# SPD3303C Series Programmable DC Power Supply

Quick Start

EN_02A

SIGLENT TECHNOLOGIES CO.,LTD

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# General Safety Summary

Please review the following safety precautions carefully to avoid personal injury or damage to this product or any product connected to it. To prevent potential danger, please use the instrument as specified.

**Use proper power cord**

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

**Power supply**

AC Input Voltages: 100V/ 110V/ 220V/ 230V ±10%, 50/60Hz.

**Use proper fuse**

The fuse types: 100V/ 110V (T6.3A/250V); 220V/ 230V (T3.15A/250V);

Make sure to use the correct type of fuse before turning on the instrument.

Do not connect the power cord before replacing the fuse.

Find out the reason why the fuse burned out before replacing the fuse.

**Ground the instrument**

The instrument is grounded through the protective terra conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to the earth. Make sure that the instrument is properly grounded before any inputs or outputs.

**Observe all terminal ratings**

To avoid fire or electric shock, please observe all ratings and symbols on the instrument. Read this guide carefully to know more details about the ratings before connection.

**Keep proper ventilation**

Inadequate ventilation may cause an increase of temperature, which will lead to further damage. Please keep proper ventilation and check the fan and air-vents regularly when using the instrument.

**Operate condition**

Location: indoor, no strong light, almost no Interfering pollution;

Comparative humidity: < 80%

Altitude: < 2000m

Temperature: 0℃ to 40℃

**Do not operate in an explosive atmosphere**

To avoid personal injury or damage to instrument, please do not operate in an explosive atmosphere.

**Keep surface of the product clean and dry**

To avoid dust or moisture in the air influence the performance of the instrument, please keep surface of the product clean and dry.

## Safety Terms and Symbols

**Terms used in this product.** These terms may appear in the product:

| | |
|---|---|
| **DANGER** | Indicates direct injury or hazard that may happen. |
| **WARNING** | Indicates potential injury or hazard that may happen. |
| **CAUTION** | Indicates potential damage to the instrument or other property that may happen. |

**Symbols used in this product.** These symbols may appear on the product:

Hazardous Voltage

Protective Earth Ground

Warning

Earth Ground

Power Switch

# Brief Introduction

SPD3303C LED series Programmable DC Power Supply is convenient, flexible and multi-function. It is designed with three groups of independent output terminals, the output voltage of two groups is adjustable and another group is fixed to select: 2.5V, 3.3V, and 5V. The instrument also provides output short circuit and overload protection.

**Main Features**

- Three independent output channels, two of which are controllable, with a total power up to 220W;
- Compatible design for power voltage: 100V, 110V, 220V and 230V to satisfy different power network;
- Capable of saving and recalling set parameters;
- Perfect PC software to realize the real-time control through USBTMC

# Quick Guide

In this chapter, we mainly introduce the panel and display of SPD3303C, as well as the new machine inspection and attentions at first use. Reading the following steps will give you a quick understanding on operation.

## General Inspection

**1. Inspect the shipping container.**

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

The consigner or carrier will be responsible for damages to the instrument resulting from shipment. **SIGLENT** would not provide free maintenance or replacement.

**2. Inspect the instrument.**

If there are instruments found damaged, defective or failure in electrical and mechanical tests, please contact **SIGLENT**.

**3. Check the accessories.**

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

# Safety Considerations

To ensure that the instrument can work normally, please conduct necessary inspection before using the SPD3303C.

### Input Power Requirement

The SPD3303C allows a 50Hz/60Hz frequency, and four levels of AC power: 100V/ 120V/ 220V/ 230V. You can select wanted power voltage with the “DIP Switch ” at the rear panel according to the actual demand.

| | |
|---|---|
| ⚠ | **Warning**<br>To switch to the wanted power voltage, please disconnect the power cord first. |

### Electrical Check

Please use the power cord provided as accessory and connects the instrument to AC power. Check the power as the following steps.

