RIGOL

快速指南

DS6000 系列数字示波器

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RIGOL Technologies, Inc.

目 录

保证和声明

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联系我们
如您在使用此产品或本手册的过程中有任何问题或需求，可与 **RIGOL** 联系：
电子邮件：service@rigol.com
网址：www.rigol.com

安全要求

一般安全概要

了解下列安全性预防措施，以避免受伤，并防止损坏本产品或与本产品连接的任何产品。为避免可能的危险，请务必按照规定使用本产品。

使用正确的电源线。
只允许使用所在国家认可的本产品专用电源线。

将产品接地。
本产品通过电源电缆的保护接地线接地。为避免电击，在连接本产品的任何输入或输出端子之前，请确保本产品电源电缆的接地端子与保护接地端可靠连接。

正确连接探头。
探头地线与地电势相同。请勿将地线连接至高电压。

查看所有终端额定值。
为避免起火和过大电流的冲击，请查看产品上所有的额定值和标记说明，请在连接产品前查阅产品手册以了解额定值的详细信息。

使用合适的过压保护。
确保没有过电压（如由雷电造成的电压）到达该产品。否则操作人员可能有遭受电击的危险。

请勿开盖操作。
请勿在仪器机箱打开时运行本产品。

更换电源保险丝。
如需更换电源保险丝，请将仪器返厂，由 **RIGOL** 授权的维修人员进行更换。

避免电路外露。
电源接通后，请勿接触外露的接头和元件。

怀疑产品出故障时，请勿进行操作。

如果您怀疑本产品出现故障，请联络**RIGOL**授权的维修人员进行检测。任何维护、调整或零件更换必须由**RIGOL**授权的维修人员执行。

保持适当的通风。

通风不良会引起仪器温度升高，进而引起仪器损坏。使用时应保持良好的通风，定期检查通风口和风扇。

请勿在潮湿环境下操作。

为避免仪器内部电路短路或发生电击的危险，请勿在潮湿环境下操作仪器。

请勿在易燃易爆的环境下操作。

为避免仪器损坏或人身伤害，请勿在易燃易爆的环境下操作仪器。

请保持产品表面的清洁和干燥。

为避免灰尘或空气中的水分影响仪器性能，请保持产品表面的清洁和干燥。

防静电保护。

静电会造成仪器损坏，应尽可能在防静电区进行测试。在连接电缆到仪器前，应将其内外导体短暂接地以释放静电。

正确使用电池。

严禁将电池暴露于高温或火中。要让儿童远离电池。不正确地更换电池可能造成爆炸（警告：锂离子电池）。必须使用 **RIGOL** 指定的电池。

注意搬运安全。

为避免仪器在搬运过程中滑落，造成仪器面板上的按键、旋钮或接口等部件损坏，请注意搬运安全。

安全术语和符号

本手册中的术语。以下术语可能出现在本手册中：

⚠ **警告**
警告性声明指出可能会危害操作人员生命安全的条件和行为。

⚠ **注意**
注意性声明指出可能导致本产品损坏或数据丢失的条件和行为。

产品上的术语。以下术语可能出现在产品上：

危险 表示您如果进行此操作可能会立即对您造成危害。
警告 表示您如果进行此操作可能会对您造成潜在的危害。
注意 表示您如果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。

产品上的符号。以下符号可能出现在产品上：

高电压　　注意请参阅手册　　保护性接地端　　壳体接地端　　测量接地端

测量类别

测量类别

DS6000 系列数字示波器可在测量类别 I 下进行测量。

⚠️ **警告**
本示波器仅允许在指定的测量类别中使用。

测量类别定义

测量类别 I 是指在没有直接连接到主电源的电路上进行测量。例如，对没有从主电源导出的电路，特别是受保护（内部）的主电源导出的电路进行测量。在后一种情况下，瞬间应力会发生变化。因此，用户应了解设备的瞬间承受能力。

测量类别 II 是指在直接连接到低压设备的电路上进行测量。例如，对家用电器、便携式工具和类似的设备进行测量。

测量类别 III 是指在建筑设备中进行测量。例如，在固定设备中的配电板、断路器、线路（包括电缆、母线、接线盒、开关、插座）以及工业用途的设备和某些其他设备（例如，永久连接到固定装置的固定电机）上进行测量。

