

RIGOL

User's Guide

DP800A Series Programmable Linear DC Power Supply

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RIGOL Technologies, Inc.

Guaranty and Declaration

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Safety Requirement

General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injuries or damages 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 by 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.

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.

Replace the Fuse.

Please use fuse that matches the voltage selected at the voltage selector of the power supply at the rear panel.

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.

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.

Handling Safety.

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

Safety Terms and Symbols

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



WARNING

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



CAUTION

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

Terms 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 a potential damage to the instrument or other property might occur.

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



Hazardous Voltage



Safety Warning



Protective Earth Terminal



Chassis Ground



Test Ground

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.



WARNING

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

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
- Provide delay on/off output function and support infinite or specified number of cycles of channel on/off toggle
- 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
- 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-C class 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 accessory list, warranty information as well as service and support information of DP800A.

Index

Provide keyword search to quickly locate the desired information.

Tip

For the newest version of this manual, download it from www.rigol.com .
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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 denoted 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

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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

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

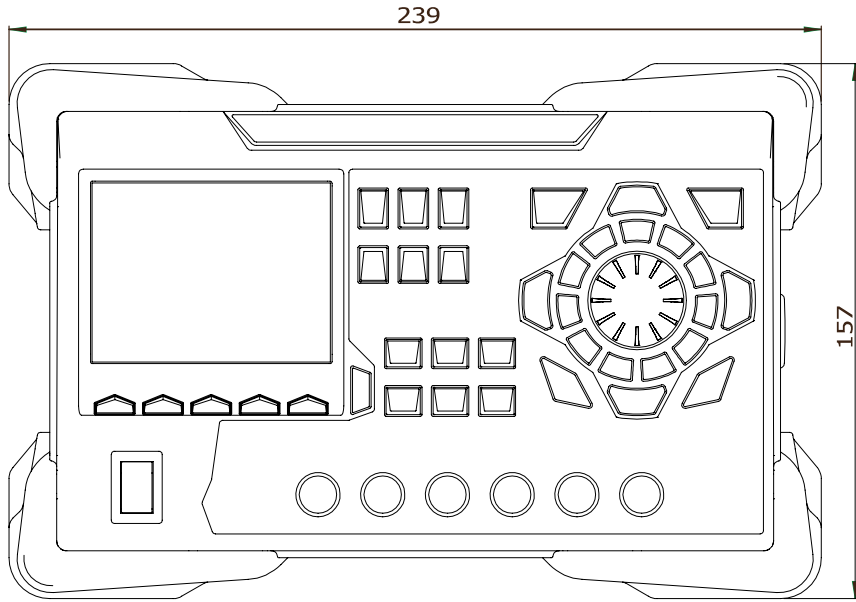


Figure 1-1 Front View

Unit: mm

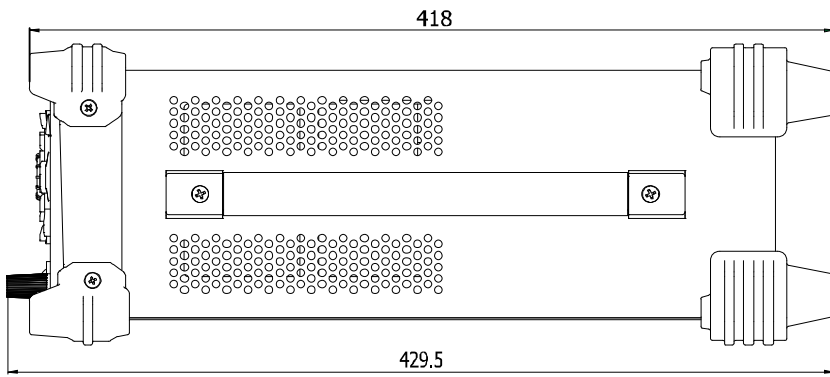


Figure 1-2 Side View

Unit: mm

Front Panel

The front panel of DP800A is as shown in Figure 1-3. This section gives a brief introduction of the function of each part at the front panel.

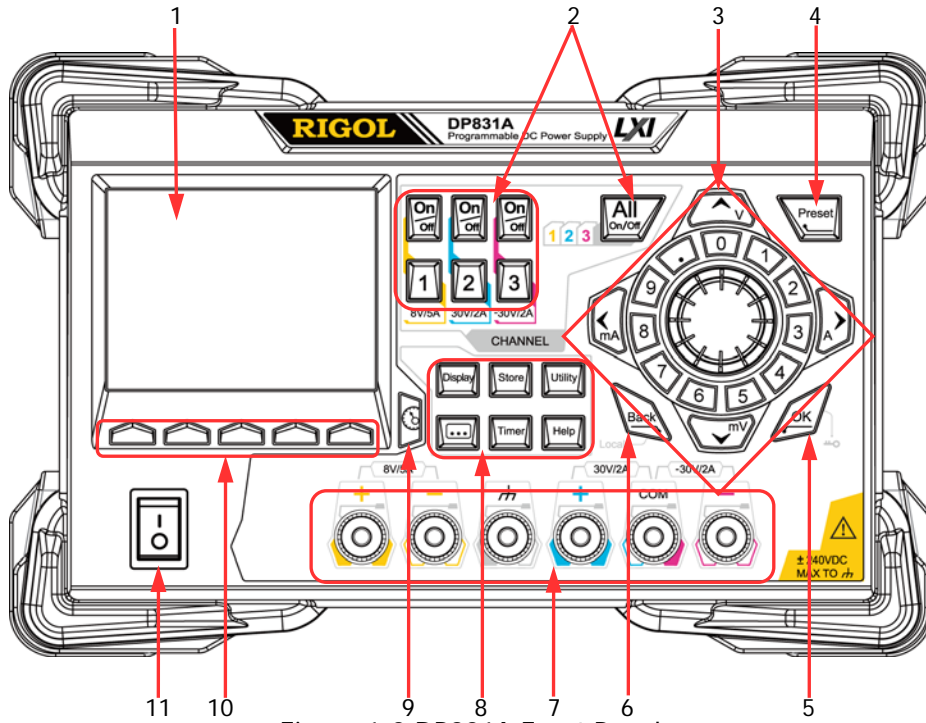
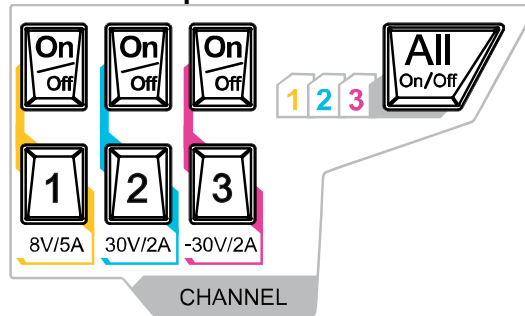


Figure 1-3 DP831A Front Panel

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 Selection and Output Switch



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.



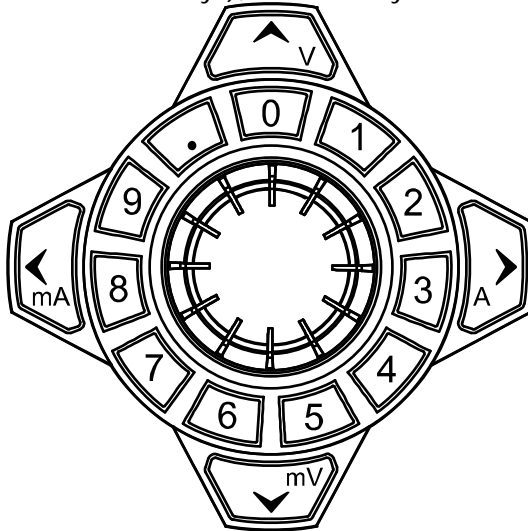
Press this key to enable or disable the output of the corresponding channel.



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.

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 enter 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

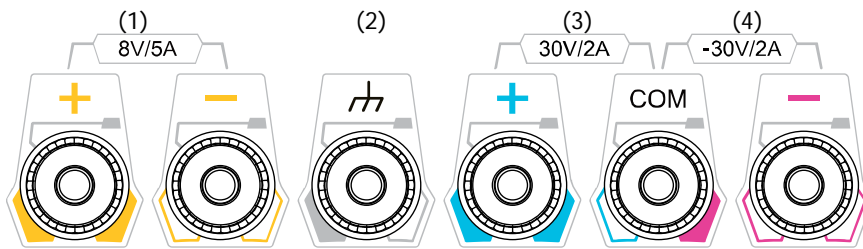
channel and ) are not available. Press and hold this key again to unlock the front panel keys. When the keyboard lock password is enabled, you need to input the correct password (2012) to unlock the front panel keys.

6. **Back**

Delete the character currently before the cursor.