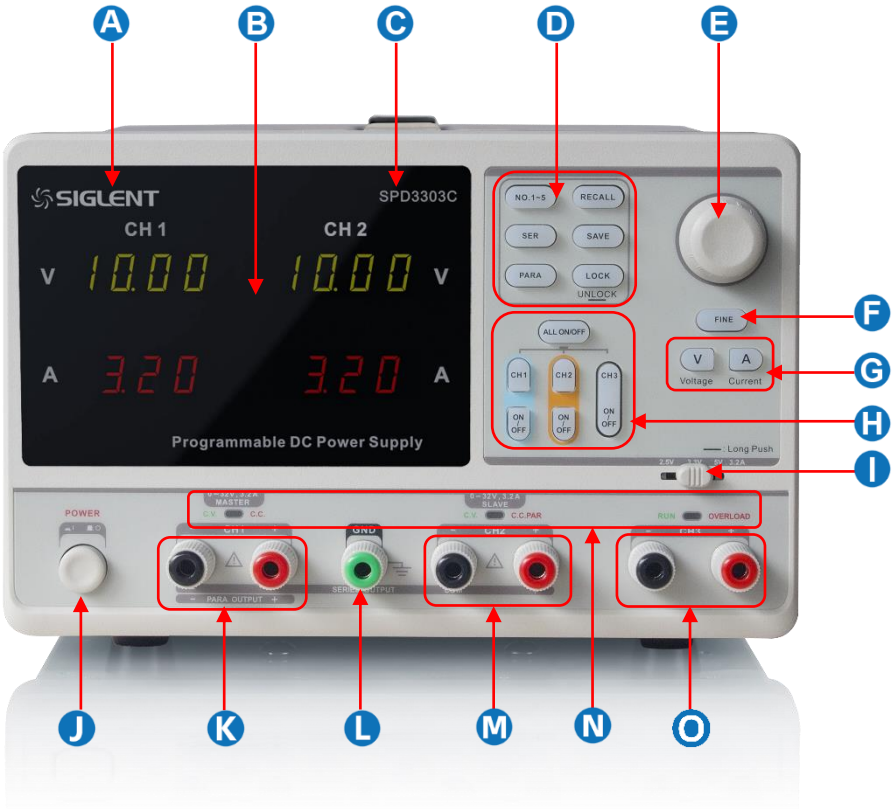
1. Connect the power supply

| | |
|---|---|
| ⚠ | **Warning**<br>To avoid electric shock, please make sure that the instrument is grounded correctly. |

2. Turn on the power switch

Press the button to enter boot interface, and system return to the default settings after a while.

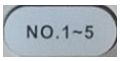
## The Front Panel




| NO. | Description | NO. | Description |
|---|---|---|---|
| A | Logo | I | CH3 DIP Switch |
| B | LED Display | J | Power Switch |
| C | Model | K | CH1 Output Terminal |
| D | System Parameter Configuration button | L | Ground Terminal |
| E | Multi-function knob | M | CH2 Output Terminal |
| F | Fine Adjust button | N | CV/CC Indicator Light |
| G | Voltage/Current button | O | CH3 Output Terminal |
| H | Channel Control button | | |

# Instruction for Buttons

### Buttons for setting parameters



: Press the button to choose the storage location;

: Press the button to set series mode of CH1/CH2;

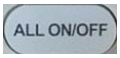
: Press the button to set parallel mode of CH1/CH2;

: Long press the button to turn on/off the keylock function;

: Press the button to enter the storage system for saving files;

: Press the button to enter the storage system for recalling files.

### Buttons for controlling the channel



: Press the button to turn on/off all channels;

: Press the button to select CH1 as the current channel;

: Press the button to select CH2 as the current channel;

: Press the button to turn on/off output of the current channel;

: Press the button to turn on/off the CH3 output;

### Other buttons

: Press the button to open the fine adjust function and modify the parameter in the minimum step;

: To select between voltage and current. press the A Button longer to enter/exit the OCP mode.

### The Front Panel Terminals

The positive/ negative output terminals of CH1, CH2, CH3, and the common GND for CH1, CH2 are located on the front panel. Refer to later “control panel operation” for wiring method details.