测量类别 IV 是指在低压设备的源上进行测量。例如，在主要过电保护设备和脉冲控制单元上的量电计和测量。

通风要求

本示波器通过风扇强制冷却。请确保进气和排气区域无阻塞并有自由流动的空气。为保证充分的通风，在工作台机架中使用示波器时，请确保其两侧、上方、后面应留出至少 10 厘米的间隙。

⚠️ **警告**
通风不良会引起仪器温度升高，进而引起仪器损坏。使用时应保持良好的通风，定期检查通风口和风扇。

工作环境

温度
操作时：0℃至+50℃
非操作时：-20℃至+70℃

湿度
+35℃以下：≤90％相对湿度
+35℃至+40℃：≤60％相对湿度

⚠ **警告**
为避免仪器内部电路短路或发生电击的危险，请勿在潮湿环境下操作仪器。

海拔高度
操作时：3000 米以下
非操作时：15000 米以下

安装（过电压）类别
本产品由符合安装（过电压）类别 II 的主电源供电。

⚠ **警告**
确保没有过电压（如由雷电造成的电压）到达该产品。否则操作人员可能有遭受电击的危险。

安装（过电压）类别定义
安装（过电压）类别 I 是指信号电平，其适用于连接到源电路中的设备测量端子，其中已经采取措施，把瞬时电压限定在相应的低水平。
安装（过电压）类别 II 是指本地配电电平，其适用于连接到市电（交流电源）的设备。

污染程度   2 类

污染程度定义
污染度 1：无污染，或仅发生干燥的非传导性污染。此污染级别没有影响。例如：清洁的房间或有空调控制的办公环境。
污染度 2：一般只发生干燥非传导污染。有时可能发生由于冷凝而造成的暂时性传导。例如：一般室内环境。
污染度 3：发生传导性污染，或干燥的非传导性污染，由于冷凝而变为具有传导性。例如：有遮棚的室外环境。
污染度 4：通过传导性的尘埃、雨水或雪产生永久的可导性污染。例如：户外场所。

安全级别   1 级 - 接地产品

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：
请根据使用情况经常对仪器进行清洁。方法如下：
1. 断开电源。
2. 用潮湿但不滴水的软布（可使用柔和的清洁剂或清水）擦试仪器外部的浮尘。清洁液晶显示屏时，注意不要划伤透明的 LCD 保护屏。

⚠️ **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。

环境注意事项

以下符号表明本产品符合欧盟根据关于废弃电气、电子设备（WEEE）的Directive 2002/96/EC 所制定的要求。

设备回收：
本产品中包含的某些物质可能会对环境或人体健康有害，为避免将有害物质释放到环境中或危害人体健康，建议采用适当的方法回收本产品，以确保大部分材料可正确地重复使用或回收。有关处理或回收的信息，请与当地权威机构联系。

