English

中文

RIGOL

Quick Guide

DS2000E Series Digital Oscilloscope

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RIGOL TECHNOLOGIES, INC.

Guaranty and Declaration

English

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E-mail: service@rigol.com
Website: www.rigol.com

English

General Safety Summary

1. Only the exclusive power cord designed for the instrument and authorized for use within the local country could be used.
2. Ensure that the instrument is safely grounded.
3. Observe all terminal ratings.
4. Use proper overvoltage protection.
5. Do not operate without covers.
6. Do not insert objects into the air outlet.
7. Use the proper fuse.
8. Avoid circuit or wire exposure.
9. Do not operate the instrument with suspected failures.
10. Provide adequate ventilation.
11. Do not operate in wet conditions.
12. Do not operate in an explosive atmosphere.
13. Keep instrument surfaces clean and dry.
14. Prevent electrostatic impact.
15. Handle with caution.

Safety Notices and Symbols

Safety Notices in this Manual:

WARNING
Indicates a potentially hazardous situation or practice which, if not avoided, will result in serious injury or death.

CAUTION
Indicates a potentially hazardous situation or practice which, if not avoided, could result in damage to the product or loss of important data.

Safety Terms on the Product:

DANGER	It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.
WARNING	It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.
CAUTION	It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

English

Safety Symbols on the Product:

Hazardous Voltage

Safety Warning

Protective Earth Terminal

Chassis Ground

Test Ground

Care and Cleaning

Care

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

Cleaning

Clean the instrument regularly according to its operating conditions.

1. Disconnect the instrument from all power sources.
2. Clean the external surfaces of the instrument with a soft cloth dampened with mild detergent or water. When cleaning the LCD, take care to avoid scarifying it.

CAUTION

To avoid damage to the instrument, do not expose it to caustic liquids.

WARNING

To avoid short-circuit resulting from moisture or personal injuries, ensure that the instrument is completely dry before connecting it to the power supply.

English

Document Overview

This manual gives you a quick review about the front and rear panel of DS2000E series, the user interface, and the basic operation method.

Tip
For the latest version of this manual, download it from the official website of **RIGOL** (www.rigol.com).

Format Conventions in this Manual

1. Front panel key: The key on the front panel is denoted by the format of "Key Name (Bold) + Text Box" in the manual. For example, **Utility** indicates the "Utility" key on the front panel.
2. Menu softkey: The menu softkey is denoted by the format of "Menu Word (Bold) + Character Shading". For example, **System** denotes the "System" menu softkey under **Utility**.
3. Operation step: The next step of operation is denoted by an arrow "→". For example, **Utility** → **System** denotes that first press **Utility**, and then press the **System** softkey.

Content Conventions in this Manual

DS2000E series includes the following models. Unless otherwise specified, this manual takes DS2202E as an example to introduce DS2000E series and its basic operations.

Model	Analog Bandwidth	No. of Channels
DS2102E	100 MHz	2
DS2202E	200 MHz	2

General Inspection

English

1. Inspect the packaging

If the packaging has been damaged, do not dispose the damaged packaging or cushioning materials until the shipment has been checked for completeness and has passed both electrical and mechanical tests.

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

2. Inspect the instrument

In case of any mechanical damage, missing parts, or failure in passing the electrical and mechanical tests, contact your **RIGOL** sales representative.

3. Check the accessories

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

English

Product Overview

Based on the UltraVision technology, DS2000E is a digital oscilloscope with high performance. It is equipped with extremely high memory depth, wide dynamic range, superb waveform capture rate, and comprehensive trigger functions. It also features hardware waveform recording function and good display effects. As a rare debugging instrument, it has been widely applied to various industries and fields, such as communications, aerospace, defense, embedded systems, computers, research, and education. It is the excellent representative of the 200 MHz digital oscilloscope type with the most comprehensive functions and excellent specifications.

For descriptions of the front panel, refer to Figure 1 and Table 1; for descriptions of the rear panel, refer to Figure 2 and Table 2; and for descriptions of the main interface (display screen), refer to Figure 3 and Table 3.

