SDL1000X Programmable DC Electronic Load

Quick Start

EN01E

SIGLENT TECHNOLOGIES CO.,LTD

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Contents

General Safety Summary

Carefully read the following safety precautions to avoid any personal injury or damage to the instrument and any products connected to it. To avoid potential hazards, please use the instrument as specified.

Use the Proper Power Cord

Only the power cord designed for the instrument and authorized by local government regulations should be used.

Power supply

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

Use proper fuse

The fuse types: 110V/220V: T315mA/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.

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

Ground the instrument

The instrument is grounded through the protective ground conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to the earth. Make certain that the instrument is properly grounded.

Observe all terminal ratings

To avoid fire or electric shock, please observe all ratings and symbols on the instrument. Read this guide carefully to learn 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℃

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.

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 hazards that may happen.
WARNING	Indicates potential injury or hazards 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

Warning

Protective Earth Ground

Earth Ground

Power Switch

Allgemeine Sicherheitsübersicht

Lesen Sie die folgenden Sicherheitshinweise sorgfältig durch, um Verletzungen oder Schäden am Gerät und an den daran angeschlossenen Produkten zu vermeiden. Um mögliche Gefahren zu vermeiden, verwenden Sie das Gerät bitte wie angegeben.

Verwenden Sie ein geeignetes Netzkabel

Verwenden Sie nur das für das Gerät vorgesehene und im jeweiligen Land zugelassene Netzkabel.

Erden Sie das Gerät

Das Gerät ist über den Schutzleiter der Netzleitung geerdet. Um einen elektrischen Schlag zu vermeiden, vergewissern Sie sich bitte, dass das Gerät korrekt geerdet ist, bevor Sie die Eingangs- oder Ausgangsklemmen des Geräts anschließen.

Schließen Sie das Messkabel richtig an

Die Kabelschirmung (Masse) des Messkabels ist gleich dem Potential der Erde, schließen Sie das Messkabel also nicht an eine hohe Spannung an.

Überprüfen Sie die Nennwerte aller Klemmen

Um Feuer oder einen elektrischen Schlag zu vermeiden, beachten Sie bitte alle Angaben und Hinweise auf dem Gerät. Bevor Sie das Gerät anschließen, lesen Sie bitte das Handbuch sorgfältig durch, um weitere Informationen über die Nennwerte zu erhalten.

Verwenden Sie einen ordnungsgemäßen Überspannungsschutz

Stellen Sie sicher, dass keine Überspannung (z. B. durch ein Gewitter) an das Gerät gelangen kann, da sonst die Gefahr eines elektrischen Schlages besteht.

Schutz vor Elektrostatik

Betreiben Sie das Gerät in einer Umgebung, die vor elektrostatischer Entladung geschützt ist, um Schäden durch statische Entladung zu vermeiden. Erden Sie vor dem Anschließen immer sowohl den Innen- als auch den Außenleiter des Kabels, um statische Aufladung abzubauen.

Für gute Belüftung sorgen

Eine unzureichende Belüftung kann zu einem Temperaturanstieg führen, der schließlich das Gerät beschädigt. Sorgen Sie daher für eine gute Belüftung und überprüfen Sie regelmäßig die Ansaugung und den Lüfter.

Vermeiden Sie freiliegende Schaltkreise oder Komponenten

Berühren Sie keine freiliegenden Kontakte oder Bauteile, wenn das Gerät eingeschaltet ist.

Richtige Sicherung verwenden

Verwenden Sie nur die angegebene Sicherung.

Betreiben Sie das Gerät nicht ohne Abdeckungen

Betreiben Sie das Gerät nicht, wenn Abdeckungen oder Verkleidungen entfernt sind.

Betreiben Sie das Gerät nicht bei vermuteten Defekten

Wenn Sie vermuten, dass das Gerät beschädigt ist, lassen Sie es vor dem weiteren Betrieb von qualifiziertem Servicepersonal überprüfen. Jegliche Wartung, Einstellung oder Austausch, insbesondere von Schaltkreisen oder Zubehör, muss von SIGLENT autorisiertem Personal durchgeführt werden.

Nicht in feuchter Umgebung betreiben

Um einen Kurzschluss im Geräteinneren oder einen elektrischen Schlag zu vermeiden, betreiben Sie das Gerät nicht in feuchter Umgebung.

