

RIGOL

快速指南

中文

DS8000-R 系列数字示波器

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RIGOL TECHNOLOGIES CO., LTD.

保证和声明

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中文

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软件版本

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电子邮箱：service@rigol.com

网址：www.rigol.com

一般安全概要

1. 请使用所在国家认可的本产品专用电源线。
2. 请确保产品可靠接地。
3. 查看所有终端额定值。
4. 请使用合适的过压保护。
5. 请勿开盖操作。
6. 请勿将异物插入排风口。
7. 请使用合适的保险丝。
8. 避免电路外露。
9. 怀疑产品出故障时，请勿进行操作。
10. 请保持适当的通风。
11. 请勿在潮湿环境下操作。
12. 请勿在易燃易爆的环境下操作。
13. 请保持产品表面的清洁和干燥。
14. 请注意防静电保护。
15. 请注意搬运安全。

安全术语和符号

本手册中的安全术语：



警告

警告性声明指出可能会造成人身伤害或危及生命安全的情况或操作。



注意

注意性声明指出可能导致本产品损坏或数据丢失的情况或操作。

产品上的安全术语：

DANGER
WARNING
CAUTION

表示您如果不进行此操作，可能会立即对您造成危害。

表示您如果不进行此操作，可能会对您造成潜在的危害。

表示您如果不进行此操作，可能会对本产品或连接到本产品的其他设备造成损坏。

产品上的安全符号：



高电压



安全警告



保护性接地端



壳体接地端



测量接地端

保养与清洁

保养

请勿将仪器放置在长时间受到日照的地方。

清洁

请根据使用情况定期对仪器进行清洁。方法如下：

1. 断开电源。
2. 用柔和的清洁剂或清水浸湿软布擦拭仪器外部，请注意不要将水或其他异物通过散热孔进入机箱内。清洁带有液晶显示屏的仪器时，请注意不要划伤液晶显示屏。

中文



注意

请勿使任何腐蚀性的液体沾到仪器上，以免损坏仪器。



警告

重新通电之前，请确认仪器已经干透，避免因水分造成电气短路甚至人身伤害。

文档概述

本文档用于指导用户快速了解DS8000-R系列数字示波器的外观、用户界面及基本操作方法等。

提示

本手册的最新版本可登录 **RIGOL** 网址 (www.rigol.com) 进行下载。

文档格式的约定

1. 按键

使用“按键字符（加粗）+文本框”表示前面板功能按键，如 **RUN/STOP** 表示前面板的“RUN/STOP”按键。

2. 菜单

用“菜单文字（加粗）+字符底纹”表示一个菜单选项，如 **系统** 表示通过“导航”进入“辅助”功能菜单中的“系统”菜单选项。

3. 操作步骤

用箭头“→”表示下一步操作，如 **辅助** → **系统** 表示通过“导航”进入“辅助”功能后，再点击 **系统** 项。

4. 连接器

本手册中通常用“方括号+文字（加粗）”表示前面板或后面板上的一个连接器，如 **[TRIG OUT]**。

文档内容的约定

DS8000-R 系列包含如下型号。如无特殊说明，本手册以 DS8204-R 为例说明 DS8000-R 系列的功能和操作方法。

型号	最高模拟带宽	模拟通道数	函数/任意波形发生器通道数
DS8104-R	1 GHz	4	1（选件）
DS8204-R	2 GHz	4	1（选件）

本产品的主要用户文档包括快速指南、用户手册、编程手册和数据手册等。用户可以登录 **RIGOL** 官网（www.rigol.com）下载所需文档的最新版本。

一般性检查

1. 检查运输包装

如运输包装已损坏，请保留被损坏的包装或防震材料，直到货物经过完全检查且仪器通过电性和机械测试。

因运输造成仪器损坏，由发货方和承运方联系赔偿事宜。**RIGOL**公司恕不进行免费维修或更换。

中文

2. 检查整机

若存在机械损坏或缺失，或者仪器未通过电性和机械测试，请联系您的**RIGOL**经销商。

3. 检查随机附件

请根据装箱单检查随机附件，如有损坏或缺失，请联系您的**RIGOL**经销商。

产品简介

DS8000-R系列紧凑型示波器是基于**RIGOL**自主知识产权的ASIC芯片和UltraVision II技术平台的中高端数字示波器。它具有紧凑的机架式结构设计，机身轻薄小巧。支持多机系统集成，机架式安装，远程系统级操控，满足工业自动化测试系统要求。DS8000-R系列示波器模拟通道带宽高达2 GHz，且具备多机同步触发能力，最多支持扩展512通道。为满足客户对系统集成测试中高速、多通道并行数据采集的需求，提供了优秀的解决方案。

前面板、后面板和主界面的简要介绍请分别参考图1（具体说明见表1）、图2（具体说明见表2）和图3（具体说明见表3）。

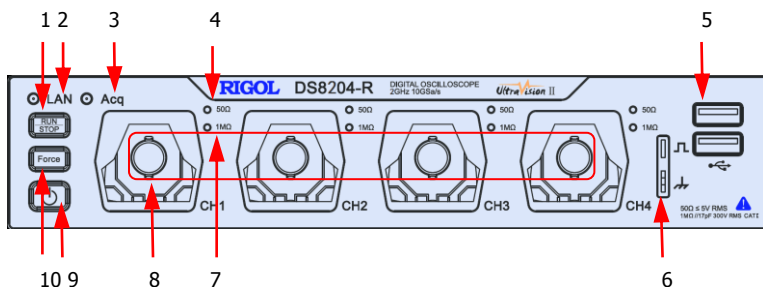


图 1 前面板

表 1 前面板说明

编号	说明	编号	说明
1	运行/停止控制键	2	LAN 接口指示灯
3	采样指示灯	4	模拟通道阻抗 50Ω 指示灯
5	USB HOST 接口	6	探头补偿信号输出端/接地端
7	模拟通道阻抗 1MΩ 指示灯	8	模拟通道输入
9	电源键	10	强制触发键

