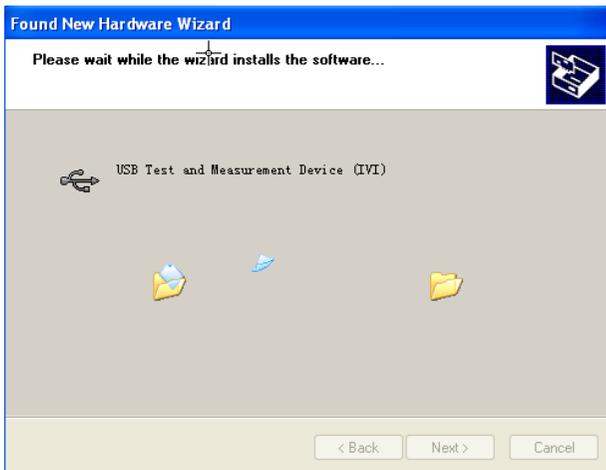
## 1. Connect the device

Connect the USB DEVICE interface at the rear panel of DP831A with your PC using a USB cable.

## 2. Install the USB driver

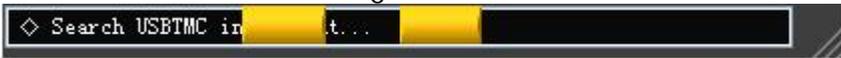
This power supply is a USB-TMC device. Assuming that your PC has already been installed with **Ultra Sigma**, after you connect the power supply to the PC and turn both on for the first time (the power supply is automatically configured to USB interface), the New Hardware Wizard as shown in the figure below is displayed on the PC. Please install the "USB Test and Measurement Device (IVI)" driver following the directions in the wizard. The steps are as follows.





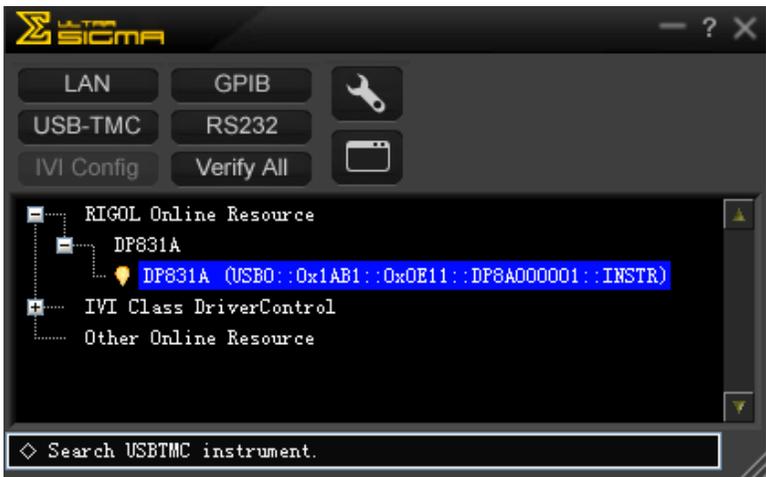
### 3. Search device resource

Start up the **Ultra Sigma** and the software will automatically search for the power supply resources currently connected to the PC. You can also click **USB-TMC** to search the resources. During the search, the status bar of the software is as shown in the figure below.



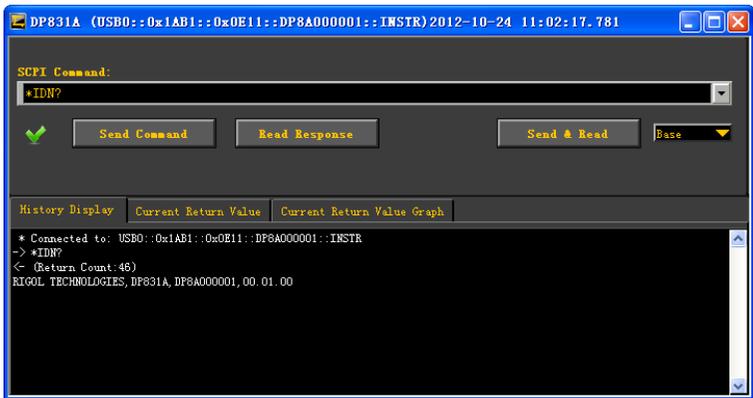
### 4. View the device resource

The resources found will appear under the "RIGOL Online Resource" directory and the model number and USB interface information of the instrument will also be displayed as shown in the figure below.