Betreiben Sie das Gerät nicht in explosionsgefährdeten Umgebungen

Um Schäden am Gerät oder Personenschäden zu vermeiden, ist es wichtig, das Gerät nicht in explosionsgefährdeter Umgebung zu betreiben.

Halten Sie die Produktoberflächen sauber und trocken

Um den Einfluss von Staub und/oder Feuchtigkeit in der Luft zu vermeiden, halten Sie die Oberfläche des Geräts bitte sauber und trocken.

Sicherheit bei der Handhabung

Bitte behandeln Sie das Gerät während des Transports vorsichtig, um Schäden an Tasten, Drehknopfschnittstellen und anderen Teilen auf den Bedienfeldern zu vermeiden.

Es dürfen nur Tastköpfe verwendet werden, die den Spezifikationen des Herstellers entsprechen

Bei Verwendung von 2X/.../10000X-Sondenbaugruppen müssen die Sondenbaugruppen durch eine doppelte oder verstärkte Isolierung von den gemessenen Stromkreisen isoliert sein.

Alle Sondenbaugruppen sollten die Anforderungen von UL 61010-031 und CAN/CSA-C22.2 Nr. 61010-031-07 erfüllen.

Das Gerät darf nicht so positioniert werden, dass es schwierig ist, die Trennvorrichtung (abnehmbarer Stecker) zu bedienen.

Wenn das Gerät auf eine Weise verwendet wird, die nicht vom Hersteller angegeben ist, kann der Schutz, den das Gerät bietet, beeinträchtigt warden.

Sicherheitsbegriffe und symbole

Begriffe in diesem Handbuch. Diese Begriffe können in diesem Handbuch vorkommen:

WARNUNG

Warnhinweise weisen auf Bedingungen oder Praktiken hin, die zu Verletzungen oder zum Verlust des Lebens führen können.

VORSICHT

Vorsichtshinweise weisen auf Bedingungen oder Praktiken hin, die zu Schäden an diesem Produkt oder anderen Gegenständen führen können.

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

GEFAHR	Weist auf direkte Verletzungen oder Gefahren hin, die auftreten können.
WARNUNG	Weist auf mögliche Verletzungen oder Gefährdungen hin, die auftreten können.
VORSICHT	Weist auf mögliche Schäden am Gerät oder an anderen Gegenständen hin, die eintreten können.

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

Hazardous Voltage

Protective Earth Ground

Warning

Terminal Ground

Power Switch

Wenn Sie solche Symbole auf dem Produkt finden, ziehen Sie das Handbuch zu Rate, um die Art der potenziellen Gefahr und die zu ergreifenden Maßnahmen zu erfahren

General Care and Cleaning

Care:

Do not store or leave the instrument in direct sunshine for extended periods.

To avoid damage to the instrument or probes, please do not expose them to fog, liquid, or solvents.

Cleaning:

Please perform the following steps to clean the instrument and probes.

1. Disconnect the instrument from all power sources and then clean it with a soft damp cloth.
2. Clean the loose dust on the outside of the instrument and probe with a soft cloth.

To avoid damage to the surface of the instrument and probe, please do not use any corrosive liquid or chemical cleansers.

Make sure that the instrument is completely dry before restarting it to avoid potential short circuits or personal injury.

General Inspection

- **Inspect the shipping container**

Keep the original shipping container and 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 will not provide free maintenance or replacement if the instrument has been damaged in shipment.

- **Inspect the instrument**

If there are instruments found damaged, defective, or have failed any electrical and / or mechanical tests, please contact SIGLENT.

- **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.

SDL1000X Brief Introduction

SDL1000X/SDL1000X-E series Programmable DC Electronic Load has a 3.5 inch TFT-LCD display, and comes with a simple, user-friendly interface and superb performance specifications. The SDL1020X/ SDL1020X-E comes with an input range of 150 V/30 A @ 200 W. The SDL1030X/ SDL1030X-E comes with an input range of 150 V/30 A @ 300 W. The SDL1000X series leads with measurement resolution of 0.1mV/0.1mA and the base SDL1000X-E series resolution is 1mV/1mA. Adjustable current slew rate range is 0.001 A/μs~2.5 A/μs, and it comes with built-in RS232/USB/LAN communication interfaces. Standard SCPI communication protocol is used to establish an intelligent testing platform for applications in various industries, such as the power industry, battery industry, LED lighting, automotive electronics, and aerospace.