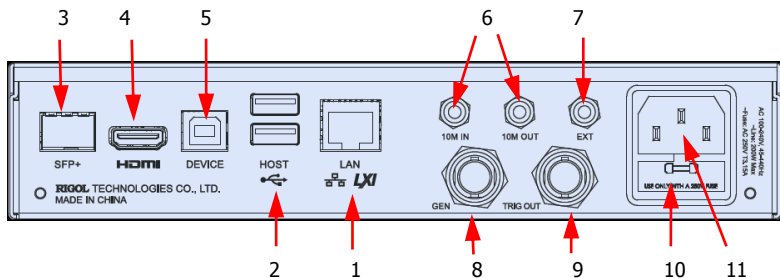
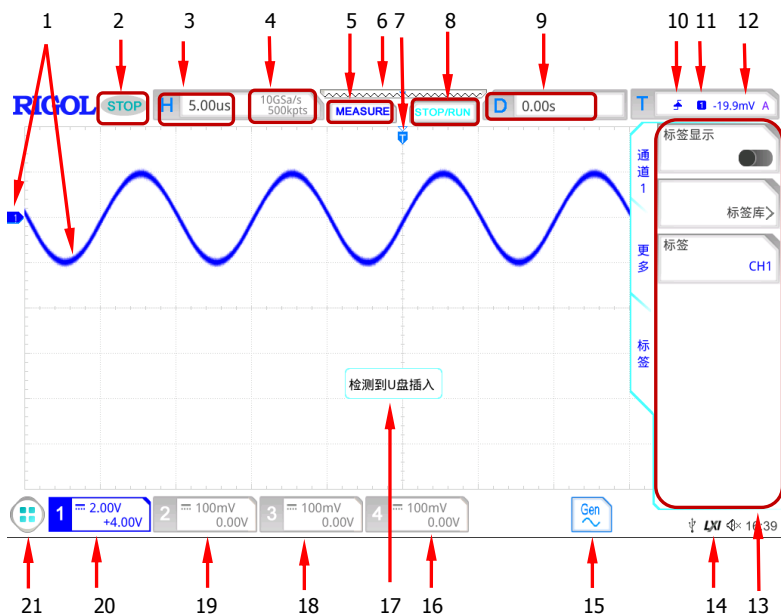


图 2 后面板

表 2 后面板说明

编号	说明	编号	说明
1	LAN 接口	2	USB HOST 接口
3	SFP+接口	4	HDMI 高清视频输出
5	USB DEVICE 接口	6	参考时钟
7	EXT 触发输入端	8	任意波形发生器输出端
9	触发输出与通过/失败	10	保险丝
11	AC 电源插孔		



中文

图3 用户界面

表3 用户界面标识

编号	说明	编号	说明
1	模拟通道标签/波形	12	触发电平
2	运行状态	13	操作菜单
3	水平时基	14	通知区域
4	采样率和存储深度	15	任意波发生器
5	自动测量标签	16	CH4 状态标签
6	波形存储器	17	消息框
7	触发位置	18	CH3 状态标签
8	运行/停止控制标识	19	CH2 状态标签
9	水平位移	20	CH1 状态标签
10	触发类型	21	功能导航
11	触发源		

使用前准备

连接电源

本示波器可输入交流电源的规格为： $100\sim 240\text{ V}$ ， $45\sim 440\text{ Hz}$ 。请使用附件提供的电源线按图 4 所示将示波器连接到电源中。

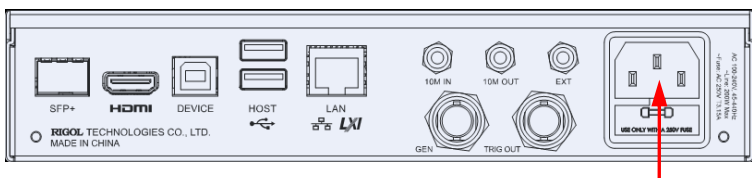


图 4 连接电源

电源插孔

连接显示和控制设备

DS8000-R 系列示波器没有显示屏，为了进行功能设置和查看测量结果，可以通过外接显示设备和鼠标、键盘或通过 Web Control 远程控制两种方法来控制 DS8000-R 系列示波器。

● 外接显示设备、鼠标和键盘

您可以通过后面板的 HDMI 口外接显示设备（如：显示器、电视、投影仪等）查看用户界面，进行功能菜单的配置，查看采集的波形和测量结果等信息。可以通过设备上的 USB Host 接口连接键盘进行数字或字符串的设置操作，连接鼠标对示波器进行功能配置和波形拖动等操作。

注意：

本文档默认通过外接显示器和鼠标方式控制 DS8000-R 系列示波器。文档中提到的屏幕，均指通过 HDMI 接口连接外部显示器屏幕。

● Web Control 远程控制

在示波器连接网络时，可以通过 PC 或移动设备的浏览器访问示波器 IP 地址，登录 Web Control 可以实时查看示波器的显示界面，用户可通过 Web Control 将仪器控制和波形分析迁移到控制端上（包括 PC 端、手机端和 iPad 等智能端），从而实现远程控制仪器。

首次登录 Web Control 的用户名和密码分别为“admin”和“rigol”。


开机检查


当示波器处于通电状态时，按前面板左下角的电源键即可启动示波器。开机过程中示波器执行一系列自检，如果示波器已连接外部显示设备，在自检结束后显示屏幕出现开机画面。

中文



提示

重启和关机：



1. 通过示波器的外接显示器和鼠标进行操作，点击屏幕左下角的功能导航图标 ，打开功能导航；

2. 点击“重启”图标 ，屏幕弹出“重启”选择框，如下图所示；



3. 点击“重启”图标 ，则示波器关机后自动重新启动；点击“关机”图标 ，则示波器关机（您也可以直接按前面板左下角的电源键关闭示波器）。

设置系统语言

DS8000-R 系列示波器支持多种系统语言，您可以点击屏幕左下角的功能导航图标 ，打开功能导航；再点击“辅助”图标 ，进入“辅助”设置菜单；点击 **Language** 设置系统语言。

连接探头

DS8000-R 系列可以搭配无源探头和有源探头使用（需自行选购）。可选探头的具体型号请参考《DS8000-R 系列数据手册》。有关探头的详细技术信息请参考相应的探头用户手册。

连接无源探头：

1. 将探头的 BNC 端连接至示波器前面板的模拟通道输入端，如图 5 所示。
2. 将探头接地鳄鱼夹或接地弹簧连接至电路接地端，然后将探针连接至待测电路测试点中。