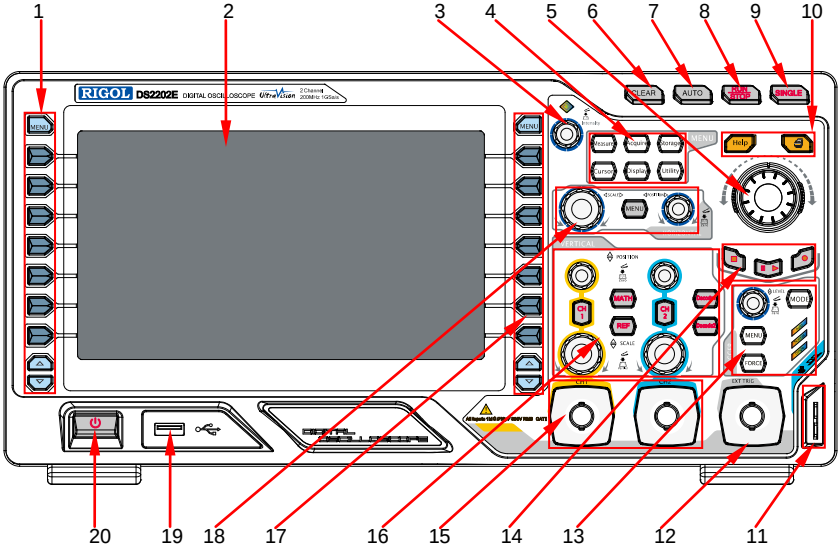


Figure 1 Front Panel

English

Table 1 Front Panel Description

No.	Description	No.	Description
1	Measurement Menu Softkeys	11	Compensation Signal Output Terminal/Ground Terminal
2	LCD	12	External Trigger Input Terminal
3	Multi-function Knob	13	Trigger Control Area
4	Function Keys	14	Waveform Recording/Playback Keys
5	Navigation Knob	15	Analog Channel Input Terminals
6	Clear Key	16	Vertical Control Area
7	AUTO Key	17	Function Menu Softkeys
8	Run/Stop Key	18	Horizontal Control Area
9	Single Trigger Control Key	19	USB HOST Interface
10	Help/Print Key	20	Power Key

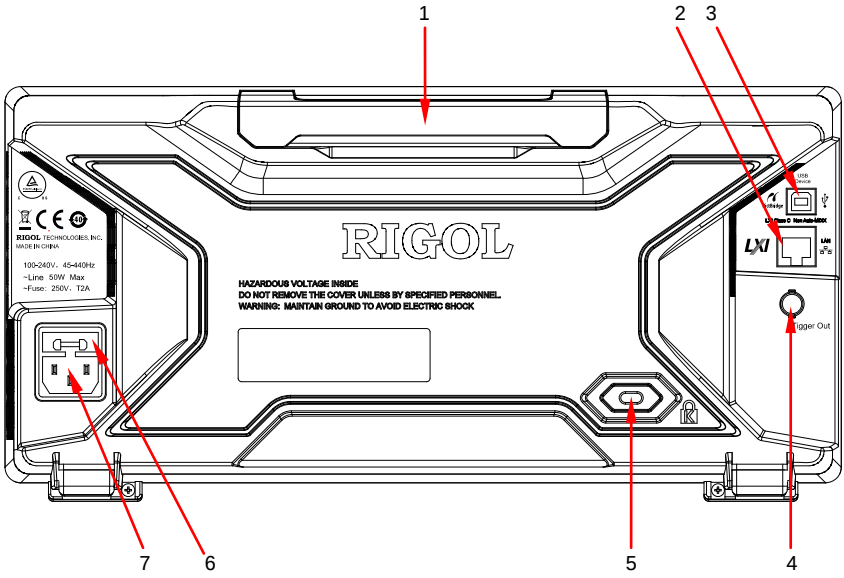


Figure 2 Rear Panel

English

Table 2 Rear Panel Description

No.	Description
1	Handle
2	LAN Interface
3	USB DEVICE Interface
4	Trigger Output Interface
5	Lock Hole
6	Fuse
7	AC Power Cord Connector