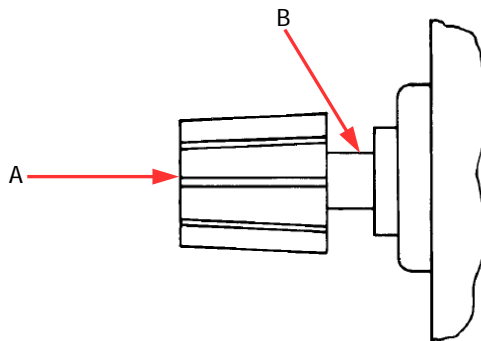
When the instrument is in remote mode, press this key to return to local mode.

7. Output Terminals



- (1) Output the voltage and current of CH1.
- (2) This terminal is connected to the instrument chassis and ground wire (power cord ground terminal) and is in grounded state.
- (3) Output the voltage and current of CH2.
- (4) Output the voltage and current of CH3.

Connection methods of the output terminal:



Method 1:

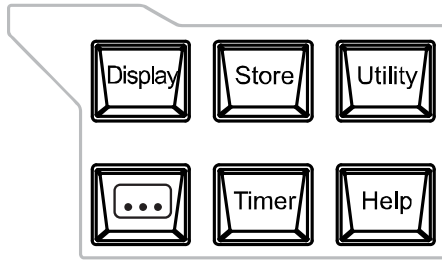
Connect the test lead to A of the output terminal.

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 luminance, 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 and delay 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 setting interface. Users can set the timer and delayer parameters.



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



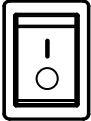
Switch between the current display mode and dial display mode. Besides, when the instrument is in a function interface (any interface under **Timer**, **...**, **Display**, **Store** and **Utility**), press this key to exit the function interface and return to the main interface.

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 panel of DP800A is as shown in Figure 1-4 and the introduction of each part is as shown in Table 1-1.

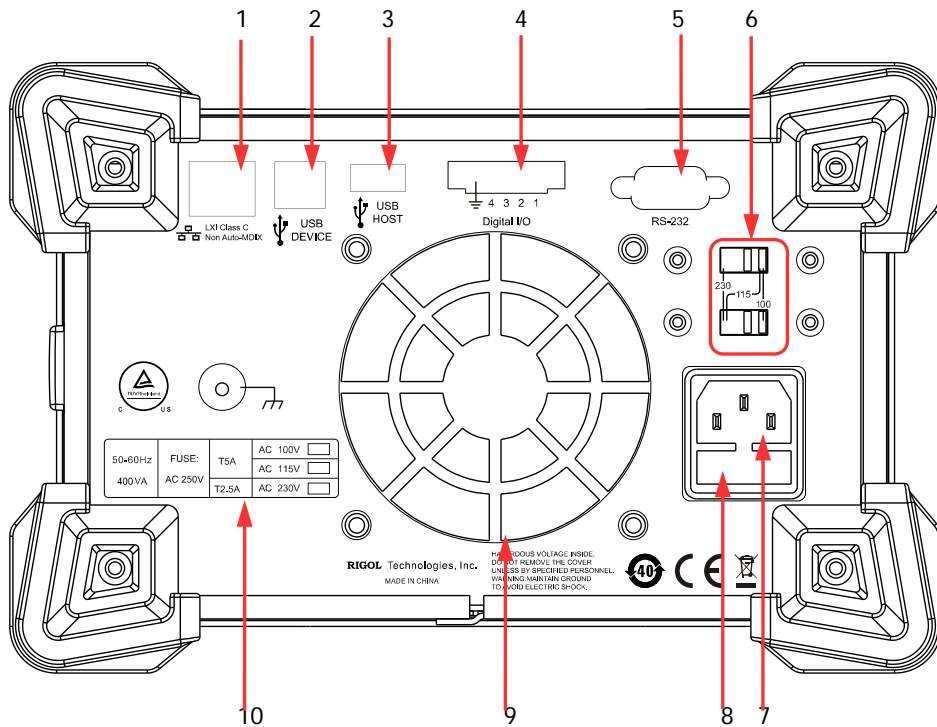


Figure 1-4 DP831A Rear Panel

Table 1-1 DP831A Rear Panel Explanation

No.	Name	Explanation
1	LAN Interface	The instrument is connected to the local network to realize remote control.
2	USB DEVICE	Connect the instrument (as "slave" device) to external USB device (such as: PC) via this interface to realize remote control.
3	USB HOST	Connect the instrument (as "host" device) to external USB device (such as: USB storage device) via this interface.
4	Digital I/O	Digital I/O interface, used to realize the trigger input and trigger output function.
5	RS232 Interface	Serial communication interface. The instrument is connected to the PC via this interface to realize remote control.
6	Voltage Selector	Select the specification of the input voltage. DP800A supports three kinds of input voltages; When the AC line is 100Vac \pm 10%, set the voltage selector to 100; When the AC line is 115Vac \pm 10%, set the voltage selector to 115; When the AC line is 230Vac \pm 10% (maximum 250VAC), set the voltage selector to 230.
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 AC power frequency, voltage and the specification of the fuse.

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 executes 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.

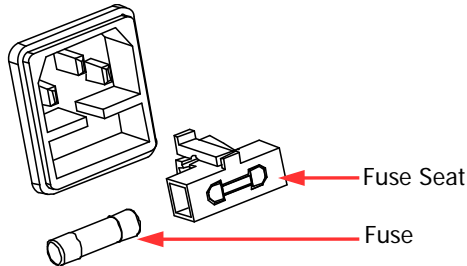
Tip

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”. This section introduces the interface layout under the normal display mode (as shown in Figure 1-8 and Table 1-2).

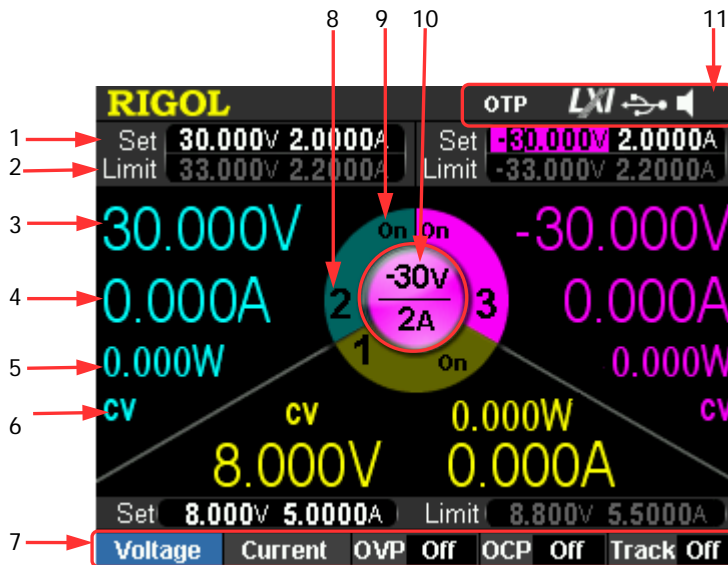


Figure 1-5 DP831A User Interface

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.

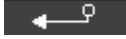
Table 1-2 DP831A User Interface Explanation

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	<p>Status bar. Display the system status labels.</p> <p>: over-temperature protection is enabled</p> <p>: the front panel is locked.</p> <p>: the network is connected.</p> <p>: USB device is recognized.</p> <p>: the beeper is enabled.</p> <p>: the beeper is disabled.</p> <p>: the instrument is in remote mode.</p>

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**.

Chapter 2 Front Panel Operations

The contents of this chapter are as follows:

- Constant Voltage Output
- Constant Current Output
- Track Function
- 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. Turn on the power switch to start the instrument.
2. 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.

3. 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.

Method 2



Press **Voltage**, use the numeric keyboard to input the desired voltage and press **V** or **mV** or press 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.

4. 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.

Method 2

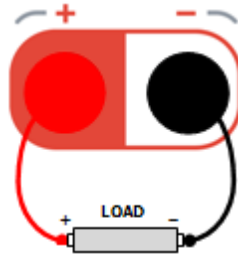
Press **Current**, use the numeric keyboard to input the desired current and press **A** or **mA** or press the unit selection key  or  to select the desired unit. Besides, you can also press **OK** to select the default unit A. During the input, press **Back** to delete the character currently before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

5. 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.

6. 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.

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.

Tip

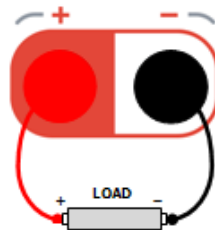
In CV output mode, when the load current is greater than the current setting value, the power supply will switch to CC output mode automatically. At this point, the output current equals the current setting value and the output voltage reduces proportionally.

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. Turn on the power switch to start the instrument.
2. 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.
3. Set the voltage
Press **Voltage** to set proper voltage according to “**Set the voltage**” in “Constant Voltage Output”.
4. Set the current
Press **Current** to set proper current according to “**Set the current**” in “Constant Voltage Output”.
5. 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.
6. 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.

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.

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.


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 two channels supporting the 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 CH3 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 CH2 changes accordingly. For example, set the voltage of CH3 to -5V and the voltage of CH2 will change to +5V automatically.
4. Disable the track function
Select CH3 and press **Track** to disable the track function.