### 5. Communication test

Right click the resource name "DP831A (USB0::0x1AB1::0x0E11::DP8A000001::INSTR)" to select "SCPI Panel Control" to turn on the remote command control panel (as shown in the figure below) through which you can send commands and read data.



## Remote Control via LAN

### 1. Connect the device

Connect the power supply to your PC or the LAN of your PC using a network cable.

### 2. Configure network parameters

#### 1) DHCP mode:

If the network supports DHCP, the DHCP server in the network assigns network parameters (IP Address, Subnet Mask, Gateway and DNS) for the power supply automatically.

#### 2) Auto IP mode:

When the network doesn't support DHCP, the DHCP mode of the power supply is disabled or the power supply is connected to the PC directly, the power supply selects Auto IP mode and acquires the IP address from 169.254.0.1 to 169.254.255.254 and subnet mask 255.255.0.0 automatically.

#### 3) Manual IP mode:

Enable the Manual IP mode and disable the DHCP mode as well as the Auto IP mode to set the network parameters manually.

If the power supply is connected to the PC directly, set the IP Addresses, Subnet Masks and Gateways for both of the PC and the power supply. The Subnet Masks and Gateways of the power supply and PC must be the same and the IP Addresses of them must be within the same network segment (for details, refer to the TCP/IP protocol). An example is shown in the table below.

Network Parameters	PC	Power Supply
IP Address	192.16.3.3	192.16.3.8
Subnet Mask	255.255.255.0	255.255.255.0
Default Gateway	192.16.3.1	192.16.3.1

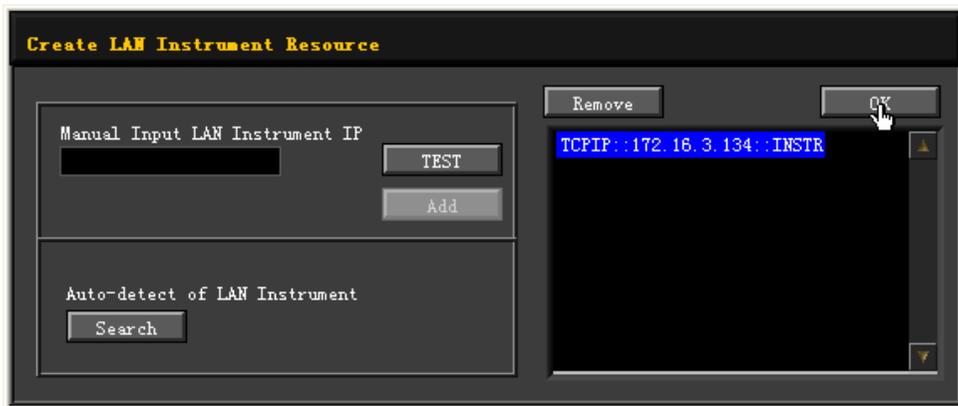
If your power supply is connected to the LAN of your PC, please acquire a set of valid network parameters (IP Address, Subnet Mask, Gateway and DNS) and configure the network parameters of the power supply according to the description in **"To Set the LAN Parameters"**.

### 3. Search device resource

Start up the **Ultra Sigma** and click **LAN**. The window as shown in figure (a) is displayed. Click **Search** and the software searches for the instrument resources currently connected to the LAN and the resources found are displayed at the right of the window as shown in figure (b). Click **OK** to add them.