快速入门

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。

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。

外观尺寸
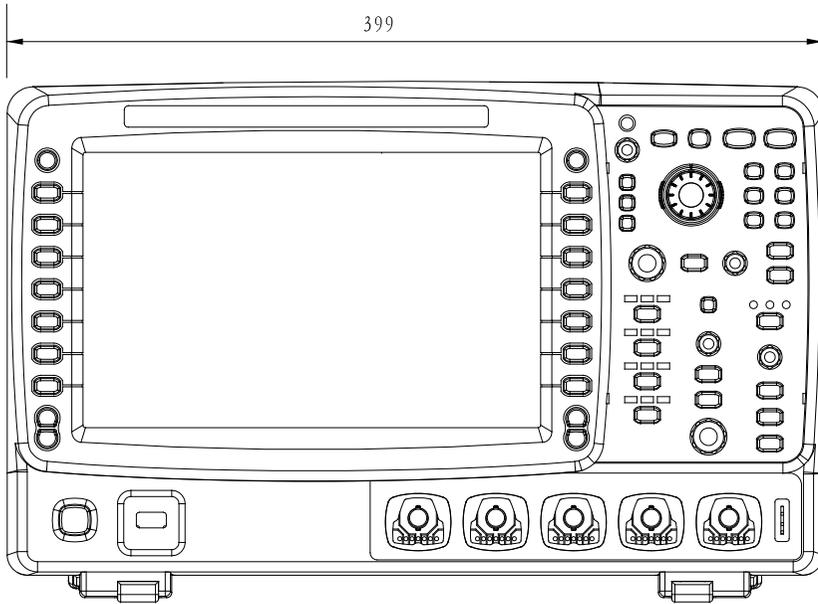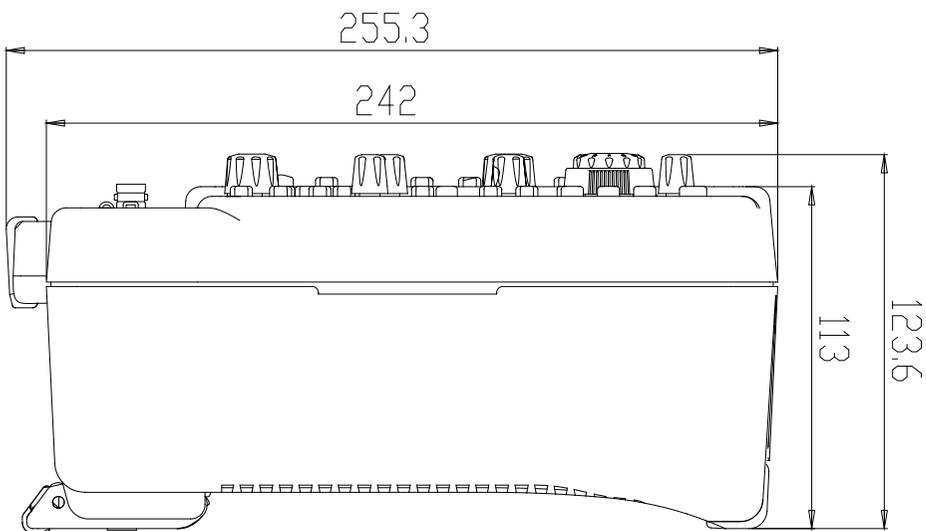

图 1 正视图　　　　　　　　　　　　单位：mm

图 2 侧视图　　　　　　　　　　　　单位：mm

使用前准备

拆卸保护壳

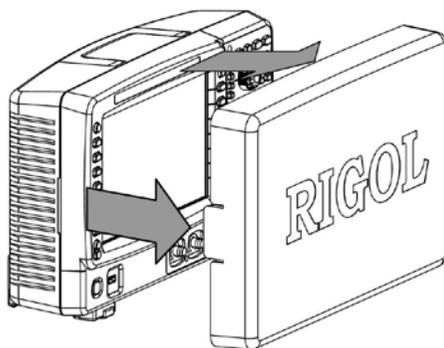使用示波器之前，请先拆除前面板保护壳。双手拉住前面板保护壳两边的横向卡钩，沿下图箭头所指方向适当用力即可将保护壳卸下。

图 3 拆卸保护壳
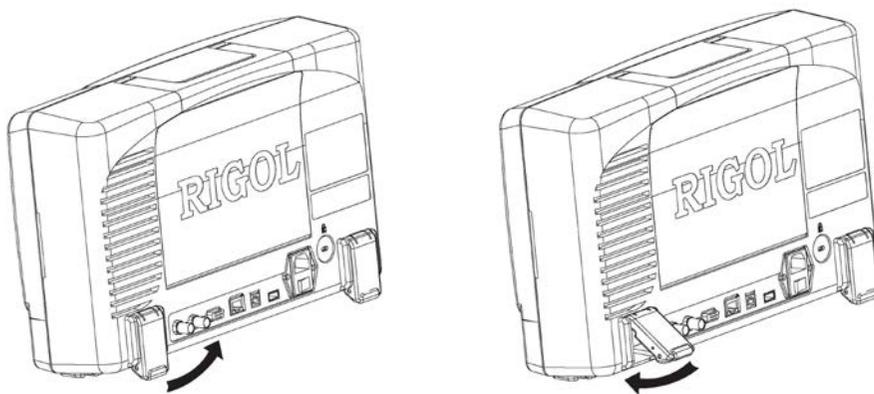
调节支撑脚

适当的调整支撑脚，将其作为支架使示波器向上倾斜，以稳定放置示波器，便于更好的操作和观察显示屏。

图 4 调节支撑脚

连接电源

本示波器可输入两种规格的交流电源：100-127V，45-440Hz，或 100-240 V，45-65Hz。请使用附件提供的电源线按下图所示将示波器连接到电源中。打开电源插孔下面的电源开关后，示波器处于通电状态，前面板左下角的电源键 ⊚ 呈呼吸状态。
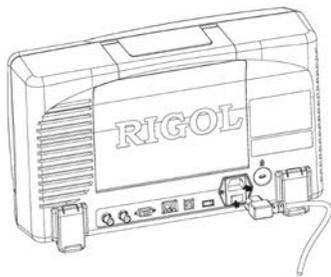
图 5 连接电源