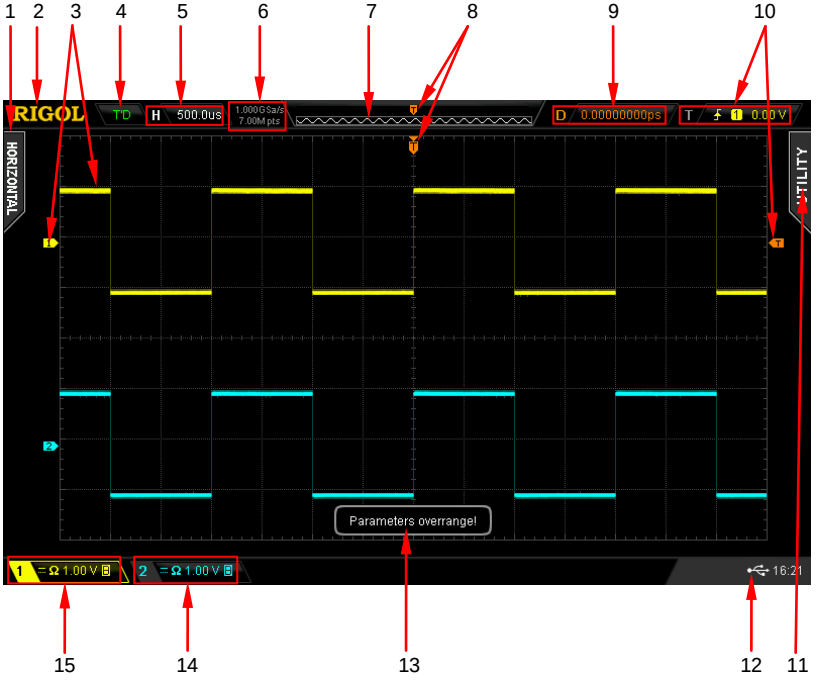


Figure 3 User Interface

Table 3 User Interface Icons

No.	Description	No.	Description
1	Auto Measurement Option	9	Horizontal Position
2	Company Logo	10	Trigger Setting
3	Analog Channel Label and Waveforms	11	Operation Menu
4	Operating Status	12	Notification Area
5	Horizontal Time Base	13	Message Box
6	Sample Rate and Memory Depth	14	CH2 Status Label
7	Waveform Memory	15	CH1 Status Label
8	Trigger Position		

To Prepare for Use

To Adjust the Supporting Legs

Adjust the supporting legs properly to use them as stands to tilt the oscilloscope upwards for stable placement of the oscilloscope as well as better operation and observation.

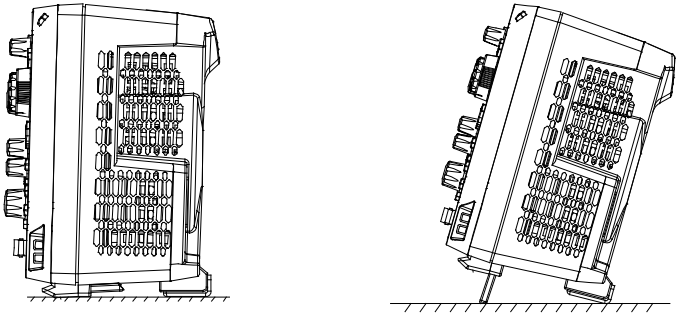


Figure 4 To Adjust the Supporting Legs

English

To Connect to AC Power

The power requirements of the oscilloscope are 100-240 V, 45-440 Hz. Please use the power cord provided in the accessories to connect the oscilloscope to the AC power source, as shown in the figure below. After you turn on the power switch, the oscilloscope is connected to power, and the Power key located at the lower left corner of the front panel is blinking.

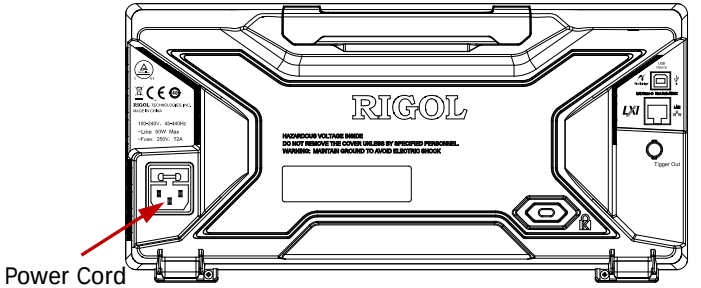


Figure 5 To Connect to AC Power

Turn-on Checkout

When the oscilloscope is connected to power, press the Power key at the lower-left corner of the front panel to start the oscilloscope. During the start-up process, the oscilloscope performs a series of self-tests. You can hear the switching sound of the relay. After the self-test, the welcome screen is displayed. The "Current Options" dialog box will be displayed if your instrument currently has installed the trial versions of the options. From this dialog box, you can view the type, the name, the version, and the remaining trial time of the option currently installed. The instrument is installed with the trial versions of the options before leaving factory. Its remaining trial time is about 2,000 minutes.