### User Interface

- A Channel Logo;
- B Voltage set/Readback value;
- C Current set/Readback value;

## The Rear Panel

**Description:**

- A Warning message
- B AC power DIP switch
- C Instruction for the AC input voltage
- D AC power socket
- E Fan vent
- F CE certification mark
- G USB interface

### Output Checking

To make sure the instrument can correctly respond to operation from the front panel, please perform the output checking, which includes voltage checking when all channels are with no load and current checking when short circuit occurs.

#### 1. Output voltage checking

(1) With the instrument no load, turn on the power, and make sure the current value displaying is not zero;

(2) Check the output voltage of CH1/CH2.

Turn on CH1/CH2 channel and the instrument acquiescently works in CV mode. Check whether the voltage value is adjustable from 0V to 32V.

#### 2. Current output check

(1) Turn on the power.

(2) Check the output current of CH1/CH2.

Use an insulated wire to connect the positive and negative terminal of CH1/CH2;

Turn on CH1/CH2;

Select voltage and revolve the knob to set the value to 32V;

Select current and revolve the knob to set the value to 0A;

Check whether the current value is adjustable from 0A to 3.2A.

# Control Panel Operation

In this chapter, the function and operation of SPD3303C control panel will be introduced in detail to give you an all-around understanding of it.

**Brief introduction**

Output Summary

CH1/CH2 Independent Output

CH3 Independent Output

Parallel Output

Series Output

Save and Recall

## Output Summary

SPD3303C is designed with three independent outputs, two of which are adjustable in voltage value and the other includes a set of selectable voltage values: 2.5V, 3.3V or 5.0V.

**Independent/Parallel/Series**

SPD3303C has three output modes: independent, parallel and series that could be selected through the track switch on the front panel.

In independent mode, the output current and voltage are controlled respectively.

In parallel mode, the current value is twice that of single channel.

In the series mode, the voltage value is twice that of single channel.

**Constant Current/Voltage**

In constant current mode (series/track mode), the current value is rated. The indicator light displays red and the voltage value are under its rating. The instrument will automatically turn to constant voltage mode when the current value gets less than its dating. (In parallel mode, the accessory channel remains in constant current mode neglecting shift of the current value.)

In constant voltage mode, the voltage value is rated. The indicator light displays green and the current value are under its rating. The instrument will turn to constant current mode when the current value gets up to d its dating.

## CH1/CH2 Independent Output

**Instruction:** CH1 and CH2 are working in independent mode and insulated from the ground.

| | |
|---|---|
| Output ratings | 0~32V / 0~3.2A |

**Operation steps**

1. Make sure that parallel/series mode is off.
2. Connect load to the positive and negative terminals of CH1/CH2.
3. Set the voltage (current) value of CH1/CH2: Firstly, press V (or A ) to select the voltage (current) parameter needed to modify. Then revolve the multi-function knob to set the wanted value (You could press FINE to make accurate adjusting).

   Coarse adjusting: 0.1V or 0.1A each step.

   Fine adjusting: the least precision each step.
4. Open output: Press ON/OFF button to turn on the output, the channel works in CC or CV mode and its indicator light gets lighted immediately.

**Set the OCP mode**

Under the condition of the corresponding channel closed, press the A Button longer to enter/exit the OCP mode. In OCP mode, you can set the overcurrent protection value. If the output current reaches the overcurrent protection value, the channel output will be closed.

## CH3 Independent mode

**Instruction:** CH3 works independently from CH1, CH2, and its voltage and current ratings are: 2.5V, 3.3V, 5V, 3.2A.

| | |
|---|---|
| Output ratings | 2.5V/ 3.3V/ 5V, 3.2A |

**Operation steps:**

1. Connect the load to the positive and negative terminal of CH3 channel.
2. Select the wanted voltage value by moving the “DIP switch” of CH3.
3. Open the output: Press ON/OFF button to turn on the channel and the indicator light gets lighted immediately.

**CV → CC**

When the current value gets higher than 3A, the overload indicator light turns red and the working mode of CH3 turns to CC mode from CV mode.