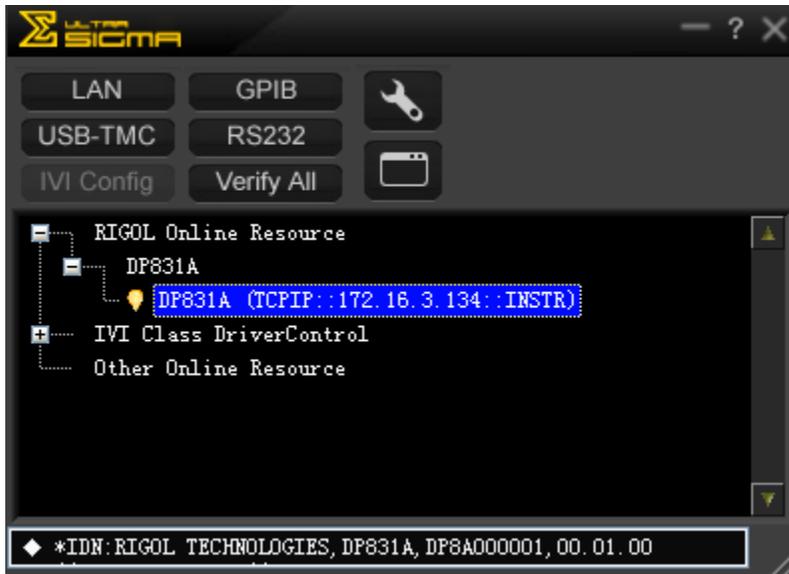
(a)



(b)

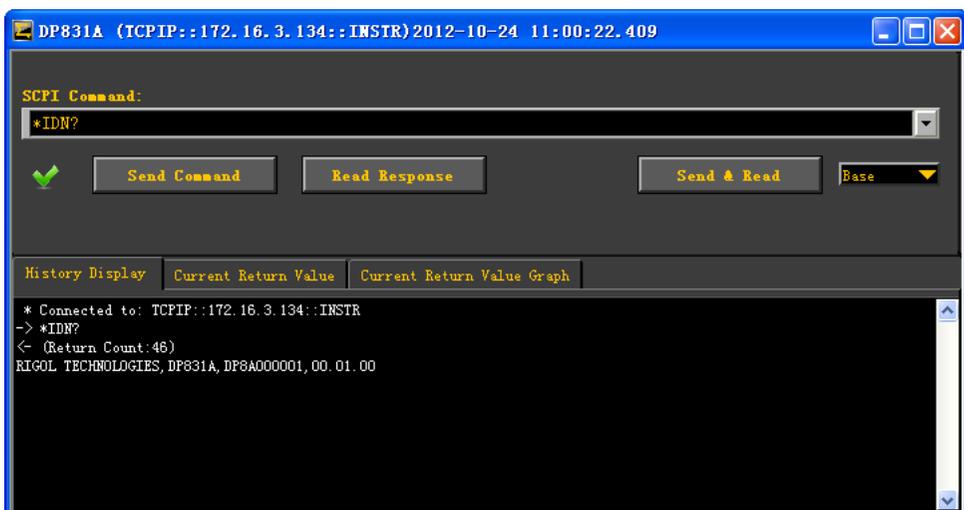
#### 4. View device resource

The resources found will appear under the “RIGOL Online Resource” directory as shown in the figure below.



#### 5. Communication test

Right click the resource name “DP831A (TCPIP::172.16.3.134::INSTR)” to select “SCPI Panel Control” to turn on the remote command control panel (as shown in the figure below) through which you can send commands and read data.



## 6. Load LXI webpage

As this power supply conforms to LXI Core Device 2011 standards, you can load LXI webpage through **Ultra Sigma** (right-click the resource name and select LXI-Web; or directly input the IP address in the browser). Various important information about the instrument (including the model, manufacturer, serial number, description, MAC address and IP address) will be displayed on the webpage.