Main features of SDL1000X

- SDL1020X (Single channel): DC 150 V/30 A, total power up to 200 W.
- SDL1030X (Single channel): DC 150 V/30 A, total power up to 300 W.
- 4 Static modes / Dynamic mode: CC/CV/CR/CP.
- CC Dynamic modes, continuous, pulsed, toggled.
- CC Dynamic mode: 25 KHz, CP Dynamic mode: 12.5 KHz, CV Dynamic mode: 0.5 Hz.
- Adjustable current slew rate range 0.001 A/us~2.5 A/us.
- Min read-back resolution: 0.1 mV, 0.1 mA.
- Measuring speed of voltage and current: up to 500 KHz.
- List can edit one hundred steps; Program support programing fifty group data.
- Over current protection test. Over power protection test, Battery test, short circuit and CR-LED test functions.
- 4-wire SENSE compensation mode function.
- External voltage and current control function.
- Voltage, Current monitoring via 0-10V.
- 3.5 inch TFT-LCD display, capable of displaying multiple parameters and states simultaneously.
- With memory function in case of power-down.
- OCP, OVP, OPP, OTP and LRV protection.
- Graphical display of waveform Function of Restore library Function of test the rise and fall time base on the voltage Von and Vlatch functions.
- Smart fan control.
- Remote control and measurements via PC.

Panel Introduction

Front Panel

1. **LCD**
2. **Knob**
3. **Function button and power key**
4. **Input Terminal**
5. **USB interface**
6. **Power Key**
7. **Function Key**

1. LCD

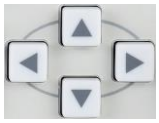
The 3.5 inch TFT-LCD display is used to display system parameter settings, system output state, wave forms, menu options, prompt messages, etc.

2. Knob

When setting parameters, rotate the knob to increase or decrease the value of the digit at the cursor. When browsing the setting object (switch of buzzer, sense, voltage and current protection, store or read files and switch modes, etc.), rotate the knob to quickly move the cursor or switch options.

3. Function button and power key

CC	Press the button to enter the constant current mode. Enter DYN mode by pressing the shift button at the same time.
CV	Press the button to enter the constant voltage mode. Enter AUX mode by pressing the shift button at the same time.

CP	Press the button to enter the constant power mode. Enter Utility mode by pressing the shift button at the same time.
CR	Press the button to enter the constant resistor mode. Enter LED mode by pressing the shift button at the same time.
Display	Press the button to enter Display mode. Enable key lock function by pressing the shift button at the same time.
Restore	Press the button to enter Restore function.
Shift	Press the button to allow a button's secondary function to be selected.
Short	Press down the button to enter Restore function.
	Use the right, left, up, down buttons to move the cursor in that direction or select the appropriate field.
0~9	Select the appropriate numerical digit.
.	Decimal point.
	Push to Enter a value.
	Push to Enter a value.

4. Input Terminal

Physical input connections for the external circuit under test.

5. USB interface

Interface port used to insert USB device. Supports FAT32 file system formats.