**Note:** “ Overload ” does not mean abnormal operation.

## CH1/CH2 Series Mode

**Instruction:** In the series mode, CH1 and CH2 are linked internally into one channel controlled by CH1. The output voltage value is twice compared with that of single channel.

| | |
|---|---|
| Output ratings | 0~60V/ 0~3.2A |

**Operation steps：**

1. Press the SER to start the Series mode, and the indicator light turns bright
2. Connect the load to the positive terminal of CH2 and the negative terminal of CH1;
3. Turn on CH1 and set its current value to 3.2A. In the default setup, the instrument works in "Coarse", you can turn to "Fine" by pressing FINE ;

   Coarse: 0.1V or 0.1A each step;

   Fine: the least precision each step;
4. Turn on CH1and set the output voltage/current value by revolving the multi-function knob;
5. Press ON/OFF button to open the output.

**Note:** You can identify the current working state "CC" or "CV" by referring to the indicator light.(red means CV, green means CC)

## CH1/CH2 Parallel Mode

**Instruction:** In the parallel mode, CH1 and CH2 are linked internally into one channel controlled by CH1. The output current value is twice as much as the single channel.

| | |
|---|---|
| Output ratings | 0~32V/ 0~6.4A |

**Operation steps:**

1. Press the PARA button to start Parallel mode, and the indicator light turns bright immediately;
2. Connect the load to the positive and negative terminals of CH1;
3. Press ON/OFF button to open the output and the indicator light turns bright.

   Turn on CH1 and set its output voltage/current value by revolving the multi-function knob. In the default setup, the instrument works in “Coarse”, you could turn to “Fine” by pressing FINE button.

**Note:** You can identity the current working state “CC” or “CV” refer to the indicator light.(red means CV, green means CC). In parallel mode, CH2 only works in CC mode.

## Save and Recall

Five groups of setups can be saved in memory. Contents of setups including:

- Independent/ series/ parallel mode
- Output voltage/ current value

**Steps for saving setup**

1. Set the state needed to save;
2. Press SAVE to enter the save interface;
3. Select the wanted file group by pressing NO.1~5 ;
4. Press SAVE again to save the current state to the specified file group.

**Steps for recalling setup**

1. Press RECALL to enter the recall interface;
2. Select the wanted file group by pressing NO.1~5 ;
3. Press RECALL again to read the previously saved file.

# Version Upgrade

The software of the instrument is upgraded with a fixed name file via PC management software with USBTMC. The upgrade method is below:

**Upgrade in normal Interface**

1. Open the EasyPower software after correct connection of the USB cable with the instrument.
2. Click the Upgrade option under the Version menu to enter the USB firmware upgrade interface. As shown in figure 1:

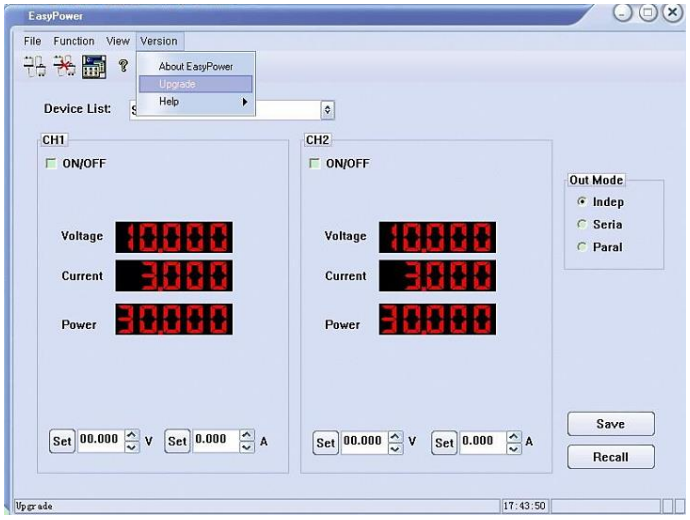



Figure 1

3. Click the “Normal Mode” option, then select the will upgrade file which is of “ugf” format.

Figure 2

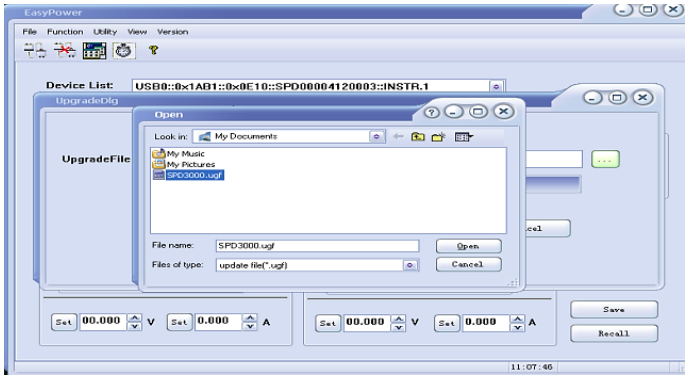



Figure 3

4. As it shows in figure 4, click the “Upgrade” to start upgrading. The instrument will run the upgraded software as soon as the upgrading completed.

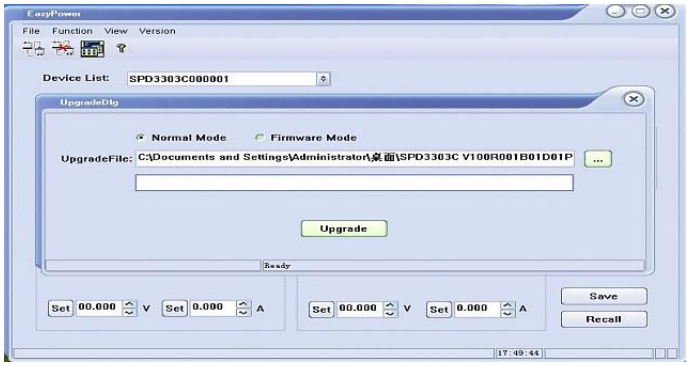



Figure 4

**Upgrade via the Guiding Procedure**

Upgrading via the guiding procedure can be used if the upgrading method above failed.

**Specific steps:**

1. Pressing the knob prior to power on the instrument to enter the guiding procedure mode.
2. As shown in figure 2, select the “Firmware Mode” option instead and the following upgrading steps are the same as method 1.

# Remote Control

SCPI Commands can be used to conduct remote control on the SPD3303C Power Supply through the USBTMC. To realize the remote control, the installation of EasyPower or NI ( Measurement & Automation ) software for the computer is required prior to connecting the instrument with it using an USB cable.

## Command List

1. *IDN?
2. *SAV
3. *RCL
4. INSTrument {CH1|CH2}
5. INSTrument ?
6. MEASure:CURRent?
7. MEAsure:VOLTage?
8. [SOURce:]CURRent <current>
9. [SOURce:]CURRent ?
10. [SOURce:]VOLTage <volt>
11. [SOURce:]VOLTage?
12. OUTPut
13. OUTPut:TRACk
14. SYSTem:ERRor?
15. SYSTem:VERSion?
16. SYSTem:STATus?

# Command Description

### 1. *IDN?

| | |
|---|---|
| **Command format** | *IDN? |
| **Description** | Query the manufacturer, product model, series NO. and software version. |
| **Return Info** | Manufacturer, product model, series NO., software version. |
| **Example** | Siglent, SPD3303C, SPD00001130025, 1.01.01.02. |

### 2. *SAV

| | |
|---|---|
| **Command format** | *SAV <name> |
| **Description** | Save the current state in nonvolatile memory with the specified name. |
| **Example** | *SAV 1 |

### 3. *RCL

| | |
|---|---|
| **Command format** | *RCL <name> |
| **Description** | Recall state that previously saved. |
| **Example** | *RCL 1 |

### 4. INSTrument

| | |
|---|---|
| **Command format** | INSTrument <CH1\|CH2> |
| **Description** | Select the channel that will be operated. |
| **Example** | INSTrument CH1 |

| | |
|---|---|
| **Command format** | INSTrument? |
| **Description** | Query the current operating channel |
| **Example** | INSTrument? |
| **Return Info** | CH1 |