Tip

- The track function only tracks 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.

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.

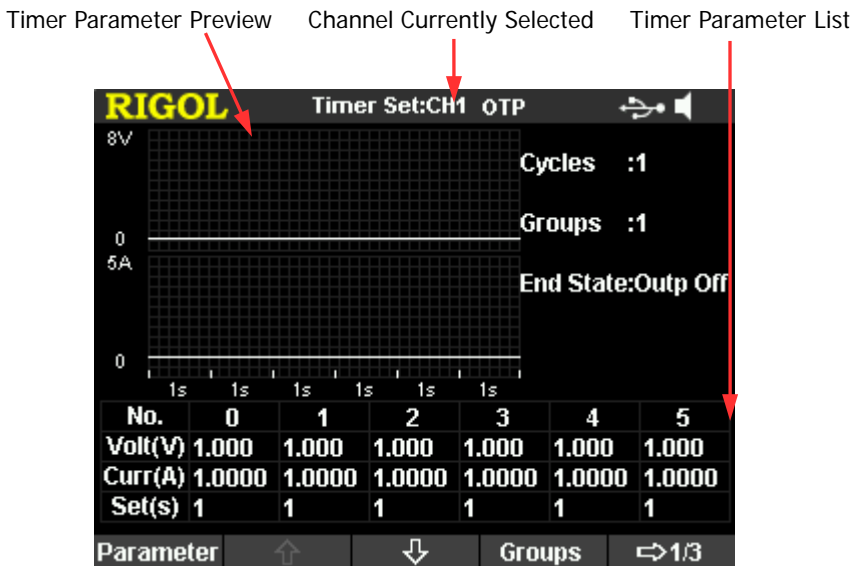


Figure 2-1 Timer Parameter Setting Interface

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 knob or numeric keyboard 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 knob or numeric keyboard 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 left/right direction keys 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 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".

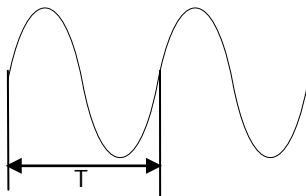
- **Voltage**: when it is selected, press **Current** and use the numeric keyboard or direction keys and knob to set the current value. Then, select the templet and edit the templet parameters. The interface displays the voltage preview.
- **Current**: when it is selected, press **Voltage** and use the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

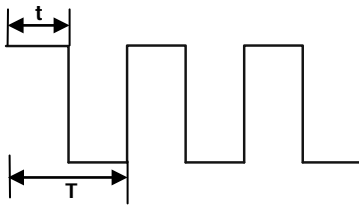


- **Pulse**

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

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

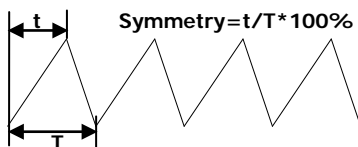
The second point: the amplitude (voltage or current) is determined by the low level set; the time equals the period currently set minus the pulse width currently set.

**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**

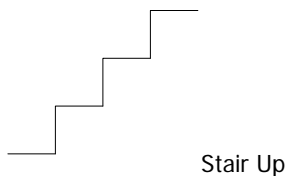
The Ramp waveform is as shown in the figure below. The instrument determines the amplitude of the Ramp according to the maximum and minimum currently set, determines the period according to the total number of points (denoted by **P**) and the time interval currently set and determines the Ramp waveform according to the symmetry (denoted by **Sym**) currently set. When creating parameters, the instrument draws $\text{int}(P * \text{Sym})$ ^[1] 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^[1]: $\text{int}(P * \text{Sym})$ refers to rounding $P * \text{Sym}$ (discard the decimal part).

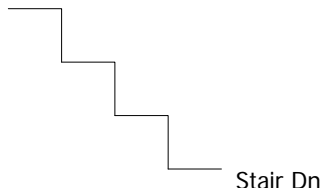
- **Stair Up**

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.



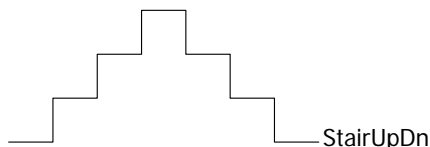
- **Stair Dn**

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**

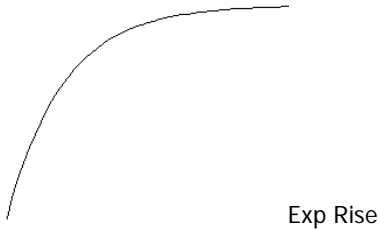
The StairUpDn waveform is as shown in the figure below. The instrument determines the StairUpDn waveform according to the maximum (denoted by **MAX**), minimum (denoted by **MIN**), total number of points (denoted by **P**) and time interval currently set and creates **P** parameters. When **P** is an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

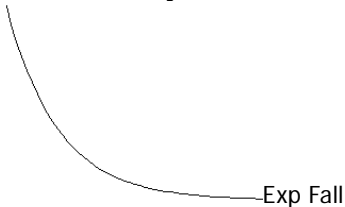
- **Exp Rise**

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**) 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.



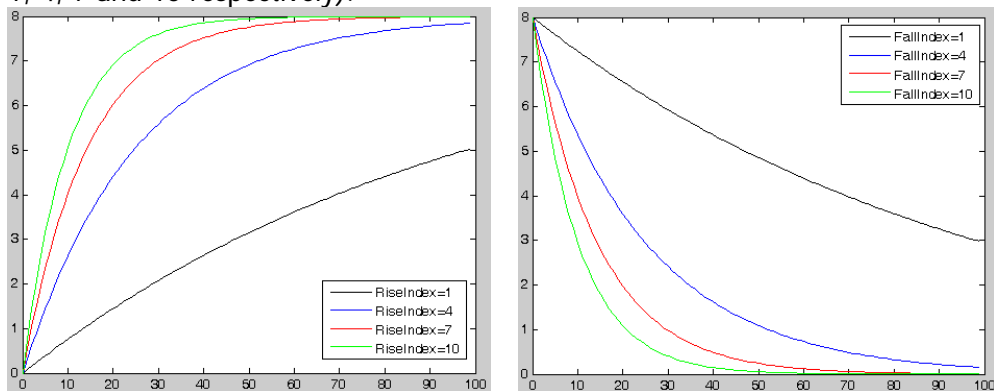
- **Exp Fall**

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**) and fall index (denoted by **FallIndex**) currently set. The waveform function is $(\text{MAX}-\text{MIN}) * e^{-i * \text{FallIndex}/P}$; 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.
- **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 2-2.

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, press **Timer** → **Timer** to enable the timing output. The timing output interface is as shown in the figure below.

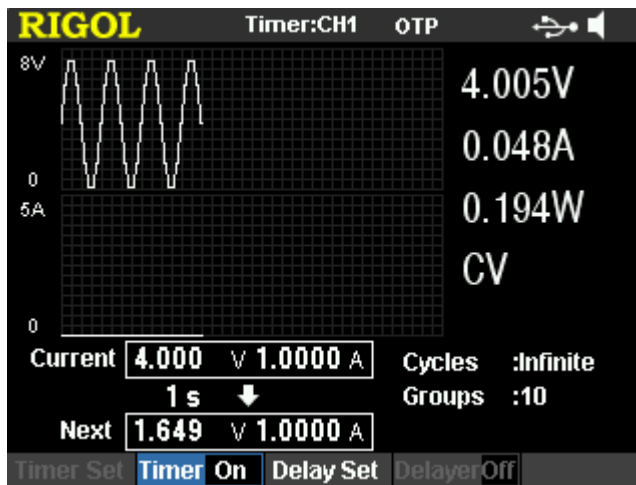


Figure 2-2 Timing Output Interface

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.

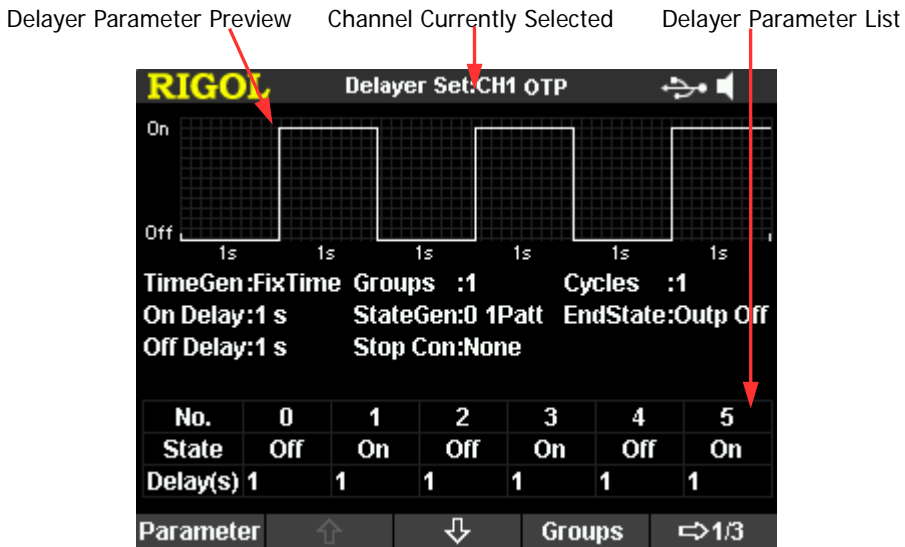


Figure 2-3 Delayer Parameter Setting Interface

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 left/right direction keys 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 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.