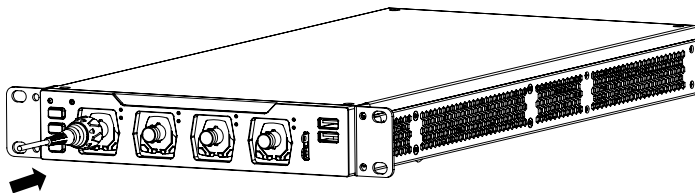


图 5 连接无源探头

连接无源探头后，您需要在测量前进行探头功能检查和探头补偿调节，具体步骤请参考“**功能检查**”和“**探头补偿**”介绍的内容。

连接有源探头：

以 RP7150（差分有源探头）为例：

1. 将探头前端与有源探头放大器连接，如图 6 所示。

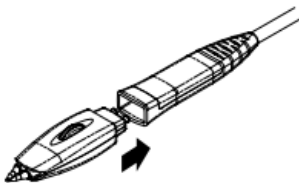


图 6 连接探头前端与有源探头放大器

2. 将有源探头放大器的另一端连接至示波器前面板的模拟通道输入端，如图 7 所示。注意将探头推到紧闭的位置。

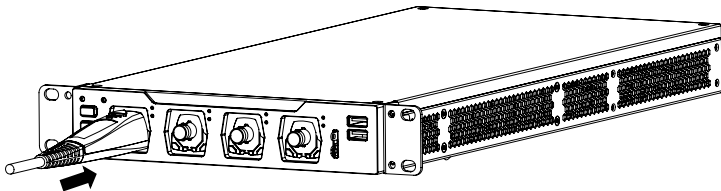




图 7 连接有源探头

- 使用探头辅助装置将探头前端连接到待测电路中。探头详细信息请参考《RP7000 系列有源探头用户手册》。

连接有源探头后，您可以根据需要进行探头校准和偏移电压调整等，具体步骤请参考本产品用户手册中关于有源探头内容的介绍。

功能检查

中文

- 点击屏幕左下角的“导航”图标 ，进入导航菜单，再点击“存储”图标 ，进入存储和加载设置菜单，选择 **更多** → **默认设置**，屏幕弹出“确定恢复默认设置？”提示框，在“确认”子菜单中选择“确定”，将示波器恢复为出厂默认配置。
- 将探头的接地鳄鱼夹连接至图 8 所示的“接地端”。
- 使用探头连接示波器的通道 1 (CH1) 输入端和图 8 所示的“补偿信号输出端”。

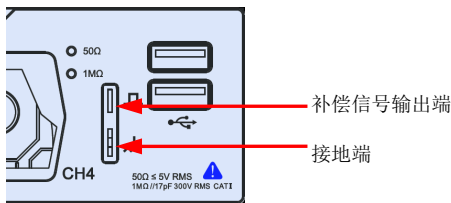


图 8 使用补偿信号

- 将探头衰减比设定为 10X，通过 Web Control 控制示波器，点击操作界面右侧的 **Auto** 按键。
- 观察示波器外接显示屏上的波形，正常情况下应显示图 9 所示的方波信号。

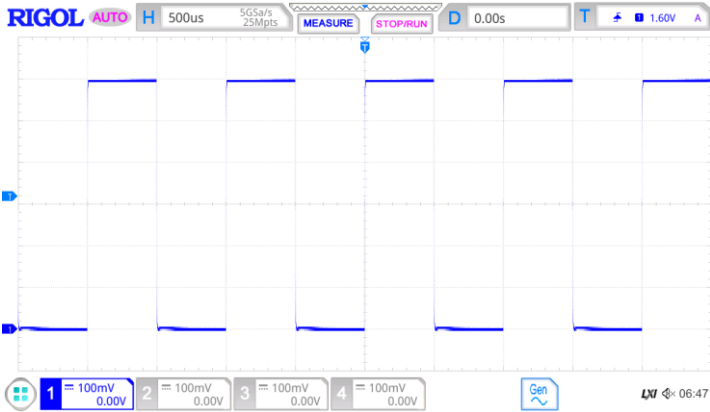


图 9 方波信号

6. 用同样方法检查其他通道。如实际显示的方波形状与上图不相符，请执行本手册中“探头补偿”一节介绍的内容。

**警告**

为避免使用探头时被电击，请首先确保探头的绝缘导线完好，并且在连接高压源时不要接触探头的金属部分。

探头补偿

首次使用探头时，应进行探头补偿调节，使探头与示波器输入通道匹配。未经补偿或补偿偏差的探头会导致测量误差或错误。探头补偿步骤如下：

1. 执行上一节“功能检查”介绍中的步骤 1、2、3 和 4。
2. 检查所显示的波形形状并与图 10 所得波形进行对比。

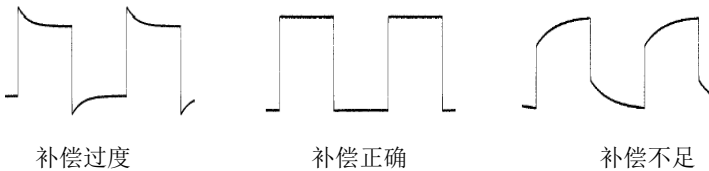




图 10 探头补偿

3. 使用附件中提供的探头补偿调节棒调整探头上的低频补偿调节孔，直到显示的波形如上图 10 所示的“补偿正确”。

常用操作

点击操作


- 点击外接屏幕上显示的菜单，可对菜单进行操作。
- 点击外接屏幕左下角的功能导航图标 ，可打开功能导航。
- 点击弹出的数字键盘，可对参数进行设置。
- 点击弹出的虚拟键盘，可设置标签名和文件名等字符串。
- 点击弹出信息框右上角的图标 ，关闭弹出框。
- 点击外接屏幕上显示的其他窗口，对窗口进行操作。
- 双击鼠标左键，可以停止波形的录制或播放，也可以停止自校正。


中文



拖动操作

单击选中并拖动鼠标，可以改变显示界面上波形或光标的位置。



滚轮操作

菜单操作时，对于菜单上显示  的参数，可以点击选中相应的菜单键后，通过弹出数字键盘设置参数，或通过滚动鼠标滚轮调整指定参数的值。

对于菜单上显示  的功能键，可以将鼠标放置在相应的菜单键区域，通过滚动鼠标滚轮对选中项进行位置调整。

例如点击屏幕左下角的功能导航图标  打开功能导航，然后点击“显示”图标 ，在屏幕右侧弹出的“显示”菜单中选择 **波形亮度**，然后通过滚动鼠标滚轮调节波形亮度。亮度可调节范围为 1%至 100%。向上滚动增大波形亮度，向下滚动减小波形亮度。

矩形绘制

点击屏幕左下角的功能导航图标 ，打开功能导航菜单，然后点击矩形绘制图标 ，切换为矩形绘制模式。在屏幕上从左上向右下拖动鼠标以绘制矩形。将鼠标移开屏幕，屏幕出现菜单，此时您可以点击选择“区域触发 A”、“区域触发 B”、“直方图”、“水平放大”、“垂直放大”或“波形放大”功能。在屏幕上从右下向左上拖动鼠标以绘制矩形。将鼠标移开屏幕，屏幕出现菜单，此时您可以用鼠标选择“区域触发 A”、“区域触发 B”、“直方图”、“水平缩小”、“垂直缩小”或“波形缩小”功能。