### 5. MEASure

| | |
|---|---|
| **Command format** | MEASure:CURRent? < CH1\|CH2> |
| **Description** | Query current value for specified channel, if there is no specified channel, query the current channel. |
| **Example** | MEASure:CURRent? CH1 |
| **Return Info** | 3.000 |

| | |
|---|---|
| **Command format** | MEASure:VOLTage? < CH1\|CH2> |
| **Description** | Query voltage value for specified channel, if there is no specified channel, query the current channel. |
| **Example** | MEASure:VOLTage? CH1 |
| **Return Info** | 30.000 |

### 6. SOURce

| | |
|---|---|
| **Command format** | <SOURce:>CURRent <value><br><SOURce>:={CH1 \| CH2} |
| **Description** | Set current value for the current channel |
| **Example** | CH1:CURRent 0.5 |

| | |
|---|---|
| **Command format** | <SOURce>:CURRent?<br><SOURce>:={CH1 \| CH2} |
| **Description** | Query the current value for the current channel. |
| **Example** | CH1:CURRent? |
| **Return Info** | 0.5 |

| | |
|---|---|
| **Command format** | <SOURce>:VOLTage <value><br><SOURce>:={CH1 \| CH2} |
| **Description** | Set voltage value for the current channel |
| **Example** | CH1:VOLTage 25 |

| | |
|---|---|
| **Command format** | <SOURce>:VOLTage? |
| | <SOURce>:={CH1 \| CH2} |
| **Description** | Query the voltage value for the current channel. |
| **Example** | CH1:VOLTage? |
| **Return Info** | 25 |

### 7. OUTPut

| | |
|---|---|
| **Command format** | OUTPut <SOURce>, <state> |
| | <SOURce>:={CH1 \| CH2\| CH3}; <state>:={ON \| OFF} |
| **Description** | Turn on/off the specified channel. |
| **Example** | OUTPut CH1,ON |

| | |
|---|---|
| **Command format** | OUTPut:TRACK <NR1> |
| | <NR1>:={0[Independent] \| 1[Series] \| 2[Parallel]} |
| **Description** | Select the operation mode |
| **Example** | OUTPut:TRACK 0 |

### 8. SYSTem

| | |
|---|---|
| **Command format** | SYSTem:ERRor? |
| **Description** | Query the error code and the information. |

| | |
|---|---|
| **Command format** | SYSTem:VERSion? |
| **Description** | Query the software version. |
| **Example** | SYSTem:VERSion? |
| **Return Info** | 1.01.01.02 |

**Command format** SYSTem:STATus?

**Description** Query the current working state.

**Example** SYSTem:STATus?

**Return info** 0x0224

**Instruction** The return info is in Hexadecimal format, which means that you must translate the return info into binary format. The correspondence relationship is as shown below.

| Bit NO. | Corresponding State |
|---|---|
| 0 | 0: CH1 CV mode; 1: CH1 CC mode |
| 1 | 0: CH2 CV mode; 1: CH2 CC mode |
| 2,3 | 01: Independent mode; 10: Parallel mode; 11: Series mode |
| 4 | 0: CH1 OFF 1: CH1 ON |
| 5 | 0: CH2 OFF 1: CH2 ON |

## 9. LOCK

**Command format** *LOCK

**Description** Lock the keys

**Example** *LOCK

**Command format** *UNLOCK

**Description** Unlock the keys

**Example** *UNLOCK

# Troubleshooting

| | |
|---|---|
| **Question 1:** | What to do if there occurs a short circuit on output terminal? |
| **Answer1:** | There are over current protection and short circuit protection inside the power, so the current will be controlled in safety range. |

| | |
|---|---|
| **Question 2:** | Is it abnormal that the CH3 overload indicator turns bright ? |
| **Answer 2:** | No. That only means the current value reaches the maximum 3A. For better use, you'd better decrease the output load. |

| | |
|---|---|
| **Question 3:** | Is it normal that in the series mode, the voltage and current value of one channel is respectively 0V and not 0A, while that of another channel proves not to be 0? |
| **Answer 3:** | Yes. Because when the current output load gets higher than the limited, the working mode turns to CC from CV. |

| | |
|---|---|
| **Question 4:** | what to do if upgrading fails? |
| **Answer 4:** | please do it again. |