To Connect the Probe

English

RIGOL's DS2000E series is equipped with a passive probe. For details about the models of the probe, refer to *DS2000E DataSheet*. For detailed technical information of the probes, please refer to the corresponding Probe User's Guide.

To Connect the Probe:

1. Connect the BNC terminal of the probe to an analog channel input of the oscilloscope at the front panel.
2. Connect the ground alligator clip of the probe to the circuit ground terminal and then connect the probe tip to the circuit point under test.

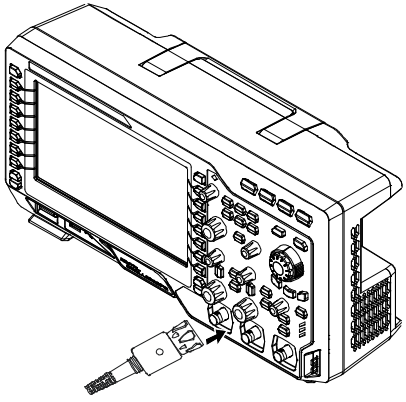


Figure 6 To Connect the Probe

English

Function Inspection

1. Press **Storage** → **Default** to restore the oscilloscope to its default configuration.
2. Connect the ground alligator clip of the probe to the "Ground Terminal" as shown in the figure below.
3. Use the probe to connect the input terminal of CH1 of the oscilloscope and the "Compensation Signal Output Terminal" of the probe.

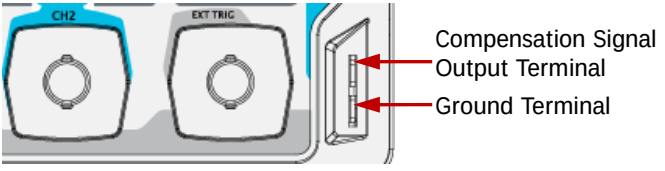


Figure 7 Compensation Signal Output Terminal/Ground Terminal

4. Set the probe attenuation to 10X, and then press **AUTO**.
5. Observe the waveform on the display. In normal condition, the square waveform as shown in the figure below should be displayed.

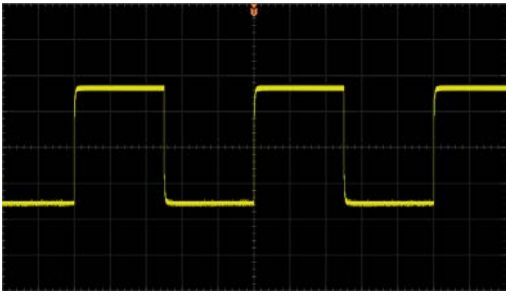


Figure 8 Square Waveform Signal

6. Use the same method to test the other channels. If the square waveforms actually shown do not match that in the figure above, please perform "**Probe Compensation**" introduced in the next section.

English

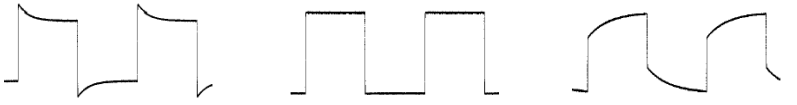
WARNING
To avoid electric shock when using the probe, please make sure that the insulated wire of the probe is in good condition. Do not touch the metallic part of the probe when the probe is connected to high voltage source.

Tip
The probe compensation signal can only be used for probe compensation adjustment and cannot be used for calibration.

Probe Compensation

When the probes are used for the first time, you should compensate the probes to make them match the input channels of the oscilloscope. Non-compensated or poorly compensated probes may cause measurement inaccuracy or errors. The probe compensation procedures are as follows:

1. Perform Step 1, 2, 3, and 4 in "**Function Inspection**".
2. Check the displayed waveforms and compare them with the following figures.



Over compensated Perfectly compensated Under compensated

Figure 9 Probe Compensation

3. Use a nonmetallic screwdriver to adjust the low-frequency compensation adjustment hole on the probe until the waveform is displayed as "Perfectly compensated" in the figure above.