- **Decline**
The duration is generated in monotonic decline mode.

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 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, press **Timer** → **Delayer** to enable the delay output. The delay output interface is as shown in the figure below.

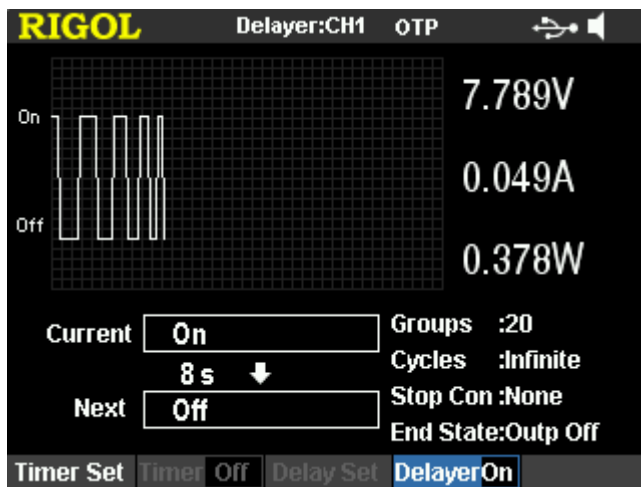



Figure 2-4 Delay Output Interface

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. Press **Period** and use the numeric keyboard or 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, 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 groups, median, mode as well as the average, VAR, 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 1s and the end time is the maximum record time of the file opened.

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 1 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. The range is from the **start time** to the maximum record time of the file opened.

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.

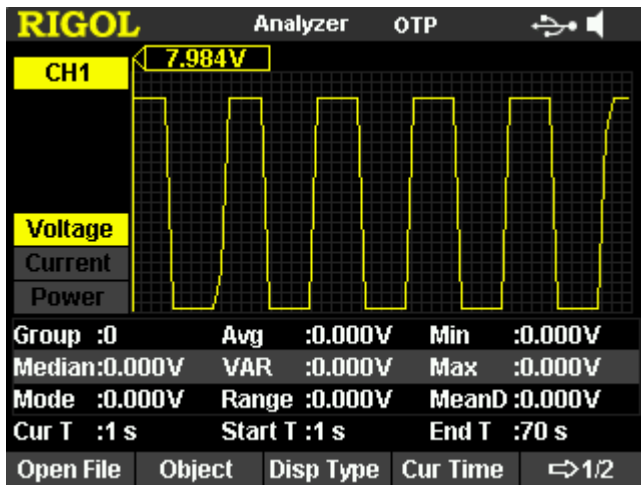


Table: display each group of voltage, current and power of the current record file in table form.

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

- **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 according to the channel number.

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 **OK** 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

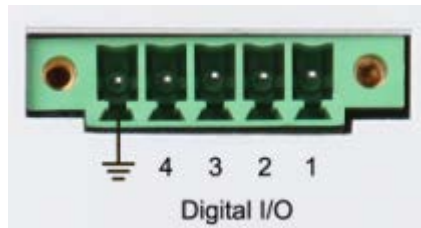
Press **Stop Mode**, use the direction keys and **OK** to set the stop mode ("Output Off", "Warning" and "Beeper") and multiple modes can be selected. When the channel output state meets the monitor condition set, the instrument will turn off the output, display the corresponding prompt message or sound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

6. Switch

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

Trigger

The rear panel of DP800A provides a digital I/O interface (as shown below) 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 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.

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.

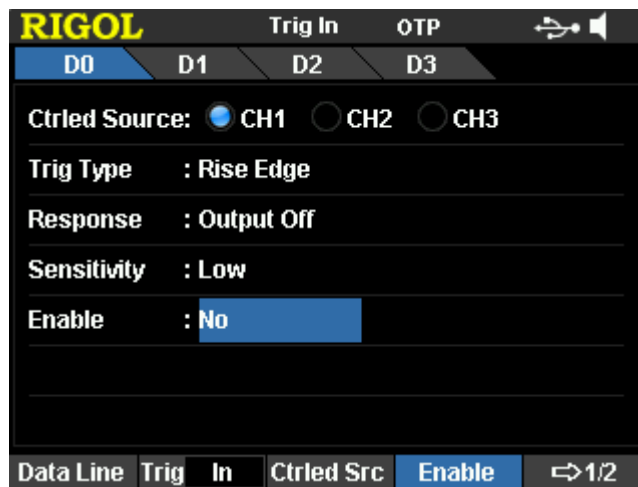



Figure 2-5 Trigger Setting Interface

Trigger Input

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

Press  → **Trigger** → **Trig** to select “In” to enter the interface as shown in Figure 2-9.

1. Data Line

Press **Data Line** to select D0, D1, D2 or 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 **Ctrlled 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.

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 set the sensitivity to high, middle or 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 select D0, D1, D2 or 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 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 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 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 set the signal type of the trigger output to "Level" or "Square". When "Square" is selected, press **Period** to set the square period and the range is from 100 μ 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.

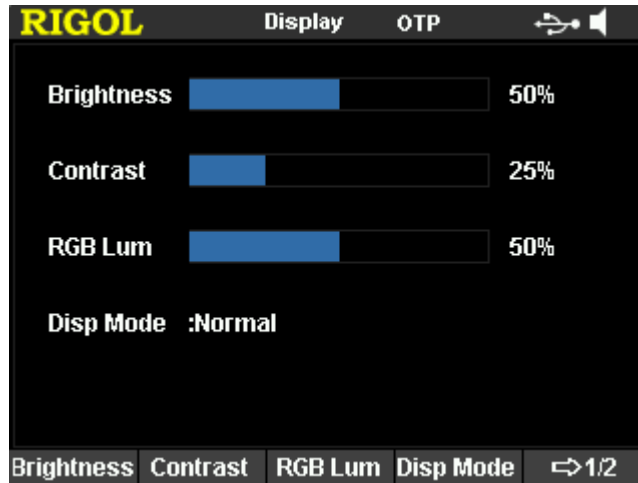


Figure 2-7 Display Setting Interface

Brightness

Press **Display** → **Brightness** and rotate the knob 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 rotate the knob 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 rotate the knob 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 325×56 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 2-12. 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 2-12) 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).

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.

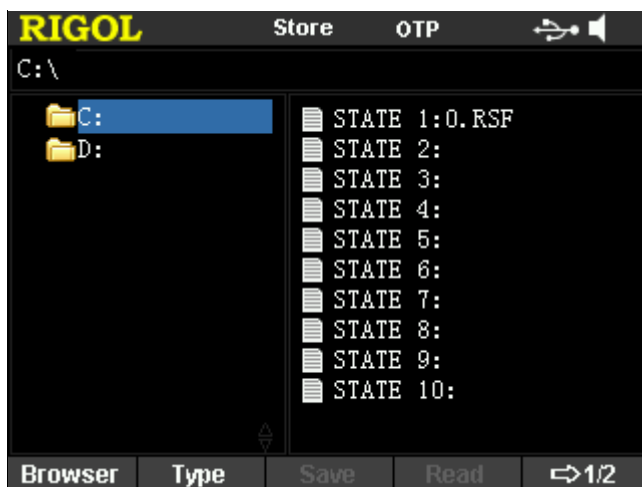


Figure 2-9 Store and Recall Interface

Browser

Press **Store** → **Browser** to move the cursor to the directory or file area and then use the knob 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.

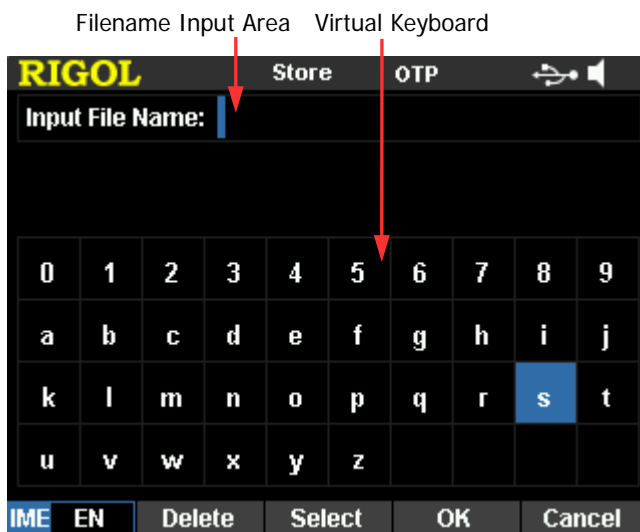


Figure 2-10 Filename Input Interface (English)

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 this English character). 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 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”.