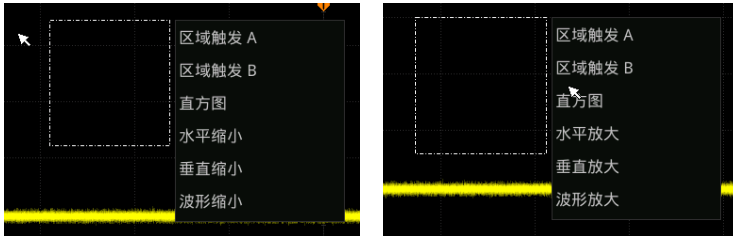




图 11 矩形绘制

- 选择“区域触发 A”：
 - 绘制区域触发 A 的区域；
 - 打开区域触发 A；
 - 打开“区域触发”菜单。
- 选择“区域触发 B”：
 - 绘制区域触发 B 的区域；
 - 打开区域触发 B；
 - 打开“区域触发”菜单。
- 选择“直方图”：
 - 绘制直方图的范围；
 - 打开“直方图”菜单。
- 选择“水平放大”：水平方向扩展波形；选择“水平缩小”：水平方向压缩波形。
- 选择“垂直放大”：垂直方向扩展波形；选择“垂直缩小”：垂直方向压缩波形。
- 选择“波形放大”：水平方向和垂直方向同时扩展波形；选择“波形缩小”：水平方向和垂直方向同时压缩波形。

提示

点击“矩形绘制”图标，可在矩形绘制和操作波形两个模式之间进行切换。

点击“矩形绘制”图标，若图标显示 ，则表示打开矩形绘制模式；点击“矩形绘制”图标，若图标显示 ，则表示打开操作波形模式，本示波器默认打开操作波形模式。

注意：

通过示波器外接屏幕上显示的菜单及屏幕上可使用的图标均可以使用 Web Control 功能控制，但 Web Control 不支持如下操作：

- 双击鼠标左键，停止波形的录制、播放和停止自校正。

- 所有拖动鼠标操作。
- 所有滚动鼠标滚轮操作。
- 矩形绘制操作。

本文档以示波器外接屏幕方式控制示波器操作描述为主，若某些操作需要详述 Web Control 功能，将在相关内容中进行具体介绍。

中文

参数设置方法

DS8000-R 的参数设置主要有 Web Control 远程控制和外接显示屏、鼠标、键盘两种输入方式，常用的通过弹出的数字键盘设置参数的方法如下。

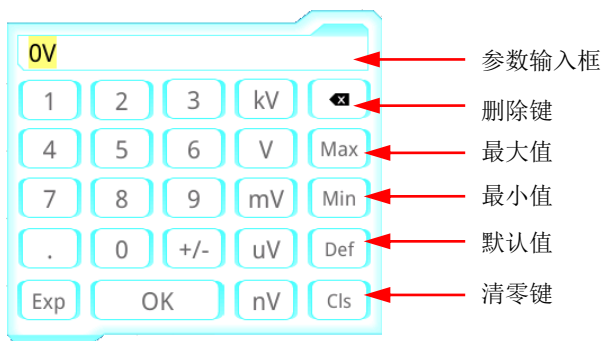


图 12 数字键盘

在数字键盘中，您可以使用外接鼠标点击数字键盘中的数值或单位进行输入，也可以使用外接键盘直接输入。输入全部数值并选择所需的单位后，数字键盘自动关闭，则完成参数设置。另外，完成数值输入后，您可以直接点击数字键盘中的“OK”键关闭数字键盘，此时参数的单位为默认单位。在数字键盘中，您还可以进行以下操作：



- 删除已输入参数数值。
- 将参数设置为最大值或最小值（有时特指当前状态下的最大值或最小值）。
- 将参数设置为默认值。
- 清空参数输入框。

提示

上述方法是示波器常用的参数设置方法。若某些参数有其他设置方法，将在相关章节中详细介绍。

使用内置帮助系统

本示波器的帮助系统提供了各功能点击图标及相应菜单键的说明。查看帮助信息的步骤如下：

1. 您可以点击屏幕左下角的功能导航图标 ，然后点击帮助图标  进入“帮助”功能菜单。
2. 点击“查看帮助”菜单项，屏幕弹出帮助界面，如图 13 所示。帮助界面主要分两部分，左边为“帮助选项”，右边为“帮助显示区”。

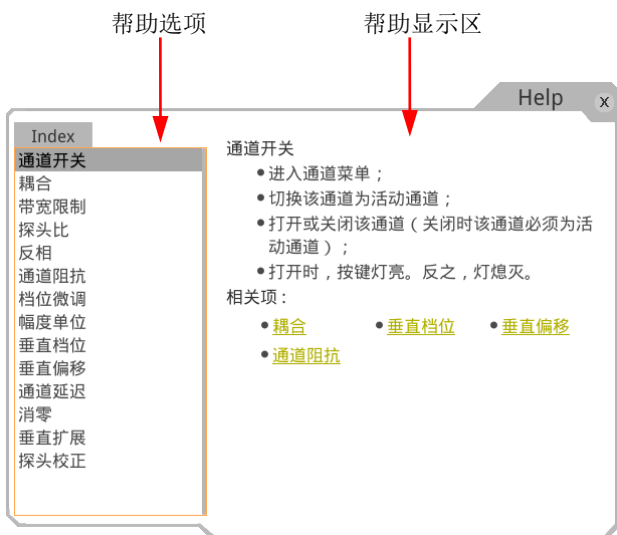


图 13 帮助信息

打开帮助界面后，您可以通过直接点击所需的帮助选项获取帮助信息。

更换保险丝

如需更换保险丝，请使用仪器指定规格（AC 250 V, T3.15 A; 5.2 mm×20 mm）的保险丝，按如下步骤进行更换（如图 14 所示）：

1. 关闭仪器，断开电源，拔去电源线；
2. 使用小一字螺丝刀撬出保险丝座；

3. 取出保险丝；
4. 更换指定规格的保险丝；
5. 重新安装保险丝座。

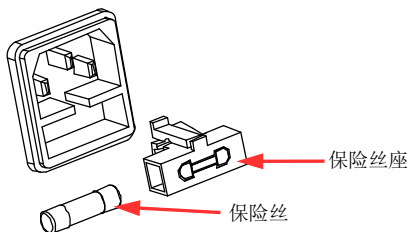


图 14 更换保险丝



警告

为避免电击，更换保险丝之前，请确保仪器已关闭并且已断开与电源的连接，且确保更换的保险丝规格符合要求。

远程控制

DS8000-R 系列数字示波器支持通过 USB 接口、LAN 接口和 GPIB 接口与计算机进行通信从而实现远程控制。远程控制基于 SCPI (Standard Commands for Programmable Instruments) 命令集实现。DS8000-R 系列数字示波器支持三种远程控制方式：用户自定义编程、使用 PC 软件（如 **RIGOL Ultra Sigma**）和 Web Control 控制。

更多产品信息

1. 获取设备信息

点击屏幕左下角的功能导航图标 ，然后点击帮助图标 ，进入“帮助”功能菜单，点击 **关于此示波器** 您可获取设备信息，包括厂商、产品型号、产品序列号和硬件版本号等。