注意
如需更换电源保险丝，请将仪器返厂，由 **RIGOL** 授权的维修人员进行更换。

使用电池

本示波器还提供可选的可充电电池。请按下图所示的方法安装电池。电池在出厂时带有一定的电量。单独使用电池供电时，屏幕右下角会显示一个电池图标并显示剩余电量（交流电和电池同时供电时无显示）。当电池电量过低时，消息框将弹出"电池电量过低！"的提示。

如需充电，请正确地安装电池，然后按"**连接电源**"的说明将示波器连接到交流电源中即可对电池进行充电。电池充满电量所需时间大约为 15 小时。
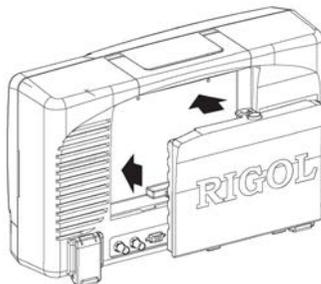
图 6 安装电池

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，您可以听到继电器切换的声音。自检结束后出现开机画面。自检结果可以通过 **UTIL** → 系统 → 自检信息 查看。

连接探头

RIGOL 为 DS6000 系列示波器提供无源和有源两种探头。有关探头的详细技术信息请参考相应的探头用户手册。下表为本示波器推荐使用的探头。

型号	描述
RP5600	600 MHz，无源探头，标配，自动识别
RP3500	500 MHz，无源探头，选配，自动识别
RP6150	1.5 GHz，无源探头，DS610X标配，自动识别
RP7150	1.5 GHz，有源探头，选配，自动识别

连接探头：
1. 将探头的 BNC 端连接到示波器前面板的通道 BNC 连接器。
2. 将探针连接至待测电路测试点中，并将探头接地鳄鱼夹连接至电路接地端。

图 7 连接探头

功能检查
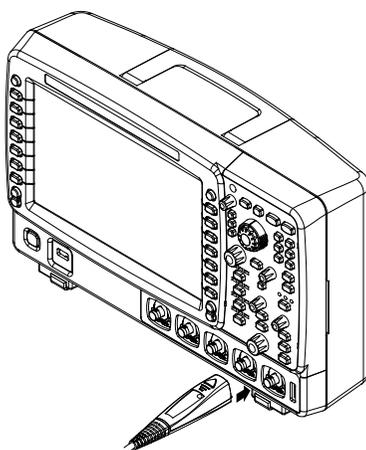
1. 按 **SAVE** → 出厂设置，将示波器恢复为默认配置。

2. 使用探头连接示波器的通道 1（CH1）输入端和探头"补偿信号输出端"。
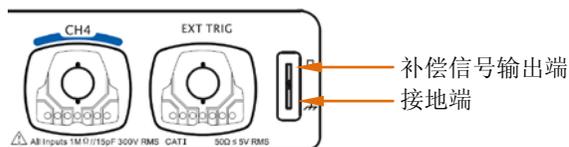
图 8 使用补偿信号

3. 将探头的接地鳄鱼夹与探头补偿信号输出端下面的"接地端"相连。

4. 按 **Auto** 键。

5. 观察示波器显示屏上的波形，正常情况下应显示下图所示的方波：
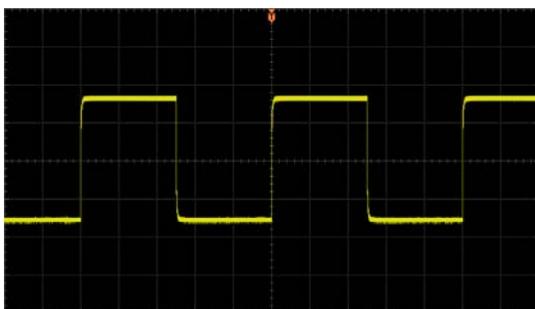
图 9 方波信号

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，请执行下一节"**探头补偿**"。

⚠️ **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。

提示

探头补偿连接器上输出的信号仅作探头补偿调整之用，不可用于校准。

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**"中的步骤 1，2，3 和 4。
2. 检查所显示的波形形状并与下图对比。