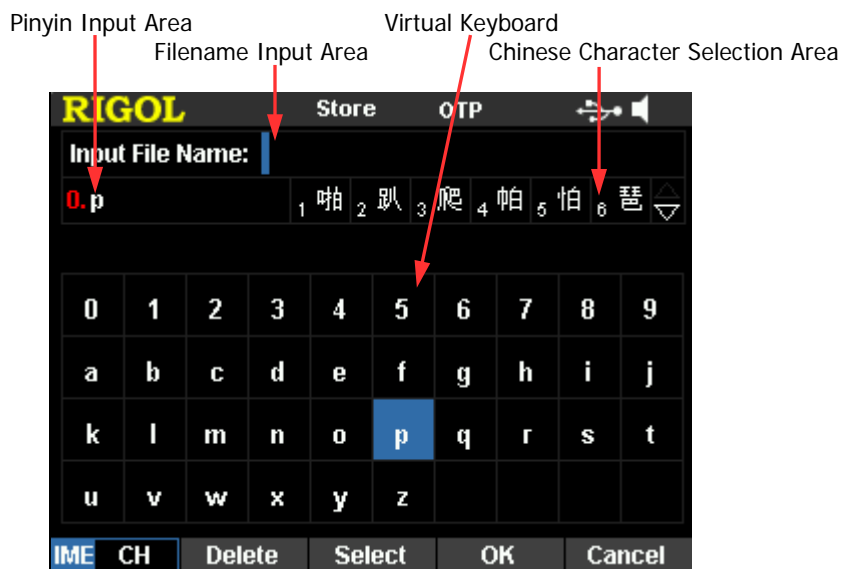


Figure 2-11 Filename Input Interface (Chinese)

- 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 instrument deletes 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.

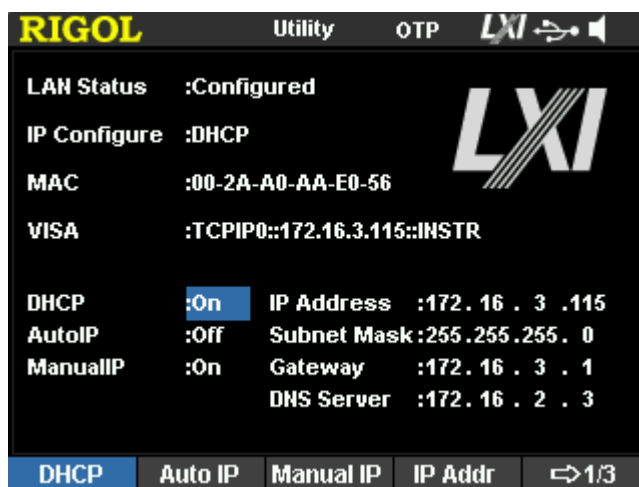


Figure 2-13 LAN Parameter Setting Interface

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::172.16.2.13::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

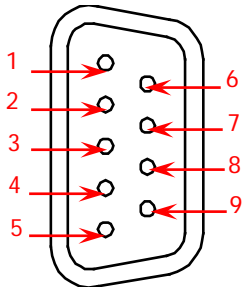
Press **Cur Cfg** to view the MAC address, current network parameters and network status information of the instrument.

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.

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  of each channel and ) 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 select the 4 groups of user-defined settings. For details, refer to the introduction in "Recall the user-defined setting".



Figure 2-14 Preset Value Type Selecting Interface

Table 2-2 Factory Setting

Parameter	Factory Setting	
Channel Parameters		
	DP831A	DP832A
CH1 Voltage/Current Setting Values	0.000V, 5.0000A	00.000V, 3.000A
CH2 Voltage/Current Setting Values	00.000V, 2.0000A	00.000V, 3.000A
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
CH2 Voltage/Current Limits	33.000V, 2.2000A	33.000V, 3.300A
CH3 Voltage/Current Limits	-33.000V, 2.2000A	5.500V, 3.300A
CH1 OVP\OCP On/Off	Off/Off	Off/Off
CH2 OVP\OCP On/Off	Off/Off	Off/Off
CH3 OVP\OCP On/Off	Off/Off	Off/Off
CH1 Track On/Off	None	Off

CH2 Track On/Off	Off	Off
CH3 Track On/Off	Off	None
CH1 Output On/Off	Off	
CH2 Output On/Off	Off	
CH3 Output On/Off	Off	
Display		
Brightness*	50%	
Contrast*	25%	
RGB Luminance*	50%	
Display Mode	Normal	
System Setting		
Language*	Chinese	
Power-on Setting*	Default	
OTP	On	
Beeper	On	
Screen Saver	Off	
Keyboard Lock*	Off	
Preset	Default	
I/O Configuration*		
GPIB Address	2	
RS232		
Baud Rate	9600	
Data Bit	8	
Stop Bit	1	
Parity Bit	None	
Hardware Flow Control	Off	
LAN		
DHCP	On	
Auto IP	On	
Manual IP	Off	
Timer		
Channel	CH1	
Timer On/Off	Off	
Output Groups	1	
Timer Parameters	Volt: 1V; Curr: 1A; Time: 1s	
Cycles	1	
End State	Off	
Object	Voltage	
Templet	Sine	

Delayer	
Channel	CH1
Delayer On/off	Off
Output Groups	1
Delayer Parameter	State: Off, On alternately
Cycles	1
End State	Off
State Generation	0 1Patt
Time Generation	
Generation Method	FixTime
Stop Condition	None
Recorder	
Recorder Switch	Off
Record Period	1s
Destination	C:\REC 10:RIGOL.ROF
Analyzer	
Channel	CH1
Analysis Object	Voltage
Display	Curve
Current Time	1s
Start Time	1s
End Time	2s
Monitor	
Channel	CH1
Monitor Switch	Off
Monitor Condition	>Volt
Voltage	Half of the rated value
Current	Half of the rated value
Power	The product of voltage times current
Output Off	True
Warning	True
Beeper	True
Trigger	
Trig	In
Trigger Input	
Data Line	D0
Source under Control	CH1
Trigger Type	Rise Edge
Output Response	Output Off
Sensitivity	Low

Enable	No
Trigger Output	
Data Line	D0
Control Source	CH1
Trigger Condition	Output Off
Output Signal	Level
Polarity	Positive
Enable	No
Store	
Browser	Directory
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 2-19, 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 2-20 (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.

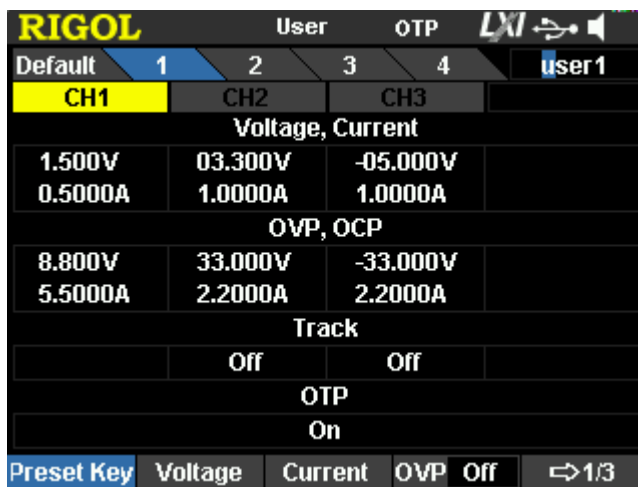


Figure 2-15 User-defined Setting Interface

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 2-20.

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 2-20. Press **Preset Key** and use the 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

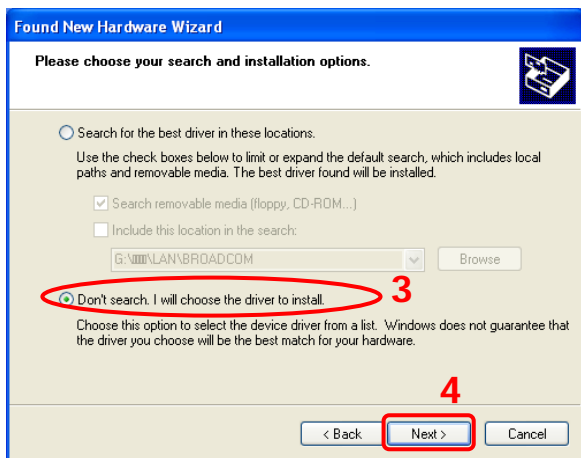
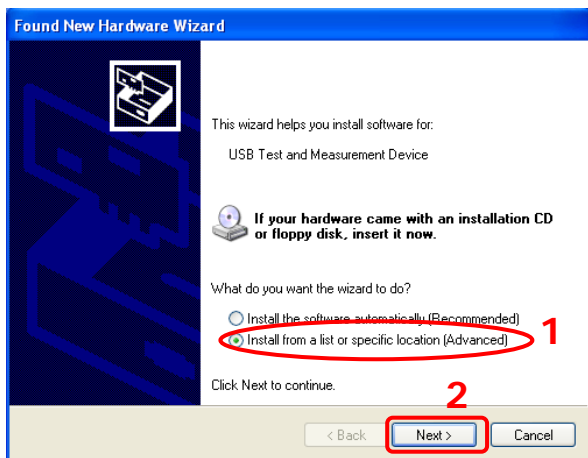
Remote Control via USB