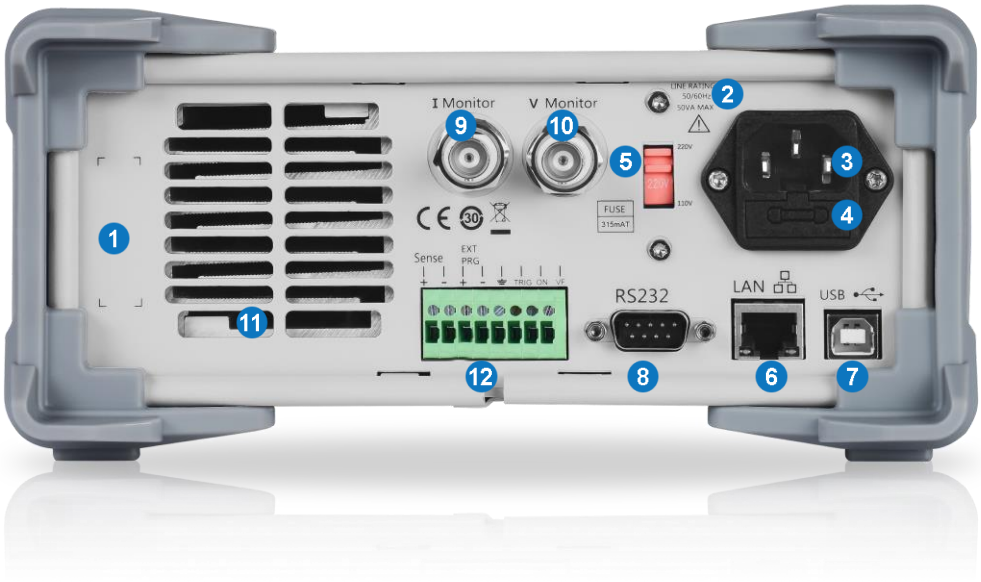
6. Power key

Turns the instrument On or Off.

7. Function key

Used to select different interface functions.

Rear Panel



1. **Warning message**
2. **AC input voltage description**
3. **AC power socket**
4. **Fuse**
5. **AC line power selection switch**
6. **LAN interface**
7. **USB device**
8. **RS232 interface**
9. **Analog current monitor output**
10. **Analog voltage monitor output**
11. **FAN**
12. **Sense terminal, External control terminal, PWM output terminal**

1. Warning message

Note reminding user to ground the instrument and that non-professional personnel should not disassemble the instrument.

2. AC input voltage description

The specified input voltage, frequency, and fuse rating.

3. AC power socket

The socket of AC input power.

4. Fuse

The needed specified fuse relate to the input voltage (Please refer to the AC input voltage description).

5. AC line power selection switch

AC Input Voltages: 110/220 V.

6. **LAN interface**

   Use to connect to the local network by RJ45 interface.

7. **USB device**

   Connects the instrument (as “slave” device) to external USB device (such as, USB storage device or external computer).

8. **RS232 interface**

   Connect to the computer via 9-pin RS232 cable.

9. **Analog current monitor output**

   User can observe the DUT output current level by connecting to an oscilloscope to monitor the current level.

10. **Analog voltage monitor output**

    To note to ground the instrument and nonprofessional personnel should not disassemble the instrument and so on.

11. **FAN**

12. **Sense terminal, External control terminal, PWM output terminal**

    Terminals used in conjunction with various external functions.

Connect Power

The SDL1000X load supports a variety of AC line power input values. For each line voltage, the rear panel voltage selector settings are to be set according to the table below:

Table 1: AC input line power specifications

AC Power Input	Voltage selector configure
110 Vac ± 10%, 50Hz~60Hz	 110V
220 Vac ± 10%, 50Hz~60Hz	 220V

Please connect the power carefully by following the steps below:

1. **Check the input power**

   Make sure that the AC line power to be connected to the instrument meets the requirements in Table 1.

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

   Make certain that the voltage selector setting located at the rear panel of the instrument matches the actual input voltage.

3. **Check the fuse**

   When the instrument leaves the factory, the specified fuse is installed. Please check to verify the fuse matches the actual input voltage according to the "Input Power Requirements" on the rear panel of the instrument.