2. 查看选件信息及选件安装

仪器出厂时我们将为用户提供选件的试用版本，试用时间将从出厂后首次打开示波器电源开始，试用时间约为 2160 分钟。打开“帮助”功能菜单，按 **选件列表** 键，可查看示波器当前已安装的选件及其相关信息；点击 **选件安装** 菜单键，进行选件安装，选件安装的具体方法请参考本产品用户手册中的详细介绍。

欲了解本产品更多信息，请查阅相关手册（您可登录**RIGOL**网站（www.rigol.com）下载）。

《DS8000-R系列用户手册》：提供本产品的功能介绍及操作方法、远程控制方法、在使用过程中可能出现的故障及处理方法、性能指标以及订货信息。

《DS8000-R系列编程手册》：提供本产品的SCPI命令集以及编程实例。

《DS8000-R系列数据手册》：提供本产品的主要特色和技术指标。

RIGOL

Quick Guide

English

DS8000-R Series Digital Oscilloscope

Jul. 2020

RIGOL TECHNOLOGIES CO., LTD.

Guaranty and Declaration

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English

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Software Version

00.01.01.00.00

Software upgrade might change or add product features. Please acquire the latest version of the manual from **RIGOL** website or contact **RIGOL** to upgrade the software.

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Product Certification

RIGOL guarantees that this product conforms to the national and industrial standards in China as well as the ISO9001:2015 standard and the ISO14001:2015 standard. Other international standard conformance certifications are in progress.

Contact Us

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

RIGOL

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.

English

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.

Safety Symbols on the Product:Hazardous
VoltageSafety
WarningProtective Earth
Terminal

Chassis Ground



Test Ground

English

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. Avoid having any water or other objects into the chassis via the heat dissipation hole. When cleaning the externally connected 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.

Document Overview

This manual gives you a quick review about the appearance of DS8000-R 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

English

1. Key

The key on the front panel is denoted by the format of "Key Name (Bold) + Text Box" in the manual. For example, **RUN/STOP** denotes the "RUN/STOP" key.

2. Menu

The menu items are denoted by the format of "Menu Word (Bold) + Character Shading". For example, **System** denotes the "System" menu item under "**Utility**" function.

3. Operation Procedures

→ denotes the next step of operation. For example, **Utility** → **System** denotes clicking on the navigation function icon to enter the "Utility" menu first, and then clicking the **System** menu item.

4. Connector

The connectors on the front or rear panel are usually denoted by the format of "Connector Name (Bold) + Square Brackets (Bold)". For example, **[TRIG OUT]**.

Content Conventions in this Manual

DS8000-R series includes the following models. Unless otherwise specified, this manual takes DS8204-R as an example to illustrate the functions and operation methods of the DS8000-R series.

Model	Max. Analog Bandwidth	No. of Analog Channels	No. of Channels of Function/AWG
DS8104-R	1 GHz	4	1 (option)
DS8204-R	2 GHz	4	1 (option)

The manuals of this product mainly include Quick Guide, User Guide, Programming Guide, Data Sheet, and etc. For the latest version of this manual, download it from the official website of **RIGOL** (www.rigol.com).

General Inspection

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.

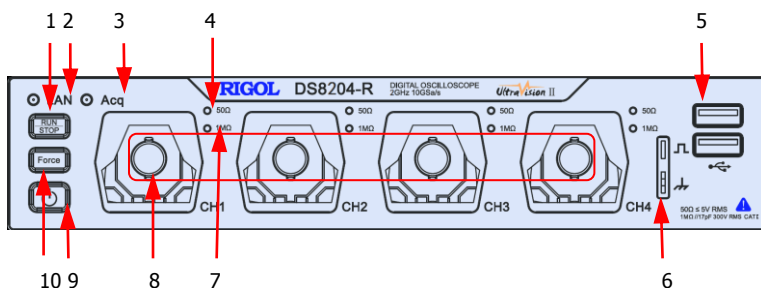
3. Check the accessories

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

Product Overview

DS8000-R series is a medium and high-end digital oscilloscope with a compact size designed on the basis of the ASIC chip (**RIGOL** self-owns its intellectual property right) and UltraVision II technical platform developed by **RIGOL**. It is compact and thin in design. It supports system integration of multiple devices, rack mount installation, and remote system operation to meet the system requirements for industrial automation test system. DS8000-R series oscilloscope has an analog bandwidth of up to 2 GHz, supporting multi-device synchronous triggering, available to be extended to 512 channels. It provides an excellent solution for users to meet their middle and high-speed requirement for the system integration test and synchronization requirement for multi-channel data acquisition.

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.



English

Figure 1 Front Panel

Table 1 Front Panel Description

No.	Description	No.	Description
1	RUN/STOP Key	2	LAN Interface Indicator
3	Acq Indicator	4	50 Ω Indicator
5	USB HOST Interface	6	Probe Compensation Signal Output Terminal/Ground Terminal
7	1 MΩ Indicator	8	Analog channel input terminals
9	Power Key	10	Force Key (used to initiate a trigger forcibly)

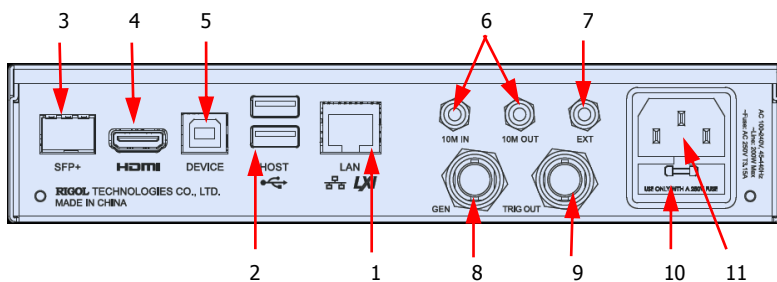


Figure 2 Rear Panel

Table 2 Rear Panel Description

No.	Description	No.	Description
1	LAN Interface	2	USB HOST Interface
3	SFP+ Interface	4	HDMI Video Output
5	USB DEVICE Interface	6	10 MHz In/Out
7	EXT TRIG	8	AWG Output Terminal
9	Trigger Out and Pass/Fail	10	Fuse
11	AC Power Cord Connector	--	--