## Remote Control via GPIB

### 1. Connect the device

Use the USB to GPIB interface converter to extend a GPIB interface for the power supply. Then, connect the power supply to your PC using a GPIB cable.

### 2. Install the driver of GPIB card

Install the driver of the GPIB card which has been connected to the PC correctly.

### 3. Set the GPIB address

Set the GPIB address of the power supply according to the description in “**To Set the GPIB Address**”.

### 4. Search device resource

Start up the **Ultra Sigma** and click **GPIB** to open the panel as shown in the figure below. Click “Search” and the software will search the GPIB instrument resources connected to the PC. The device resources will be displayed on the right side of the panel.



#### If resources cannot be found automatically:

- Select the GPIB card address of the PC from the comboBox of “GPIB::” and select the GPIB address set in the power supply from the comboBox of “::INSTR”.
- Click “Test” to check whether the GPIB communication works normally; if not, please follow the corresponding prompt messages to solve the problem.

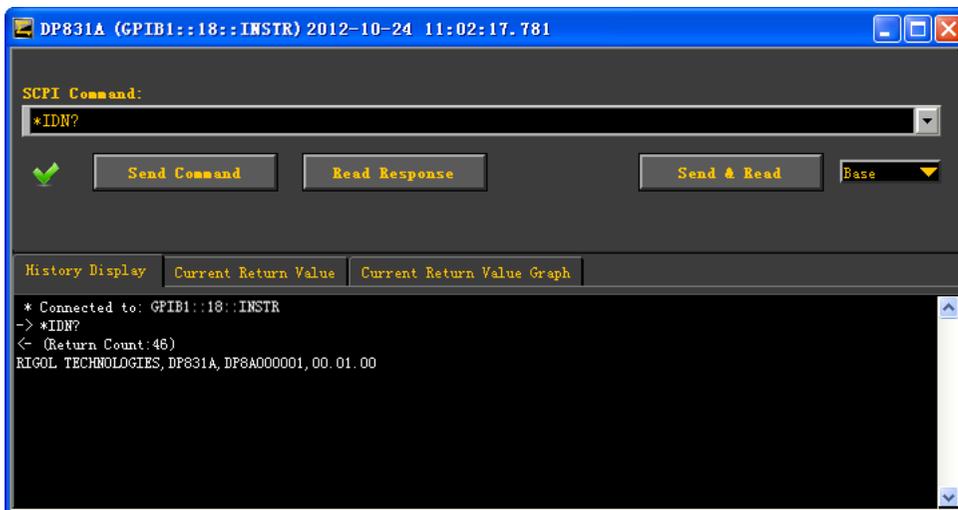
### 5. View device resource

Click "OK" to return back to the main interface of Ultra Sigma. The resources found will appear under the "RIGOL Online Resource" directory as shown in the figure below.



### 6. Communication Test

Right-click the resource name "DP831A (GPIB0::18::INSTR)" to select "SCPI Panel Control" to turn on the remote command control panel through which you can send commands and read data as shown in the figure below.



## Remote Control via RS232

### 1. Connect the device

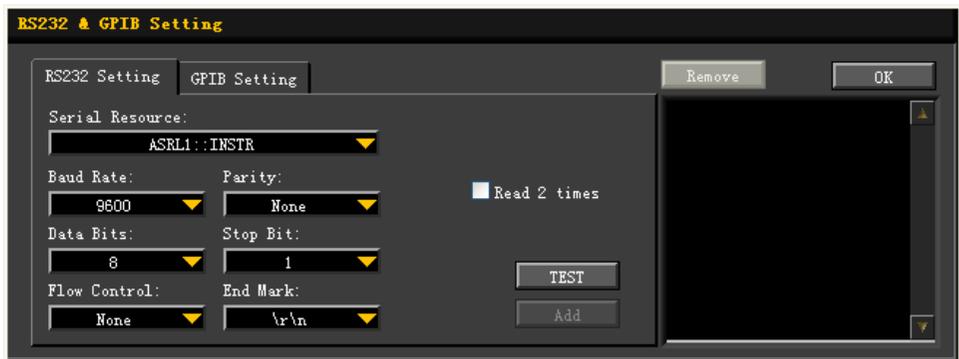
Connect the power supply to your LAN using a RS232 cable.