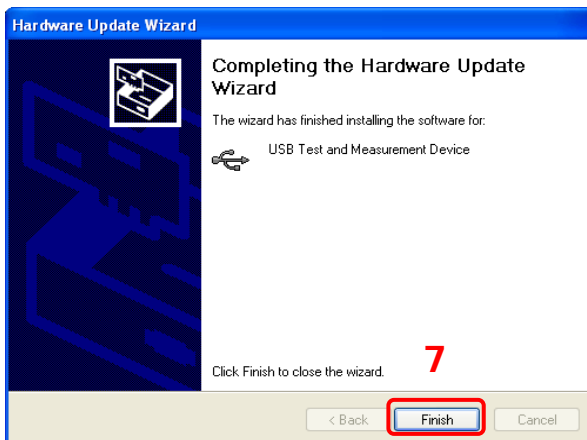
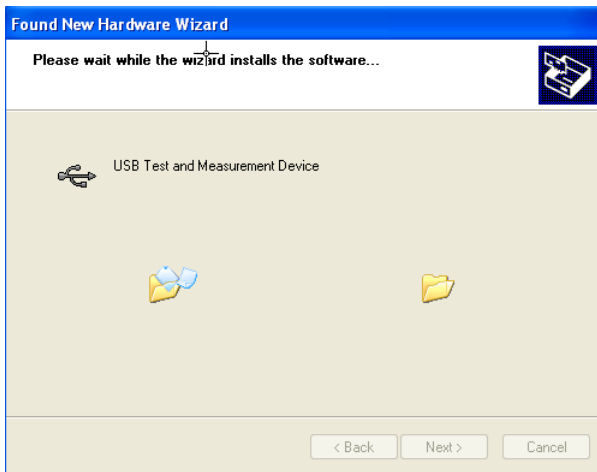
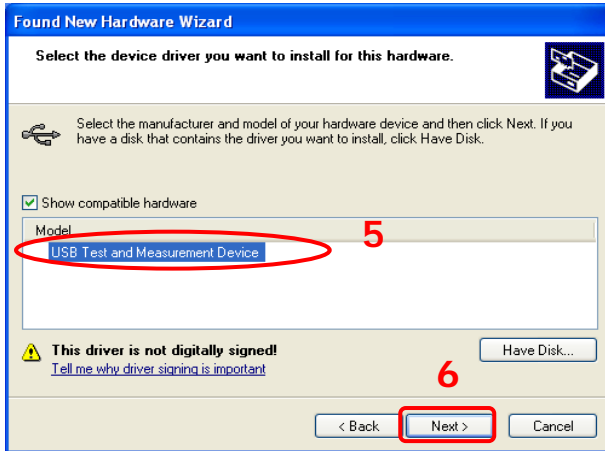
1. Connect the device

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" driver following the directions in the wizard. The steps are as follows.





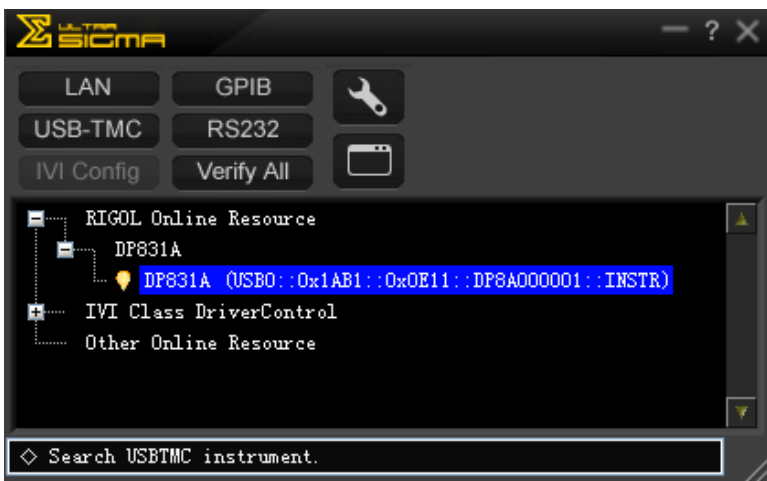
3. Search device resource

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.

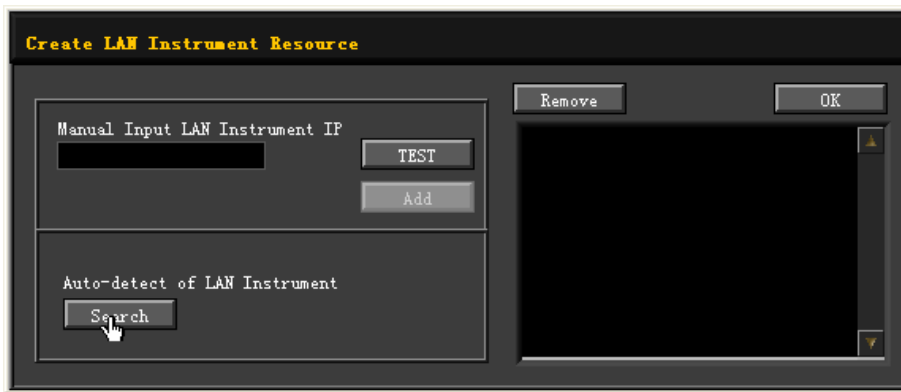
If the power supply is connected to the PC directly, set the IP Addresses, Subnet Masks and Gateways for both of the PC and the power supply. The Subnet Masks and Gateways of the power supply and PC must be the same and the IP Addresses of them must be within the same network segment (for details, refer 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

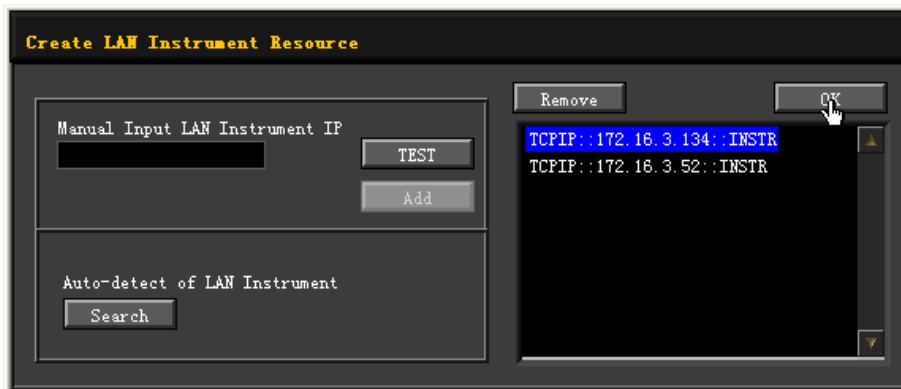
If your power supply is connected to the LAN of your PC, please acquire a set of valid network parameters (IP Address, Subnet Mask, Gateway and DNS) and configure the network parameters of the power supply according to the description in **"To Set the LAN Parameters"**.

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). Select the desired resource name and click **OK** to add it.



(a)



(b)