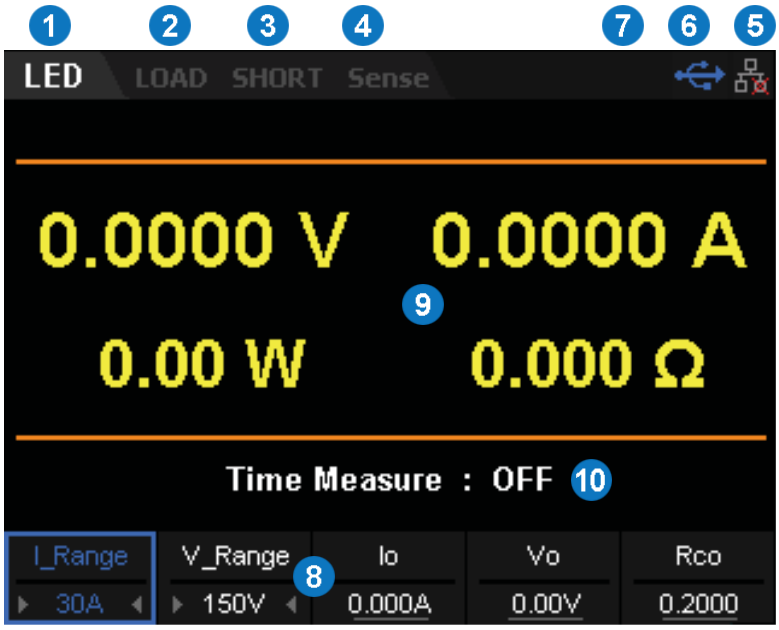
4. **Connect the power**

   Connect the instrument to the AC power source using the power cord provided in the accessories. Then press the button  to turn on the electronic load.

	**WARNING** Before switching on the input power supply voltage, please disconnect the power supply before setting the voltage selector To the appropriate gear.

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

User Interface



1. **Displays the load's mode**
2. **Displays the load's state**
3. **Displays a Short state**
4. **Remote sense mode**
5. **LAN connection icon**
6. **USB connection icon**
7. **Keyboard lock**
8. **Setting value**
9. **Measured output values**
10. **Voltage slew rate**

To Power on the instrument

After the instrument is connected to the power source, press the Power key at the left bottom of the front panel to power on the instrument. When the instrument is turned on, it will undergo a self-test. If the instrument passes the self-test, the welcome interface is displayed; otherwise, self-test failure information will be displayed. If this does occur please contact **SIGLENT**.

⚠	**CAUTION** Ensure that the AC selector setting on the rear panel of the instrument matches the actual AC input voltage, otherwise, the electronic load could be damaged.

⚠	**CAUTION** Please pay close attention to the positive and negative polarities of the electronic load to avoid wrong connection. Otherwise, the load could be damaged.

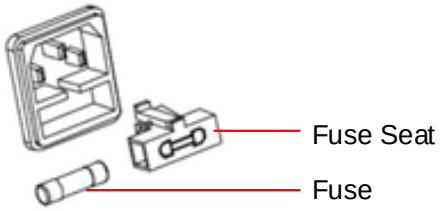
Fuse Replacement

The specifications of the fuse are relative to the actual input line voltage, shown in the table below. You can also refer to the rear panel “input power requirement”

Input voltage	Fuse specification
110 Vac	T315 mA / 250V
220 Vac	T315 mA / 250V

To replace the fuse, please 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 gently pry out the fuse seat.



3. Adjust the power voltage selector manually to select the correct voltage scale.
4. Take out the fuse and replace it with the specified fuse (for the corresponding relationship between the input voltage and fuse specification, refer to the “input power requirement” on the rear panel).
5. Re-insert the fuse holder into the power socket (please pay attention to the direction in which it is inserted).

⚠	**WARNING** To avoid personal injuries, unplug the power supply before replacing the fuse. To avoid electric shock or fire, select the proper power source settings and replace only with the proper fuse

Troubleshooting

The following are some common failures and their solutions. If the problem persists after following the listed steps, please contact SIGLENT.

1. The instrument cannot power up.

1) Check whether the power source is correctly connected.
2) Check whether the power switch at the front panel is on.
3) Remove the power cord and check whether the voltage selector is at the proper setting, whether the specification of the fuse is correct and whether the fuse is intact. If the fuse needs to be changed, refer to "**To Replace the Fuse**".
4) If the problem remains, please contact **SIGLENT**.

2. The USB device cannot be identified.

1) Check whether the USB device is correctly working.
2) Check whether the USB Host interface of the electronic load is correctly working.
3) Make certain to use a Flash U-disk. This electronic load cannot support hard drive disk devices.
4) Make certain to use FAT32 system format.
5) Restart the electronic load then insert the USB device.
6) If the problem remains, please contact **SIGLENT**.

3. The electronic load is working incorrectly.

1) Check whether the input connection wiring is correct.
2) Check whether the power is turned on.
3) Check whether the value of the conduction voltage.
4) Check whether the load settings for power, voltage and current meet the requirements.
5) If the problem remains, please contact **SIGLENT.**

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