English

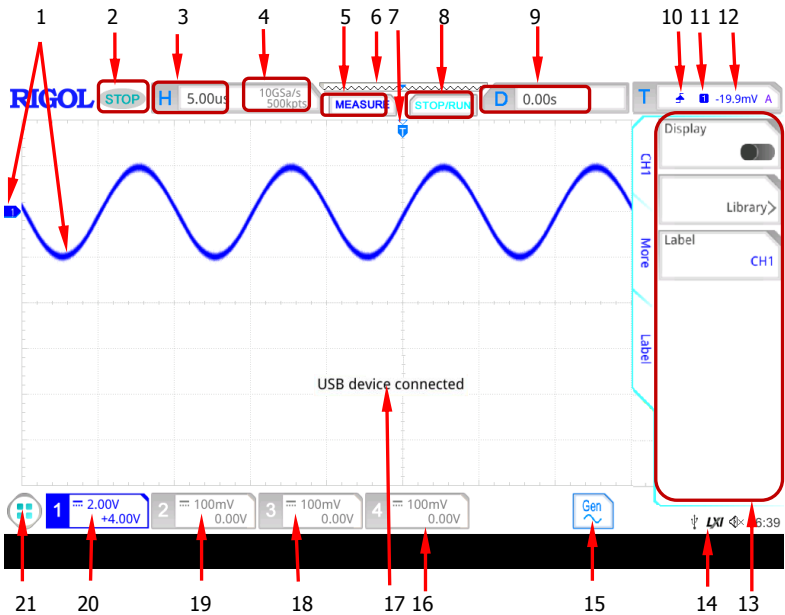


Figure 3 User Interface

Table 3 User Interface Icons

No.	Description	No.	Description
1	Analog Channel Label/Waveform	12	Trigger Level
2	Operating Status	13	Operation Menu
3	Horizontal Time Base	14	Notification Area

4	Sample Rate and Memory Depth	15	Arbitrary Waveform Generator
5	Auto Measurement Label	16	CH4 Status Label
6	Waveform Memory	17	Message Box
7	Trigger Position	18	CH3 Status Label
8	Run/Stop Label	19	CH2 Status Label
9	Horizontal Position	20	CH1 Status Label
10	Trigger Type	21	Function Navigation
11	Trigger Source	--	--

English

To Prepare for Use

To Connect to AC Power

The input AC power requirements of the oscilloscope are 100 V-240 V, 45 Hz-440 Hz. Please use the power cord provided in the accessories to connect the oscilloscope to the AC power source via the power cord connector, as shown in Figure 4.

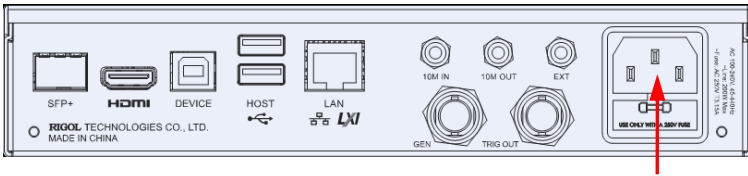


Figure 4 To Connect to AC Power

Power Cord Connector

To Connect to the Display and the Control Device

DS8000-R series does not have an LCD display or monitor. To set the parameters and view the measurement results, you need to connect it to an external control and display device. You can use the externally connected monitor, mouse, or keyboard to control the DS8000-R series oscilloscope. Also, you can use the standard Web Control software to realize remote control of the oscilloscope.

- **To connect to the display and the control device, the mouse, and the keypad board**

You can configure the parameters for the function menu, observe acquired waveforms, measurement results, and other information on the user interface through the display device (e.g. LCD, TV, projector, etc.) externally connected via the rear-panel HDMI interface. The keyboard and mouse can be connected to the oscilloscope via the USB interface. In this way, you can input values or strings with the externally connected keypad and mouse; scroll with the mouse to select the desired parameter and adjust the parameter value; drag the mouse cursor to make dragging operation on the screen.

Note:

The operations for controlling the DS8000-R series oscilloscope in this manual are, by default, described based on the externally connected mouse operation. The screen mentioned in this manual refers to the

externally connected LCD display (or monitor) that is connected via the HDMI interface.

● Web Control remote operation

Connect the oscilloscope to the network, then input the IP address of the oscilloscope into the address bar of the browser of your computer. The **RIGOL** web control interface is displayed. Click Web Control to enter the web control page. Then you can view the display of the real-time interface of oscilloscope. Through the Web Control method, you can migrate the device control and waveform analysis to the control terminals (e.g. PC, Mobile, iPad, and other smart terminals) to realize remote control of instruments.

When you first log in to the Web Control, the user name is "admin" and password is "rigol".



English

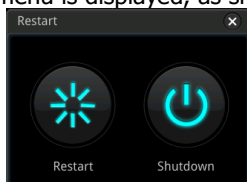
Turn-on Checkout


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. If the oscilloscope has been connected to an external display device, after the self-test, the splash screen is displayed.


Tip

Restart and Shutdown:



1. Operate the oscilloscope with the externally connected mouse. Click the function navigation icon  at the lower-left corner of the externally connected screen to enable the function navigation.
2. Click on the "Restart" icon , and then the "Restart" selection menu is displayed, as shown in the figure below:



3. If you click on the "Restart" icon , the oscilloscope will be powered off and then automatically restart again. If you click on the

"Shutdown" icon , the oscilloscope is powered off (you can also press the Power key at the lower-left corner of the front panel to turn off the oscilloscope).

To Set the System Language

This oscilloscope supports menus in multiple languages. You can click on the function navigation icon  to open the function navigation. Then click on the "Utility" icon  to enter the utility setting menu. Click **Language** to select the desired language.

To Connect the Probe

RIGOL provides the passive probe and the active probe (required to be purchased by yourself if necessary) for DS8000-R series. For specific probe models, please refer to DS8000-R Series Datasheet. For detailed technical information of the probes, please refer to the corresponding Probe User Guide.

Connect the passive probe:

1. Connect the BNC terminal of the probe to an analog channel input terminal of the oscilloscope on the front panel, as shown in Figure 5.
2. Connect the ground alligator clip or spring of the probe to the circuit ground terminal, and then connect the probe tip to the circuit point to be tested.

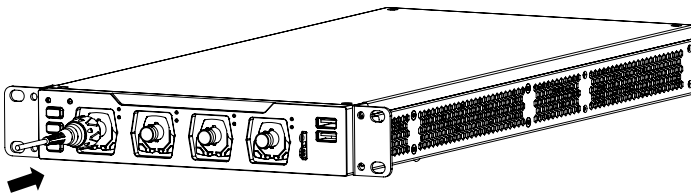


Figure 5 To Connect the Passive Probe

After you connect the passive probe, check the probe function and probe compensation adjustment before making measurements. For detailed procedures, refer to "**Function Inspection**" and "**Probe Compensation**".

Connect the active probe:

Take RP7150 (active differential probe) as an example.

1. Connect the probe head to the preamp of the active probe, as shown in Figure 6.

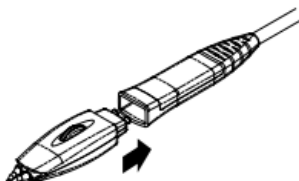


Figure 6 To Connect the Probe Head to the Preamp of the Active Probe

2. Connect the other end of the preamp to an analog channel input terminal of the oscilloscope on the front panel, as shown in Figure 7. Note that you should push the probe to the end to ensure that it is tightly connected.