### 2. Set the RS232 parameters

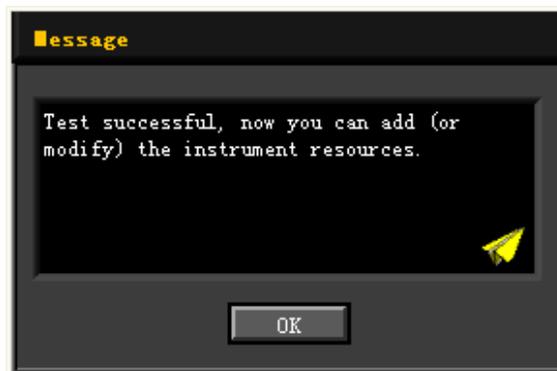
Press **Utility** → **I/O** → **RS232** to set the parameters relating to RS232 according to the introduction in “To Set the RS232 Parameters”.

### 3. Add device resource

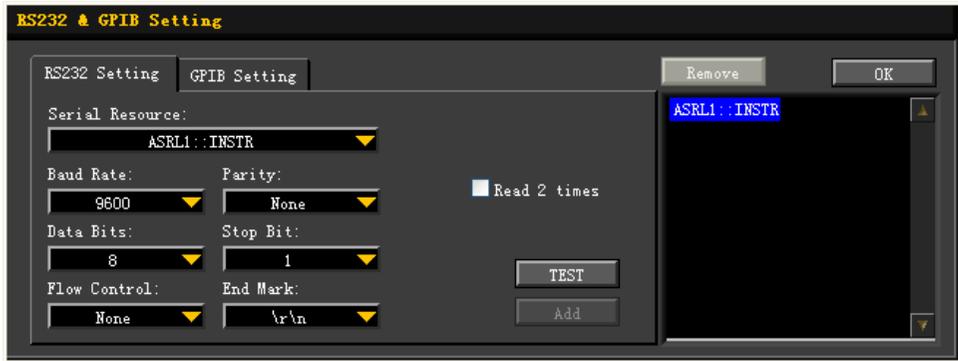
Start up the **Ultra Sigma** and click **RS232** to open the panel as shown in figure (a). Select the device resource name to be added and set the parameters in the panel (such as the baud rate and parity bit) as shown in figure (a) according to the RS232 parameter setting of the instrument (Note: `\r\n` must be selected as the End Mark). After that, click “TEST” and the dialog box as shown in figure (b) is displayed. Click **OK**; at this point, **Add** is highlighted, press this key and the device resource descriptor currently selected will be displayed at the right of the panel. Select the resource name and click **OK** to add it as shown in figure (c).



(a)



(b)



(c)