补偿过度　　　　　　　　补偿正确　　　　　　　　补偿不足
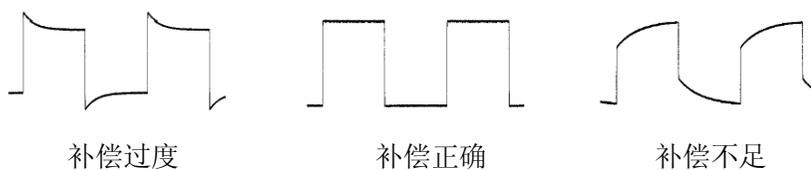
图 10 探头补偿

3. 用非金属质地的改锥调整探头上的可变电容，直到显示的波形如上图"补偿正确"。

前面板总览
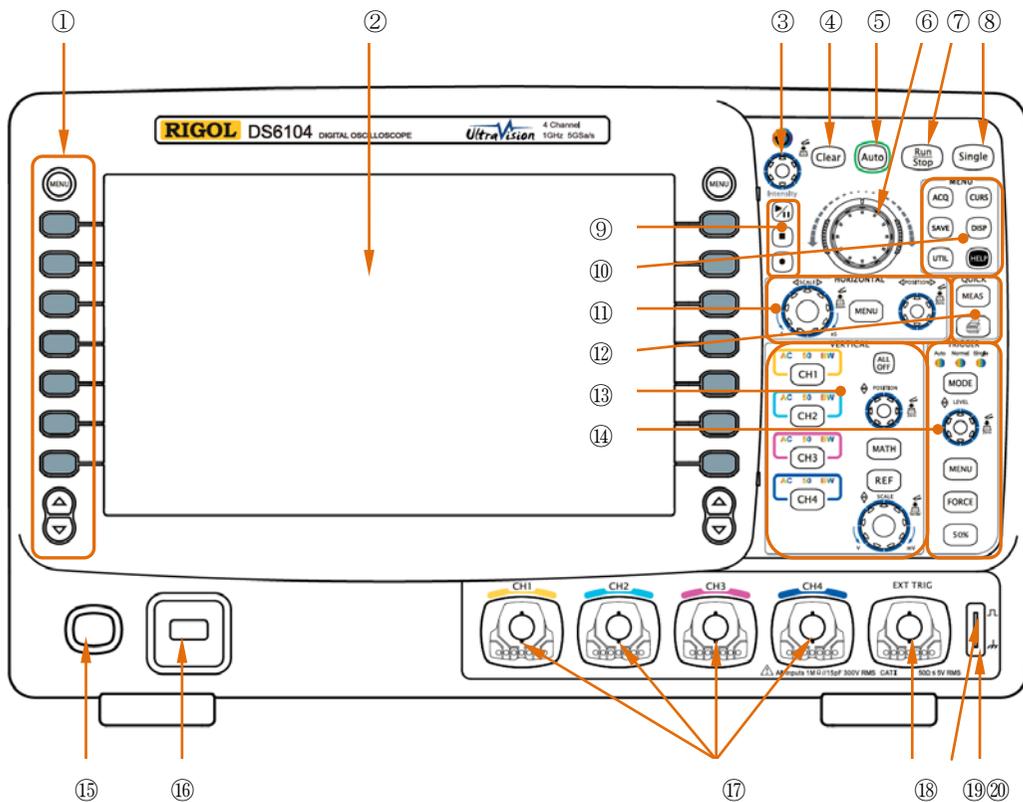
图 11 前面板总览

编号	说明	编号	说明
①	菜单控制键	⑪	水平控制区
②	LCD	⑫	测量设置/快捷打印键
③	多功能旋钮	⑬	垂直控制区
④	全部清除键	⑭	触发控制区
⑤	波形自动显示	⑮	电源键
⑥	导航旋钮	⑯	USB HOST 接口
⑦	运行/停止控制键	⑰	模拟通道输入端
⑧	单次触发控制键	⑱	外触发输入端
⑨	波形录制/回放控制键	⑲	探头补偿器信号输出端
⑩	功能菜单键	⑳	探头补偿器接地端