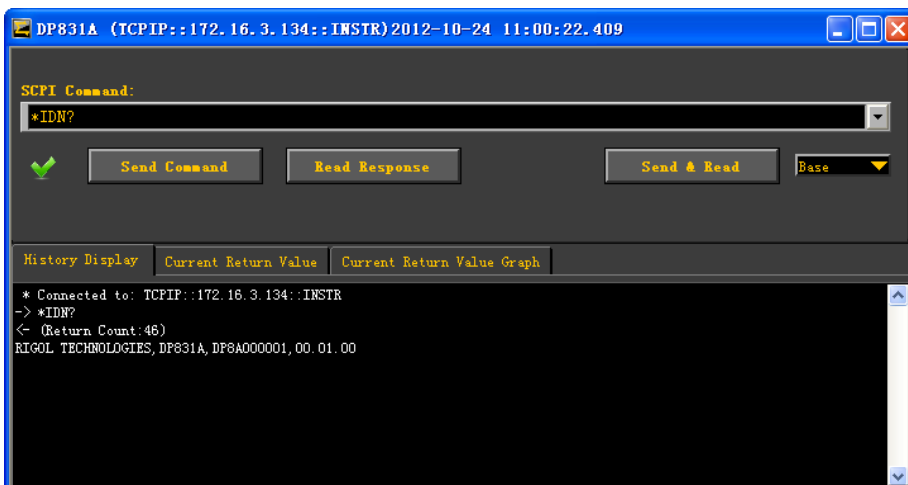
4. View device resource

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



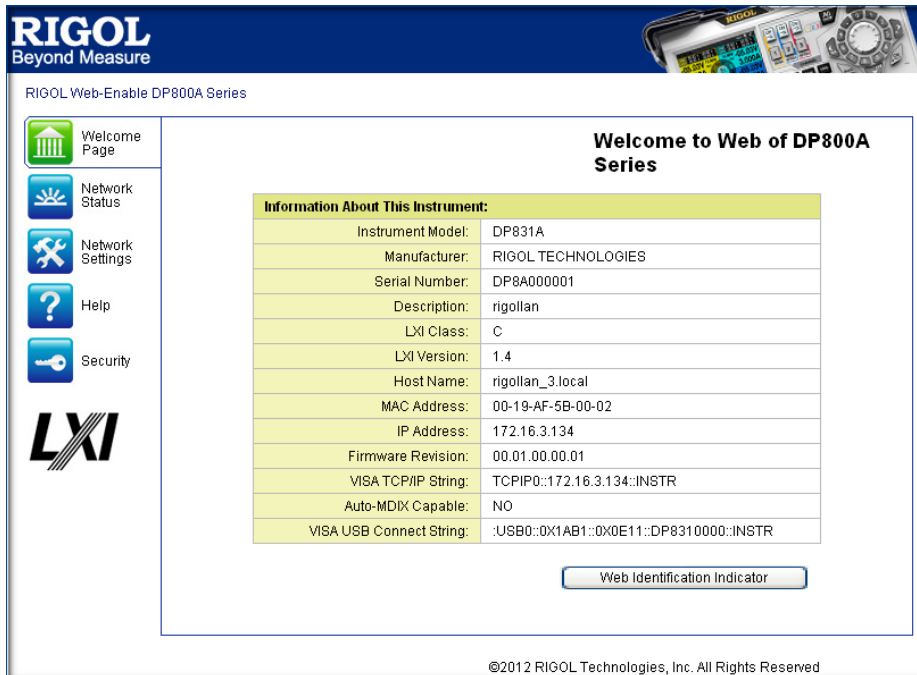
5. Communication test

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-C 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 as shown in the figure below.



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

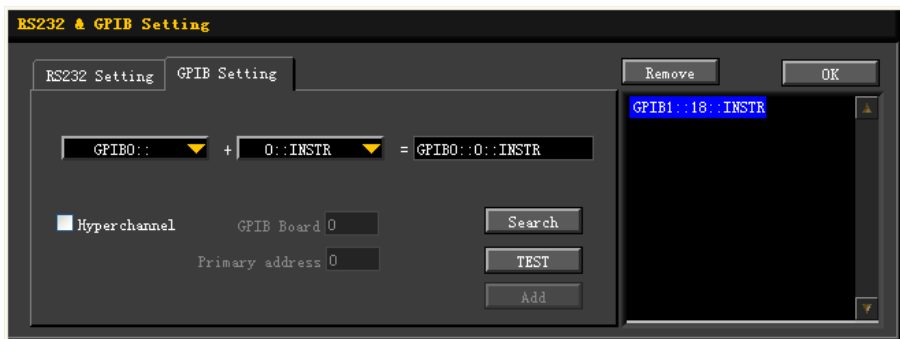
Install the driver of the GPIB card which has been connected to the PC correctly.

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.

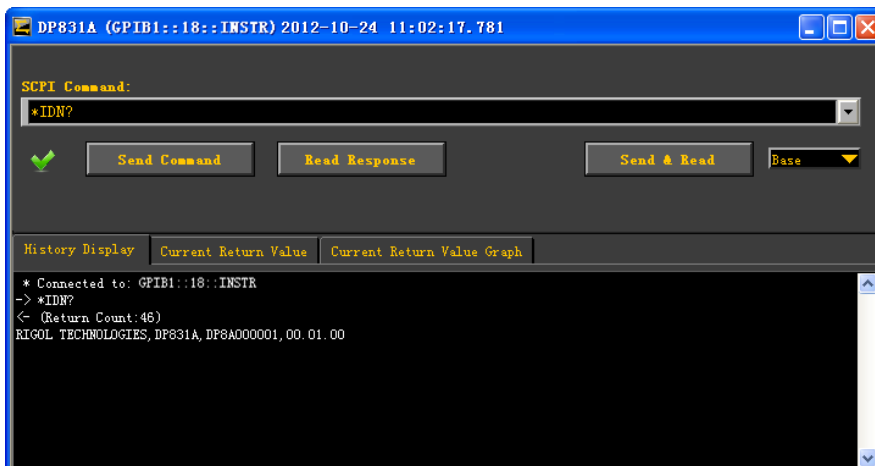
5. View device resource

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

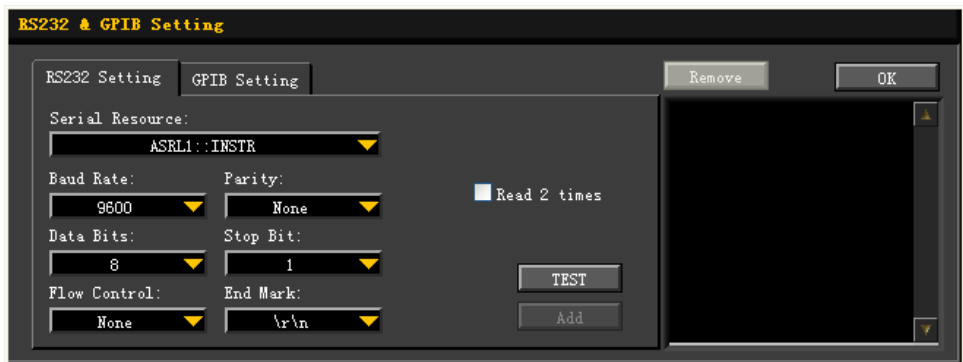
Connect the power supply to your LAN using a RS232 cable.

2. Set the RS232 parameters

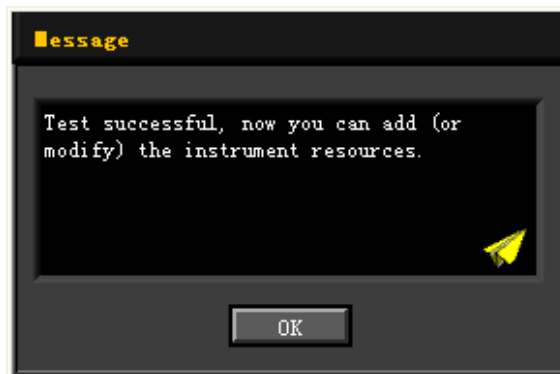
Press **Utility** → **I/O** → **RS232** to set the parameters relating to RS232 according to the introduction in “To Set the RS232 Parameters”.

3. Add device resource

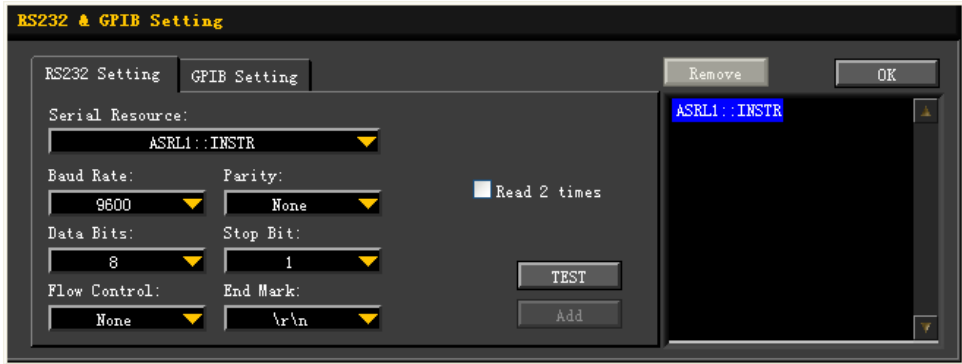
Start up the **Ultra Sigma** and click **RS232** to open the panel as shown in figure (a). Select the device resource name to be added and set the parameters in the panel (such as the baud rate and parity bit) as shown in figure (a) according to the RS232 parameter setting of the instrument (Note: `\r\n` 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)



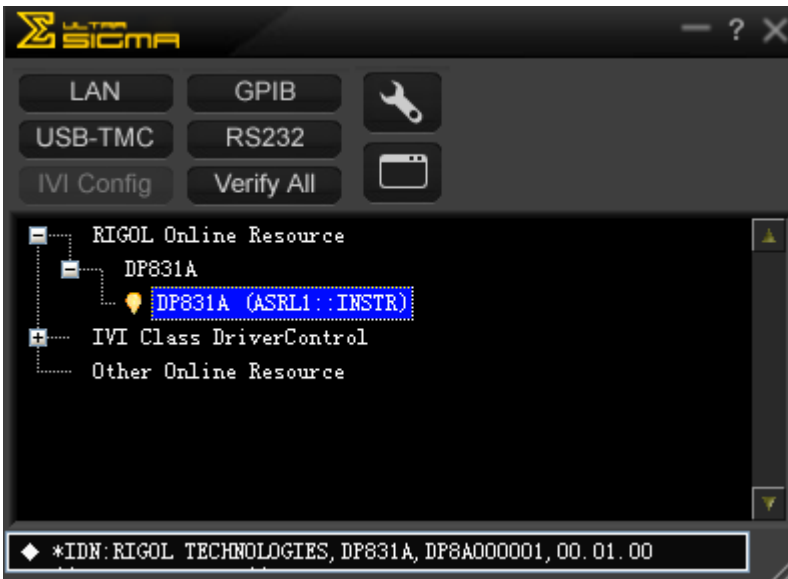
(b)