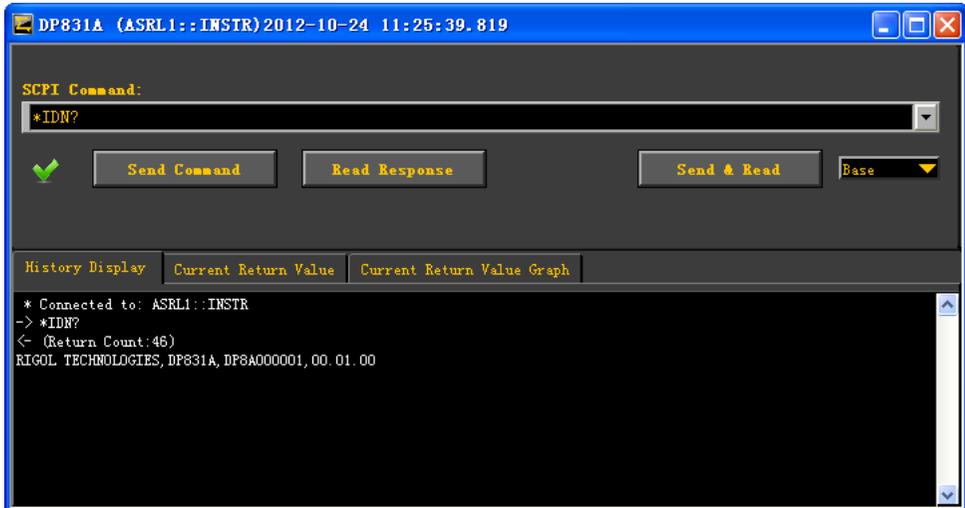
#### 4. View device resource

The RS232 device resource name added will appear under the “RIGOL Online Resource” directory as shown in the figure below.



## 5. Communication test

Right click the resource name “DP831A (ASRL1::INSTR)” to select “SCPI Panel Control” to turn on the remote command control panel (as shown in the figure below) through which you can send commands and read data.





## Chapter 4 Troubleshooting

The following failures might occur when using this instrument. Please solve the problem according to the following method; if the problem remains, please contact **RIGOL** and provide the device information of your instrument (**Utility** → **Sys Info**).

### 1. The instrument does not start.

- (1) Check the power cord connection.
- (2) Check whether the power switch at the front panel is turned on.
- (3) Remove the power cord and check whether the voltage selector is at the proper scale and whether the fuse specification is correct and the fuse is in good condition. To replace the fuse, refer to “**To Replace the Fuse**”.
- (4) If the problem remains, please contact **RIGOL**.

### 2. The constant voltage output is abnormal.

- (1) Check whether the maximum output power of the scale selected fulfills the load requirement. If yes, turn to the next step.
- (2) Check whether the cable connecting the load and power supply is short-circuited and whether it is in good contact.
- (3) Check whether the load works normally.
- (4) Check whether the current setting value of this scale is proper; if it is too low, increase the current setting value properly.
- (5) If the problem remains, please contact **RIGOL**.

### 3. The constant current output is abnormal.

- (1) Check whether the maximum output power of the scale selected meets the requirement of the load. If yes, turn to the next step.
- (2) Check whether the cable connecting the load and power supply is short-circuited and whether it is in good contact.
- (3) Check whether the load works normally.
- (4) Check whether the voltage setting value of this scale is proper; if it is too low, increase the voltage setting value properly.
- (5) If the problem remains, please contact **RIGOL**.

### 4. The USB storage device cannot be recognized.

- (1) Check whether the USB storage device can work normally.
- (2) Make sure the USB storage device used is Flash storage type, as this instrument does not support hardware storage type USB storage device.
- (3) Restart the instrument and insert the USB storage device to check it.
- (4) If the USB storage device still cannot work normally, please contact **RIGOL**.



## Chapter 5 Specifications

All the specifications are guaranteed when the instrument has been working for more than 30 minutes under the specified operation temperature. Unless otherwise noted, the specifications are applicable to all the channels of the specified model.

Model	DP831A	DP832A	DP821A	DP811A	
Channel	3		2	1 (2 ranges)	
<b>DC Output (0°C to 40°C)</b>					
Voltage/ Current (rated value)	CH1	0~8V/0~5A	0~30V/0~3A	0~60V/0~1A	Range 1: 0~20V/0~10A Range 2: 0~40V/0~5A
	CH2	0~+30V/0~2A	0~30V/0~3A	0~8V/0~10A	
	CH3	0~-30V/0~2A	0~5V/0~3A		
OVP/OCP (maximum range can be set)	CH1	1mV~8.8V/0.1mA~5.5A	1mV~33V/1mA~3.3A	1mV~66V/0.1mA~1.1A	Range 1: 1mV~22V/0.1mA~11A Range 2: 1mV~44V/0.1mA~5.5A
	CH2	1mV~33V/0.1mA~2.2A	1mV~33V/1mA~3.3A	1mV~8.8V/1mA~11A	
	CH3	-1mV~-33V/0.1mA~2.2A	1mV~5.5V/1mA~3.3A		
<b>Load Regulation Rate ± (Output Percentage + Offset)</b>					
Voltage	<0.01%+2mV				
Current	<0.01%+250μA				
<b>Linear Regulation Rate ± (Output Percentage + Offset)</b>					
Voltage	<0.01%+2mV				
Current	<0.01%+250μA				