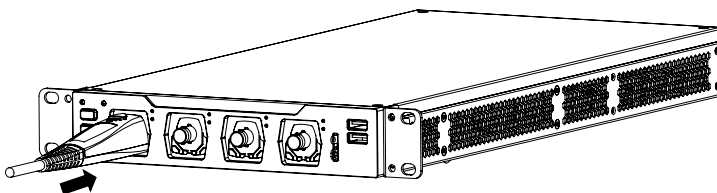




Figure 7 To Connect the Active Probe

3. Use the probe's auxiliary device to connect the probe head to the circuit under test. For details about the probes, refer to *RP7000 Series Active Probe User Guide*.

After connecting the active probe, you can perform probe calibration and offset voltage adjustment if necessary. For detailed procedures, refer to the "Active Probe" section in User Guide.

Function Inspection

1. Click on the function navigation icon  at the lower-left corner of the screen to open the function navigation. Then click on the "Storage" icon  to enter the storage and loading setting menu. Click **More** →

Default, then a prompt message "Restore default settings?" is displayed. Click **OK** to restore the instrument to its factory default settings.

2. Connect the ground alligator clip of the probe to the "Ground Terminal" as shown in Figure 8 below.
3. Use the probe to connect the input terminal of CH1 of the oscilloscope and the "Compensation Signal Output Terminal" of the probe, as shown in Figure 8.

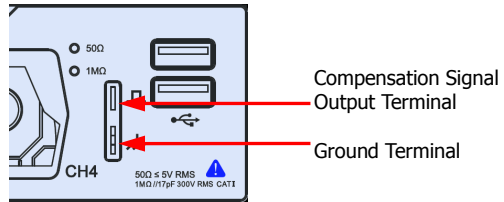


Figure 8 To Use the Compensation Signal

4. Set the probe attenuation to 10X, and then click the **Auto** key in the Web Control page.
5. Observe the waveform on the display. In normal condition, the square waveform as shown in Figure 9 should be displayed.

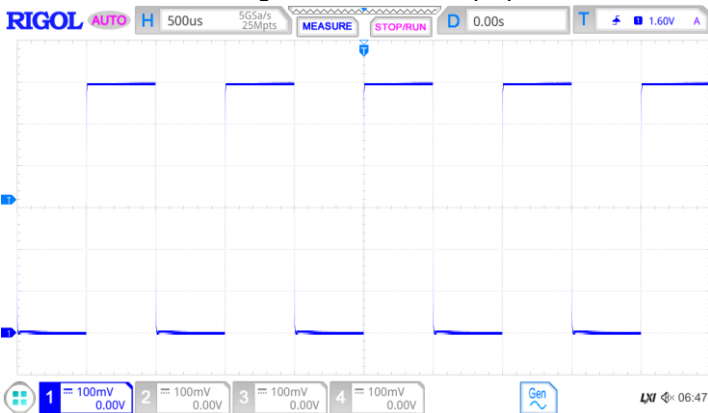


Figure 9 Square Waveform Signal

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.

**WARNING**

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

Probe Compensation

English

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 specified in "**Function Inspection**".
2. Check the displayed waveforms and compare them with the waveforms shown in Figure 10.

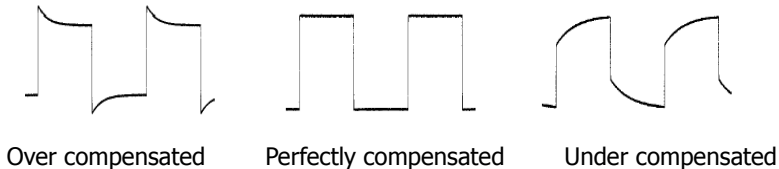




Figure 10 Probe Compensation

3. Use the probe compensation adjustment tool provided in the accessories to adjust the low-frequency compensation adjustment hole on the probe until the displayed waveform is consistent with the "Perfectly compensated" waveform shown in Figure 10.

Common Operation

Click Operation


- Click the menu displayed on the externally connected screen to operate on the menu.
- Click the function navigation icon  at the lower-left corner of the externally connected screen to enable the function navigation.
- Click the displayed numeric keypad to set the parameters.
- Click the virtual keypad to set the label name, the filename, and other character strings.


- Click the close button  at the upper-right corner of the message box to close the prompt window.
- Click other windows on the touch screen and operate on the windows.
- Double-click the left mouse button to stop the recording/playing of the waveforms or stop the self-calibration.


Drag Operation


Click to select the menu and then drag the mouse to change the position of the waveforms or the cursor on the screen.

Scroll Operation



For the menu with the icon  on it, click to select the parameter item, then scroll up and down with the mouse to adjust the parameter value. You can also set it with the pop-up numeric keypad.

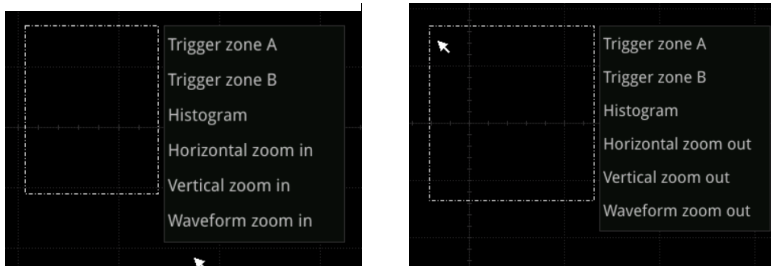
For the menu with the icon , click the menu and scroll up and down with the mouse to adjust the parameter.

For example, to adjust the waveform brightness, first click on the function navigation icon  to open the function navigation. Then click on the

"Display" icon  to enter the "Display" setting menu. Click **Intensity** to adjust the intensity. The adjustable range of the intensity is from 1% to 100%. Scroll up with the mouse to increase the brightness, and scroll down with the mouse to decrease the brightness.

Rectangle Drawing

Click the function navigation icon  at the lower-left corner of the externally connected screen to open the function navigation. Then click on the "Draw rect" icon  to switch to the rectangle drawing mode. Drag the mouse cursor from upper left to lower right across the screen to draw a rectangle on the screen, and then a menu is displayed on the screen. At this time, you can click to select "Trigger zone A", "Trigger zone B", "Histogram", "Horizontal zoom in", "Vertical zoom in", or "Waveform zoom in". Drag the mouse cursor from lower right to upper left across the screen to draw a rectangle on the screen. Move your cursor away from the screen, and then a menu is displayed on the screen. At this time, you can click to select "Trigger zone A", "Trigger zone B", "Histogram", "Horizontal zoom out", "Vertical zoom out", or "Waveform zoom out".