后面板总览

1.触发输出/自校正   3.视频输出   5.USB DEVICE   7. 交流输入/开关

2. 参考时钟   4. LAN   6.USB HOST   8. 锁孔
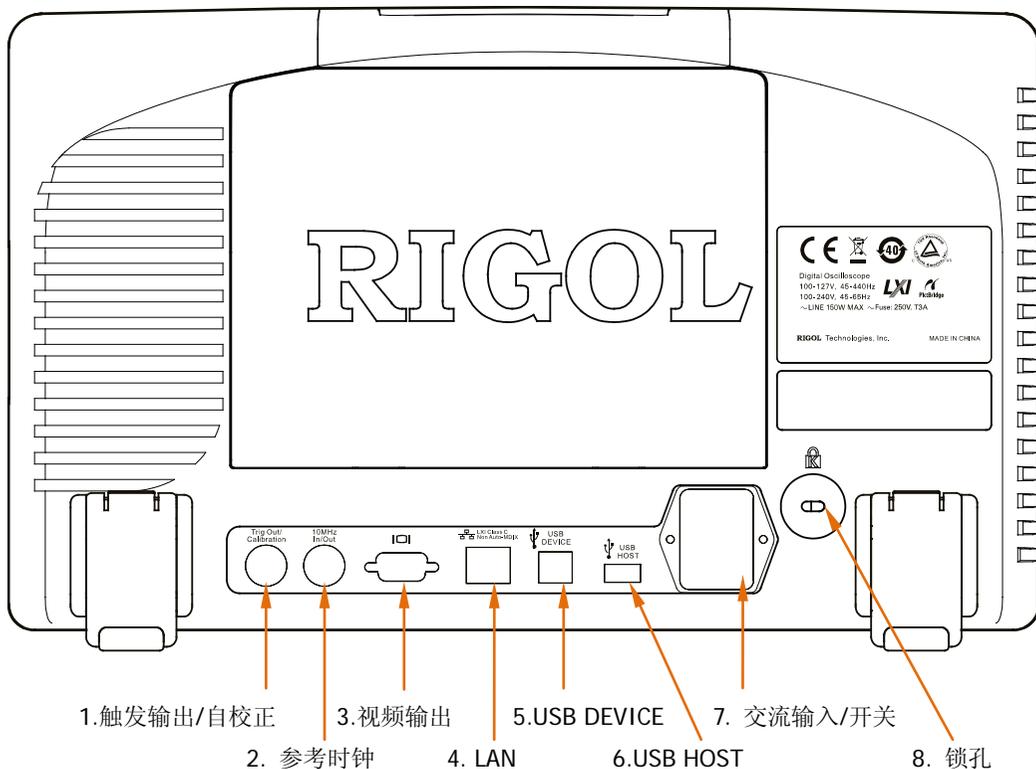
图 12 后面板总览

1. 触发输出/自校正

该连接器可输出多种信号（按 **UTIL** ➔ **Aux 输出**，选择所需的输出类型。）：

1) 触发输出：选择该类型后，示波器产生一次触发时，输出一个可反映示波器当前的捕获率的信号。

2) 快沿：选择该类型后，可输出一个快沿信号，该信号可用于示波器的自校正。

3) GND：选择该类型后，可输出一个接地电平。

4) 通过失败：选择该类型后，当示波器测试到失败的波形，将输出一个脉冲信号，将该信号转接到其他控制系统中可方便查看测试结果。

2. 参考时钟

使用参考时钟可以为示波器提供更准确的采样时钟信号，还可同步两台或多台示波器的时钟。

3．视频输出

通过该接口将示波器与投影仪等外部显示器相连，可以观察到更清晰的波形显示。注意此时示波器的显示屏仍然有效。

4．LAN

通过该接口将示波器连接到网络中，对其进行远程控制。本示波器符合 LXI-C 类仪器标准，可快速搭建测试系统。

5．USB DEVICE

通过该接口可连接 PictBridge 打印机以打印波形数据，或连接 PC，通过上位机软件对示波器进行控制。

6．USB HOST

通过该接口可连接普通打印机以打印波形数据，或插入 U 盘以存储波形文件。可以使用 **RIGOL** 提供的 USB-GPIB 转接模块（选配）实现 GPIB 接口通信。注意示波器前面板也提供了该接口。