(c)

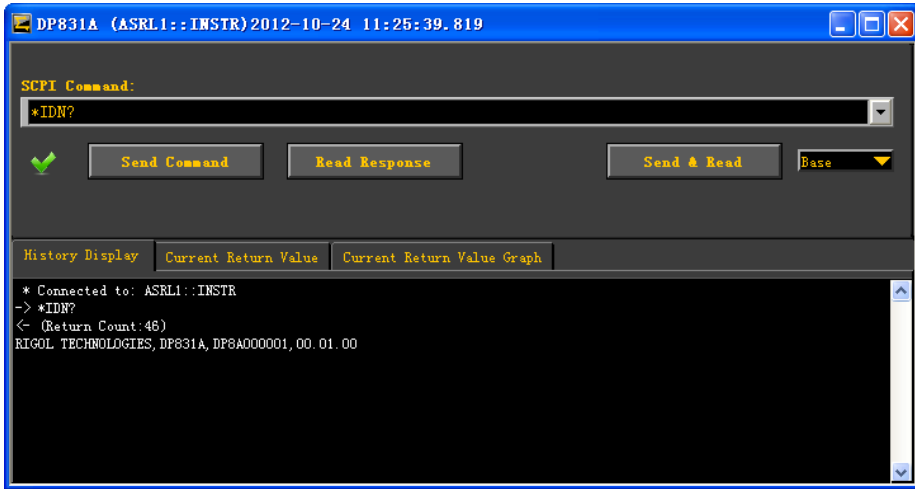
4. View device resource

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.

DP831A Specifications

Model	DP831A		
Channel	8V/5A	30V/2A	-30V/2A
DC Output (0°C to 40°C)			
Voltage	0 to +8V	0 to +30V	0 to -30V
Current	0 to 5A	0 to 2A	0 to 2A
OVP	1mV to 8.8V	1mV to 33V	-1mV to -33V
OCP	0.1mA to 5.5A	0.1mA to 2.2A	0.1mA to 2.2A
Load Regulation Rate ± (Output Percentage+Offset)			
Voltage	<0.01%+2mV		
Current	<0.01%+250µA		
Linear Regulation Rate ± (Output Percentage+Offset)			
Voltage	<0.01%+2mV		
Current	<0.01%+250µA		
Ripples and Noise (20 Hz to 20 MHz)			
Normal Mode Voltage	<350µVrms / 2mVpp		
Normal Mode Current	<2mArms		
Common Mode Current	<1.5µArms		
Annual Accuracy^[1] (25°C ±5°C) ± (Output Percentage+Offset)			
Programming	Voltage	0.1%+20mV	
	Current	0.2%+10mA	
Readback	Voltage	0.1%+20mV	
	Current	0.2%+10mA	
Resolution			
Programming	Voltage	1mV	
	Current	0.3mA	0.1mA 0.1mA
Readback	Voltage	0.1mV	
	Current	0.1mA	
Display	Voltage	1mV	
	Current	1mA	
Transient Response Time			
Less than 50 µsec for output to recover to within 15 mV following a change in output current from full load to half load or vice versa.			
Command Processing Time^[2]			
<100ms			
Temperature Coefficient per °C (Output Percentage+Offset)			
Voltage	0.01%+2mV		
Current	0.02%+3mA		
Stability^[3] ± (Output Percentage+Offset)			
Voltage	0.03%+1mV	0.02% + 2mV	
Current	0.1%+3mA	0.05% + 1mA	
Voltage Programming Control Speed (1% within the total variation range)			

Rise	Full Load	<11ms	<50ms
	No Load	<10ms	<25ms
Fall	Full Load	<13ms	<30ms
	No Load	<200ms	<400ms
OVP/OCP			
Accuracy ±(Output Percentage+Offset)		0.5%+0.5V/0.5%+0.5A	
Activation Time		1.5ms (OVP≥ 3V) <10ms (OVP<3V and OCP)	
Mechanical			
Dimensions		239mm(W) x 157mm(H) x 418mm(D)	
Weight		9.0kg	
Power			
AC Input (50Hz-60Hz)		100Vac±10%, 115Vac±10%,230Vac±10% (maximum 250VAC)	
I/O			
USB Device		1	
USB Host		1	
LAN		1	
RS232		1	
Digital IO		1	
Environment			
Working Temperature		Full Rated Value Output: 0℃ to 40℃ Under Relatively Higher Temperature: the linearity of the output current reduces to 50% at the highest temperature 55℃	
Cooling Method		Fan Cooling	

Note:

- [1] The accuracy parameters are acquired via calibration under 25℃ 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.

DP832A Specifications

Model	DP832A			
Channel	30V/3A	30V/3A	5V/3A	
DC Output (0°C to 40°C)				
Voltage	0 to 30V	0 to 30V	0 to 5V	
Current	0 to 3A	0 to 3A	0 to 3A	
OVP	1mV to 33V	1mV to 33V	1mV to 5.5V	
OCP	1mA to 3.3A	1mA to 3.3A	1mA to 3.3A	
Load Regulation Rate ± (Output Percentage+Offset)				
Voltage	<0.01%+2mV			
Current	<0.01%+250μA			
Linear Regulation Rate ± (Output Percentage+Offset)				
Voltage	<0.01%+2mV			
Current	<0.01%+250μA			
Ripples and Noise (20 Hz to 20 MHz)				
Normal Mode Voltage	<350μVrms/2mVpp			
Normal Mode Current	<2mArms			
Common Mode Current	<1.5μArms			
Annual Accuracy^[1] (25°C ±5°C) ± (Output Percentage+Offset)				
Programming	Voltage	0.05% + 10mV		
	Current	0.2% + 10mA		
Readback	Voltage	0.05% + 5mV		
	Current	0.15% + 5mA		
Resolution				
Programming	Voltage	1mV		
	Current	1mA		
Readback	Voltage	0.1mV		
	Current	0.1mA		
Display	Voltage	1mV		
	Current	1mA		
Transient Response Time				
Less than 50 μsec for output to recover to within 15 mV following a change in output current from full load to half load or vice versa.				
Command Processing Time^[2]				
<100ms				
Temperature Coefficient per °C (Output Percentage+Offset)				
Voltage	0.01%+5mV		0.01%+2mV	
Current	0.01%+2mA			
Stability^[3] ± (Output Percentage+Offset)				
Voltage	0.02%+2mV	0.02% + 2mV	0.01%+1mV	
Current	0.05%+2mA	0.05% + 2mA	0.05% + 2mA	
Voltage Programming Control Speed (1% within the total variation range)				
Rise	Full Load	<50ms	<50ms	<11ms
	No Load	<25ms	<25ms	<10ms
Fall	Full Load	<30ms	<30ms	<13ms
	No Load	<400ms	<400ms	<200ms
OVP/OCP				
Accuracy ± (Output Percentage+Offset)	0.5%+0.5V/0.5%+0.5A			

Activation Time	1.5ms (OVP \geq 3V) <10ms (OVP<3V and OCP)
Mechanical	
Dimensions	239mm(W) x 157mm(H) x 418mm(D)
Weight	9.0kg
Power	
AC Input (50Hz-60Hz)	100Vac \pm 10%, 115Vac \pm 10%, 230Vac \pm 10% (maximum 250VAC)
I/O	
USB Device	1
USB Host	1
LAN	1
RS232	1
Digital IO	1
Environment	
Working Temperature	Full Rated Value Output: 0 $^{\circ}$ C to 40 $^{\circ}$ C Under Relatively Higher Temperature: the linearity of the output current reduces to 50% at the highest temperature 55 $^{\circ}$ C
Cooling Method	Fan Cooling

Note:

- [1] The accuracy parameters are acquired via calibration under 25 $^{\circ}$ 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.
Model	Programmable Linear DC Power Supply (Three-channel)	DP831A
	Programmable Linear DC Power Supply (Three-channel)	DP832A
Standard Accessories	Power Cord	--
	USB Cable	CB-USB-150
	Resource CD (including the User's Guide, etc.)	--
	Fuse (50T-025H 250V 2.5A)	--
	Short-circuit Equipment	--
	Quick Guide (Hard Copy)	--
Optional Accessories	USB to GPIB Interface Converter	USB-GPIB
	DP1000 Series Rack Mount Kit	RM-DP-1

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.

Appendix C: Any Question or Comment?

If you have any question or comment on our document, please mail to:
service@rigol.com

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