<b>Ripples and Noise (20 Hz to 20 MHz)</b>					
Normal Mode Voltage	<350µVrms/2mVpp				
Normal Mode Current	<2mArms				
<b>Annual Accuracy <sup>[1]</sup> (25°C±5°C) ± (Output Percentage + Offset)</b>					
Programming					
Voltage	CH1	0.1%+5mV	0.05%+20mV	<0.1%+25mV	0.05%+10mV
	CH2	0.05%+20mV	0.05%+20mV	<0.05%+10mV	
	CH3	0.05%+20mV	0.1%+5mV		
Current	CH1	0.2%+10mA	0.2%+5mA	0.2%+10mA	0.1%+10mA
	CH2	0.2%+5mA	0.2%+5mA	0.2%+10mA	
	CH3	0.2%+5mA	0.2%+5mA		
Readback					
Voltage	CH1	0.1%+5mV	0.05%+10mV	<0.1%+25mV	0.05%+10mV
	CH2	0.05%+10mV	0.05%+10mV	0.05%+5mV	
	CH3	0.05%+10mV	0.1%+5mV		
Current	CH1	0.2%+10mA	0.15%+5mA	0.15%+10mA	0.1%+10mA
	CH2	0.1%+5mA	0.15%+5mA	0.15%+10mA	
	CH3	0.1%+5mA	0.15%+5mA		
<b>Resolution</b>					
Programming					
Voltage	1mV	1mV	CH1: 10mV CH2: 1mV	1mV	
Current	CH1: 0.3mA CH2/CH3: 0.1mA	1mA	CH1: 0.1mA CH2: 1mA	0.5mA	
Readback					

Voltage	0.1mV	0.1mV	1mV	0.1mV	
Current	0.1mA	0.1mA	CH1: 0.1mA CH2: 1mA	0.1mA	
Display					
Voltage	1mV	1mV	1mV	1mV	
Current	1mA	1mA	CH1: 0.1mA CH2: 1mA	1mA	
<b>Transient Response Time</b>					
Less than 50 $\mu$ sec for output to recover to within 15 mV following a change in output current from full load to half load or vice versa.					
<b>Command Processing Time</b> <sup>[2]</sup>					
<100ms					
<b>Temperature Coefficient per °C (Output Percentage + Offset)</b>					
Voltage	0.01%+2mV	CH1/CH2: 0.01%+5mV CH3: 0.01%+2mV	0.01%+3mV	0.01%+3mV	
Current	0.02%+3mA	0.01%+2mA	0.02%+3mA	0.02%+3mA	
<b>Stability</b> <sup>[3]</sup> $\pm$ (Output Percentage + Offset)					
Voltage	CH1: 0.03%+1mV CH2/CH3: 0.02%+2mV	CH1/CH2: 0.02%+2mV CH3: 0.01%+1mV	0.02%+1mV	0.02%+1mV	
Current	CH1: 0.1%+3mA CH2/CH3: 0.05%+1mA	0.05%+2mA	0.1%+1mA	0.1%+1mA	
<b>Voltage Programming Control Speed (1% within the total variation range)</b>					
Rise	Full Load	CH1: <11ms CH2/CH3: <50ms	CH1/CH2: <50ms CH3: <11ms	CH1: <800ms CH2: <50ms	<20ms
	No Load	CH1: <10ms CH2/CH3: <25ms	CH1/CH2: <25ms CH3: <10ms	<30ms	<20ms
Fall	Full Load	CH1: <13ms CH2/CH3: <30ms	CH1/CH2: <30ms CH3: <13ms	<50ms	<50ms