| | |
|---|---|
| **Question 5:** | Is it normal that the practical value is a little different from the value you set (exceed performance standard), or even shifts slowly on startup? |
| **Answer 5:** | Yes. During the startup, components inside the instrument are getting stable in 30 minutes, which lead to going up of the temperature. |

| | |
|---|---|
| **Question 6:** | What if the circuit air switch turns off automatically when power on? |
| **Answer 6:** | First of all, make sure if the rating of the air switch is proper (For instance: the rating of air switch B and C should be respectively over 16A and 10A). If the failure still exits beyond the reason, check if there occurs a short circuit, or return it to the factory to have it repaired by qualified personnel. |

# Specification

Test conditions: warm-up for about 30minitus, with temperature between +20℃~+30℃.

| | | |
|---|---|---|
| Output Ratings | CH1/CH2 independent | 0～32V , 0～3.2A |
| | CH1/CH2 series | 0～60V , 0～3.2A |
| | CH1/CH2 parallel | 0～32V , 0～6.4A |
| | CH3 | 2.5V/3.3V/5.0V , 3.2A |
| Constant Voltage Mode | Line regulation | ≤0.01%+3mV |
| | Load regulation | ≤0.01%+3mV |
| | Ripple and noise | ≤1mVrms（ 5Hz ～ 1MHz） |
| | Recover time | ≤50 μs(50% load change , minimum load 0.5A) |
| | Temperature coefficient | ≤300ppm/℃ |
| Constant Current Mode | Line regulation | ≤0.2%+3mA |
| | Load regulation | ≤0.2%+3mA |
| | Ripple and noise | ≤3mArms |
| CH3 | Line Regulation | ≤0.01%+3mV |
| | Load Regulation | ≤0.01%+3mV |
| | Ripple and noise | ≤1mVrms（ 5Hz ～ 1MHz） |
| Tracking Operation | Track error | ≤0.5%+10mV of Master(No Load) |
| Parallel Mode | Line Regulation | ≤0.01%+3mV |
| | Load Regulation | ≤0.01%+3mV |
| Series Mode | Line Regulation | ≤0.01%+5mV |
| | Load Regulation | ≤300mV |
| Resolution | Voltage | 10mV |
| | Current | 10mA |
| Display | Ammeter | 3.2A full scale, 3 digits LED display |
| | Voltmeter | 32V full scale, 4 digits LED display |
| Accuracy | Program accuracy | Voltage: ±(0.5% of reading + 2digits)<br>Current: ±(0.5% of reading + 2digits) |
| | Readback accuracy | Voltage: ±(0.5% of reading + 2digits)<br>Current: ±(0.5% of reading + 2digits) |
| Insulation | Case to terminal | 20MΩ or above (DC 500V) |
| | Case to AC line | 30MΩ or above (DC 500V) |
| Operating environment | Indoor | |
| | Elevation | ≤2000 m |
| | Environment temperature | 0 ~ 40℃ |
| | Relative humidity | ≤80% |
| | Installation level | II |
| | Pollution level | 2 |
| Storage environment | Environment temperature | -10 ~ 70℃ |
| | Relative humidity | ≤70% |
| Power supply | AC 100V/120V/220V/230V±10%, 50/60HZ | |
| Size | 275mm x 225mm x 136mm | |
| Weight | 7.5kg | |

# Contact SIGLENT

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## About SIGLENT

SIGLENT is an international high-tech company, concentrating on R&D, sales, production and services of electronic test & measurement instruments.

SIGLENT first began developing digital oscilloscopes independently in 2002. After more than a decade of continuous development, SIGLENT has extended its product line to include digital oscilloscopes, isolated handheld oscilloscopes, function/arbitrary waveform generators, RF/MW signal generators, spectrum analyzers, vector network analyzers, digital multimeters, DC power supplies, electronic loads and other general purpose test instrumentation. Since its first oscilloscope was launched in 2005, SIGLENT has become the fastest growing manufacturer of digital oscilloscopes. We firmly believe that today SIGLENT is the best value in electronic test & measurement.


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