English

To Use the Built-in Help System

The help system of this oscilloscope provides instructions for all the function keys (including the menu keys) on the front panel. Press **Help** to open the help interface. Press it again to close the interface. The help interface mainly consists of two sections. The left section is "Help Options", and you can select the "Button" or "Index" tab. The right section is "Help Display Area", which displays the help information.

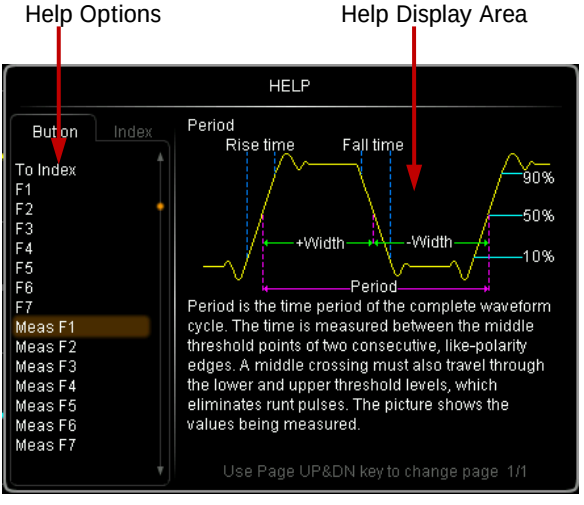


Figure 10 Help Information

Button:

By default, the "Button" tab is selected. Under the tab, you can view the corresponding help information in the "Help Display Area" by pressing the keys or menu softkeys (except the Power key, the multi-function knob, and the Page Up/Down key) on the front panel directly or rotating the multi-function knob to select the desired key name (the item currently selected is displayed with brown shading) in the "Help Options" area and then pressing down the knob.

To switch to the **Index** tab, use the multi-function knob to select "To Index" and then press down the knob.

English

Index:

Under the tab, you can use the multi-function knob to select the desired item (e.g. BW). The item currently selected is displayed with brown shading in the "Help Options" area. Then press down the knob to obtain the help information about the item.

To switch to the **Button** tab, use the multi-function knob to select "To Button" and then press down the knob.

English

Parameter Setting Method

The commonly used parameter setting methods for the DS2000E series are follows:

Method 1:

For the parameters with the sign  or  , rotate the multi-function knob  on the front panel directly to select the parameter item or modify the parameter value.

Method 2:

For the parameters with the sign  , first rotate the multi-function knob  on the front panel to select one item from the available choices, and then press down the multi-function knob  to select the item.

Method 3:

For the parameters with the sign  , rotate the navigation knob on the front panel to increase or decrease the value of the parameter. Use the inner knob to make a fine adjustment, the outer knob to make a coarse adjustment.

Method 4:

For the parameters without the above signs, press the desired menu softkey to switch between the parameter items. This method is applicable to the parameters with only two available options.

Tip

The above methods are commonly used in parameter settings. For other setting methods of certain parameters, refer to details in relevant chapters of *DS2000E User's Guide*.

English

Remote Control

DS2000E series digital oscilloscope can be connected to the PC via the USB, LAN, or GPIB interface to set up communication and realize remote control through the PC. The remote control can be realized by using SCPI (Standard Commands for Programmable Instruments) commands. DS2000E series digital oscilloscope supports two ways of remote control: user-defined programming and PC software (e.g. **RIGOL** Ultra Sigma).

More Product Information

1. **Obtain the device information**
   Press **Utility** → **System** → **System Info** to obtain the information of the instrument, including the manufacturer, model, serial number, software version number, and hardware version number.

2. **Check the option installation status**
   Press **Utility** → **Options** → **Installed** to view the options currently installed on the oscilloscope and their information. Press **Setup** to enter the option activation operation menu and input the serial number of the option that you've purchased.

For more information about this instrument, refer to the relevant manuals by logging in to the official website of **RIGOL** (www.rigol.com) to download them.
DS2000E User's Guide: introduces the functions of the instrument and the operation methods, remote control methods, possible failures and solutions in using the instrument, the technical specifications, and order information;
DS2000E Programming Guide: provides detailed descriptions of SCPI commands and programming examples of the instrument.
DS2000E Datasheet: provides the main features and technical specifications of the instrument.