English

Figure 11 Rectangle Drawing

- Select "Trigger zone A":
 - Draw the region for Trigger zone A;
 - Open Trigger zone A:
 - Open the "Zone Trigger" menu.
- Select "Trigger zone B":
 - Draw the region for Trigger zone B;
 - Open Trigger zone B:
 - Open the "Zone Trigger" menu.
- Select "Histogram":
 - Draw the region for the histogram;
 - Open the "Histogram" menu.
- Select "Horizontal zoom in": expands the waveforms in the horizontal direction. Select "Horizontal zoom out": compresses the waveforms in the horizontal direction.
- Select "Vertical zoom in": expands the waveforms in the vertical direction. Select "Vertical zoom out": compresses the waveforms in the vertical direction.
- Select "Waveform zoom in": expands the waveforms both in the horizontal and vertical direction. Select "Waveform zoom out": compresses the waveforms both in the horizontal and vertical direction.

Tip

Click on the "Draw rect" icon to switch between the rectangle drawing and waveform operation modes.

Click on the "Draw rect" icon, if  is displayed, it indicates that the rectangle drawing mode is enabled. Click on the "Draw rect" icon, if  is displayed, it indicates that the waveform operation mode is enabled. By default, the waveform operation mode is enabled.

Note:

The menu displayed on the externally connected screen or the icon available to be enabled on the screen can all be operated by Web Control. However, Web Control does not support the following operations:

- Double-click the mouse left button to stop recording/playing of the waveforms; or stop the self-calibration.
- All the mouse dragging operation.
- All the mouse scrolling operation.
- Rectangle drawing operation.

In this manual, descriptions on menu operation through externally connected screen are illustrated in details. For details about menu operation through Web Control, we will illustrate it in relevant chapters if necessary.

Parameter Setting Method

You can set the parameters of DS8000-R series through the Web Control or the externally connected display device/mouse/keyboard. The common parameter setting method is as follows:

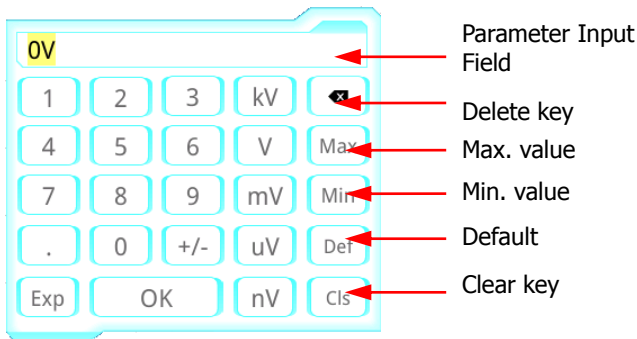


Figure 12 Numeric Keypad

In the numeric keypad, click to select the value or the unit in the numeric keypad. You can also use the externally connected keyboard to input the parameter value. After you input all the values and select the desired units, the numeric keypad is turned off automatically. This indicates that you have completed parameter setting. Besides, after you have input the values, you can also press **OK** directly to close the numeric keypad. At this time, the unit of the parameter is the default unit. In the numeric keypad, you can also perform the following operations:

- Delete the parameter value that has been input.
- Set the parameter to a maximum or minimum value (sometimes, the maximum or minimum value are the specified one for the current state).
- Set the parameter to a default value.
- Clear the parameter input field.



Tip

The above method is commonly used for the parameter settings of the oscilloscope. For other methods of parameter settings, refer to details in relevant chapters.

English

To Use the Built-in Help System

The help system of this oscilloscope provides instructions for all the function keys and their corresponding menu keys. The steps for viewing the help information are as follows:

1. Click the function navigation icon  to open the function navigation. Click the "Help" icon  to enter the "Help" menu.
2. Click **Content**, and then the help information is displayed on the screen, as shown in Figure 13. The help interface mainly consists of two sections. The left section lists "Help Options", and the right section is the "Help Display Area".

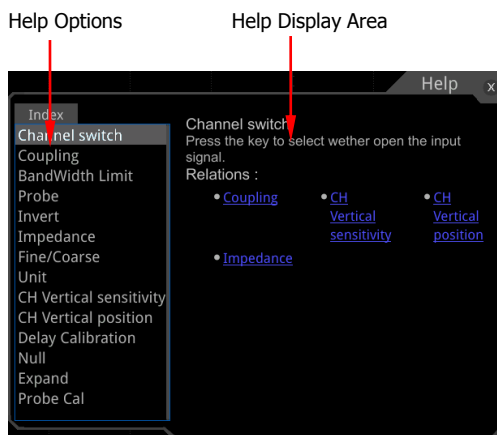


Figure 13 Help Information

After opening the help interface, you can click the desired help option to get its help information in the "Help Display Area".

Fuse Replacement

English

If you need to replace the fuse, use only the specified fuse (AC 250V, T3.15A; 5.2 mm×20 mm) and perform the following operations (as shown in Figure 14):

1. Turn off the instrument, cut off the power, and remove the power cord.
2. Use a small straight slotted screwdriver to pry out the fuse holder.
3. Take out the fuse holder.
4. Replace the old fuse with a specified fuse.
5. Install the fuse holder.

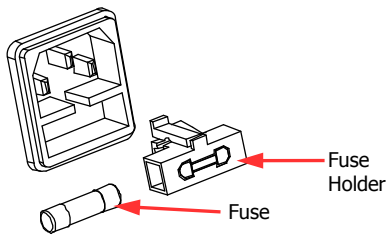


Figure 14 To Replace the Fuse



WARNING

To avoid electric shock, please ensure that the instrument has been turned off, the power source has been cut off, and the fuse to be used conforms to the fuse rating.



Remote Control

DS8000-R 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. DS8000-R series digital oscilloscope supports three ways of remote control: user-defined programming, PC software (e.g. **RIGOL** Ultra Sigma), and Web Control.

English

More Product Information

1. Obtain the device information

Click on the function navigation icon  at the lower-left corner of the screen to open the function navigation. Then click on the "Help" icon  to enter the help menu. Click **About** to obtain the information of the instrument, such as the manufacturer, model, serial number, firmware version number, and hardware version number.

2. Check the option installation status

The instrument is installed with the trial versions of the options before leaving factory. When you power on the instrument for the first time, the trial time is about 2,160 minutes. Open the "Help" menu, and then click **Option list** to view the options currently installed on the oscilloscope and their information. Click **Option setup** to install the option. For detailed setting methods, refer to descriptions in *DS8000-R User Guide*.

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. *DS8000-R User 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. *DS8000-R Programming Guide*: provides detailed descriptions of SCPI commands and programming examples of the instrument. *DS8000-R Datasheet*: provides the main features and technical specifications of the instrument.