7．交流输入/开关

使用交流电源时，请将电源线插头垂直插入该插口，并通过插口下面的开关控制示波器通电与否。

8．锁孔

可以使用安全锁（请用户自行购买）通过该锁孔将示波器锁定在固定位置。

前面板功能概述

垂直控制
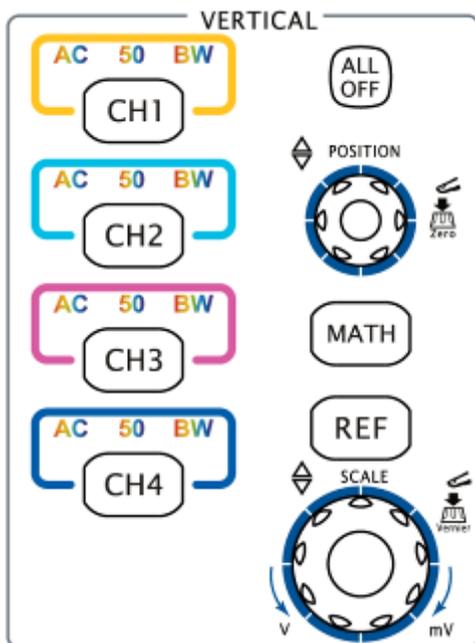
CH1、**CH2**、**CH3**、**CH4**：模拟输入通道。4 个通道标签用不同颜色标识，并且屏幕中的波形和通道输入连接器的颜色也与之对应。按下任一按键并打开相应通道菜单，再次按下关闭通道。

AC：通道耦合方式 AC 时变亮。

50：通道输入阻抗为 50 Ω 时变亮。

BW：带宽限制打开时变亮。

ALL OFF：按下该键关闭所有已打开的通道。

MATH：按下该键打开数学运算和解码功能菜单。可进行（加、减、乘、除）运算、FFT 运算、逻辑运算、高级运算、（并行、RS232、SPI、I2C）解码。

REF：按下该键打开参考波形功能。可将实测波形和参考波形比较，以判断电路故障。

垂直 ◎ **POSITION**：修改当前通道波形的垂直位移。顺时针转动增大位移，逆时针转动减小位移。修改过程中波形会上下移动，同时屏幕左下角弹出的位移信息（如

POS:-136.0mV ）实时变化。按下该旋钮可快速复位垂直位移。

垂直 ◎ **SCALE**：修改当前通道的垂直档位。顺时针转动减小档位，逆时针转动增大档位。修改过程中波形显示幅度会增大或减小，同时屏幕下方的档位信息（如

100mV ）实时变化。按下该旋钮可快速切换垂直档位调节方式为"粗调"或

"微调"。

水平控制
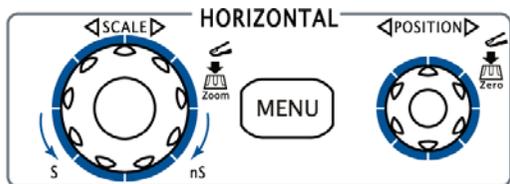
MENU：按下该键打开水平控制菜单。可开关延迟扫描功能，切换不同的时基模式，切换档位的微调或粗调，以及修改水平参考设置。

水平 ◎ **SCALE**：修改水平时基。顺时针转动减小时基，逆时针转动增大时基。修改过程中，所有通道的波形被扩展或压缩显示，同时屏幕上方的时基信息（如 **H 500.0us**）实时变化。按下该旋钮可快速切换至延迟扫描状态。

水平 ◎ **POSITION**：修改触发位移。转动旋钮时触发点相对屏幕中心左右移动。修改过程中，所有通道的波形左右移动，同时屏幕右上角的触发位移信息（如 **D 680.0000us**）实时变化。按下该旋钮可快速复位触发位移（或延迟扫描位移）。

触发控制
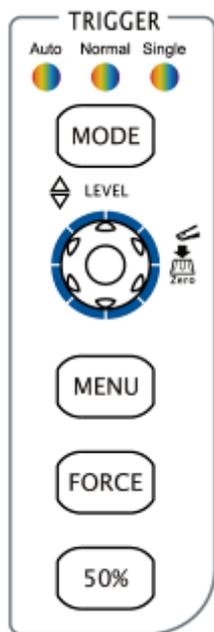
MODE：按下该键切换触发方式为 **Auto**、**Normal** 或 **Single**，当前触发方式对应的状态背灯会变亮。

触发 ◎ **LEVEL**：修改触发电平。顺时针转动增大电平，逆时针转动减小电平。修改过程中，触发电平线上下移动，同时屏幕左下角的触发电平消息框（如 **Trig Lvl: 284mV**）中的值实时变化。按下该旋钮可快速将触发电平恢复至零点。