	No Load	CH1: <200ms CH2/CH3: <400ms	CH1/CH2: <400ms CH3: <200ms	CH1: <800ms CH2: <400ms	<400ms
<b>OVP/OCP</b>					
Accuracy ± (Output Percentage + Offset)	0.5%+0.5V/0.5%+0.5A				
Activation Time	1.5ms (OVP≥3V) <10ms (OVP<3V and OCP)				
<b>Mechanical</b>					
Dimensions	239mm(W) x 157mm(H) x 418mm(D)				
Weight	9.75kg	10.5kg	10.0kg	10.3kg	
<b>Power</b>					
AC Input (50Hz-60Hz)	100Vac±10%, 115Vac±10%, 230Vac±10% (maximum 250VAC)				
<b>I/O</b>					
USB Device	1				
USB Host	1				
LAN	1				
RS232	1				
Digital IO	1				
USB-GPIB	Option				
Rear Output Interface					1
<b>Environment</b>					
Working Temperature	Full Rated Value Output: 0°C to 40°C Under Relatively Higher Temperature: the linearity of the output current reduces to 50% at the highest temperature 55°C		Full Rated Value Output: 0°C to 40°C Under Relatively Higher Temperature: the linearity of the output current reduces to 50% at the highest temperature 55°C or the fuse is blown		Full Rated Value Output: 0°C to 40°C Under Relatively Higher Temperature: the linearity of the output current reduces to 50% at the highest temperature 55°C
Cooling Method	Fan Cooling				

**Note:**

- [1] The accuracy parameters are acquired via calibration under 25°C after 1-hour warm-up.
- [2] The maximum time required for the output to change accordingly after receiving the APPLy and SOURce commands.
- [3] The variation of the output within 8 hours after 30-minute warm-up when the load circuit and environment temperature are constant.



## Chapter 6 Appendix

### Appendix A: Accessories and Options

	Description	Order NO.
<b>Model</b>	Programmable Linear DC Power Supply (Three-channel)	DP831A
	Programmable Linear DC Power Supply (Three-channel)	DP832A
	Programmable Linear DC Power Supply (Dual-channel)	DP821A
	Programmable Linear DC Power Supply (Single channel)	DP811A
<b>Standard Accessories</b>	Power Cord	--
	USB Cable	CB-USBA-USBB-FF-150
	Resource CD (including the User's Guide, etc.)	--
	Fuse (50T-025H 250V 2.5A)	--
	Short-circuit Equipment	--
	Quick Guide (Hard Copy)	--
	Digital I/O Interface Connecting Terminals	Terminal-Digital I/O-DP800
Rear Output Interface Connecting Terminals	Terminal-RearOutput-DP800	
<b>Optional Accessories</b>	USB to GPIB Interface Converter	USB-GPIB
	DP800 Series Rack Mount Kit (for single instrument)	RM-1-DP800
	DP800 Series Rack Mount Kit (for dual instruments)	RM-2-DP800

Note: For all the accessories and options, please contact the local office of **RIGOL**.

## Appendix B: Warranty

**RIGOL** warrants that its products mainframe and accessories will be free from defects in materials and workmanship within the warranty period.

If a product is proven to be defective within the respective period, **RIGOL** guarantees the free replacement or repair of products which are approved defective. To get repair service, please contact with your nearest **RIGOL** sales and service office.

**RIGOL** does not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hint guarantee items related to tradable characteristic and any particular purpose. **RIGOL** will not take any responsibility in cases regarding to indirect, particular and ensuing damage.

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