MENU：按下该键打开触发操作菜单。本示波器提供丰富的触发类型。

FORCE：在 **Normal** 和 **Single** 触发方式下，按下该键将强制产生一个触发信号。

50%：按下该键将触发电平设置为触发信号幅值的垂直中点。

运行控制

按下该键将示波器的运行状态设置为"运行"或"停止"。
"运行"状态下，该键黄灯点亮。
"停止"状态下，该键红灯点亮。

单次触发

按下该键将示波器的触发方式设置为"Single"。单次触发
方式下，按 FORCE 键立即产生一个触发信号。

波形自动显示

按下该键启用波形自动设置功能。示波器将根据输入信号
自动调整垂直档位、水平时基以及触发方式，使波形显示
达到最佳状态。注意应用自动设置要求被测信号的频率不
小于 50 Hz，占空比大于 1%，且幅度至少为 20 mVpp。

多功能旋钮

调节波形亮度：
非菜单操作时（菜单隐藏），转动该旋钮可调整波形显示的
亮度。亮度可调节范围为 0%至 100%。顺时针转动增大
波形亮度，逆时针转动减小波形亮度。按下旋钮将波形亮
度恢复至 50%。
也可按 DISP → 波形亮度，使用该旋钮调节波形亮度。

多功能旋钮：（操作时，背灯变亮）
菜单操作时，按下某个菜单软键后，转动该旋钮可选择该
菜单下的子菜单，然后按下旋钮可选中当前选择的子菜单。
还可以用于修改参数、文件名输入等等。

导航旋钮
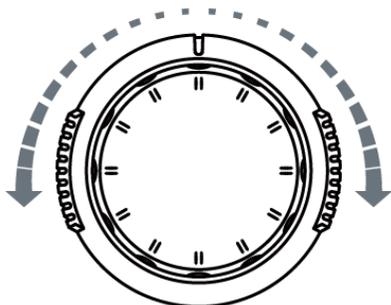
对于某些可设置范围较大的数值参数，该旋钮提供了快速调节/定位的功能。顺时针（逆时针）旋转增大（减小）数值；内层旋钮可微调，外层旋钮可粗调。例如，在回放波形时，使用该旋钮可以快速定位需要回放的波形帧（"当前帧"菜单）。类似的菜单还有：触发释抑，脉宽设置，斜率时间等。

功能菜单

ACQ：按下该键进入采样设置菜单。可设置示波器的获取方式、采样方式、存储深度和抗混叠功能。

CURS：按下该键进入光标测量菜单。示波器提供手动测量、追踪测量和自动测量三种光标模式。

SAVE：按下该键进入文件存储和调用界面。可存储的文件类型包括：轨迹存储、波形存储、设置存储、图像存储和 CSV 存储。支持内、外部存储和磁盘管理。

DISP：按下该键进入显示设置菜单。设置波形显示类型、余辉时间、波形亮度、屏幕网格、网格亮度和菜单保持时间。

UTIL：按下该键进入系统功能设置菜单。设置系统相关功能或参数，例如接口、扬声器、语言等。此外，还支持一些高级功能，例如通过/失败测试、波形录制和打印设置等。

HELP：按下该键打开帮助界面。详情请参考**"使用内置帮助系统"**中的介绍。

波形录制

播放/暂停：按下该键播放已录制或暂停的波形，再次按下暂停播放。按键背灯为黄色。

停止：按下该键停止正在录制或回放的波形。按键背灯为橙色。

录制：按下该键开始波形录制。按键背灯为红色。

快捷测量

按下该键进入测量菜单。支持测量参数设置，全部测量、统计分析和频率计等功能。按屏幕左侧的 **MENU** 键可快速打开 22 种测量参数选择菜单，轻松实现常用参数的"一键"测量。

全部清除

按下该键清除屏幕上所有的波形。如果示波器处于"RUN"状态，则继续显示新波形 。

打印

按下该键执行打印功能或将屏幕保存到 U 盘中。若当前已连接打印机（PictBridge 打印机或普通打印机），并且打印机处于闲置状态，按下该键将执行打印功能。若当前未连接打印机，但连接 U 盘，按下该键则将屏幕图形以".bmp"格式保存到 U 盘中。同时连接打印机和 U 盘时，打印机优先级较高。

用户界面

DS6000 示波器提供 10.1 英寸 WVGA（800*480）160,000 色 TFT LCD。值得一提的是，14 格超宽的屏幕可让您观察到更"长"时间的波形。
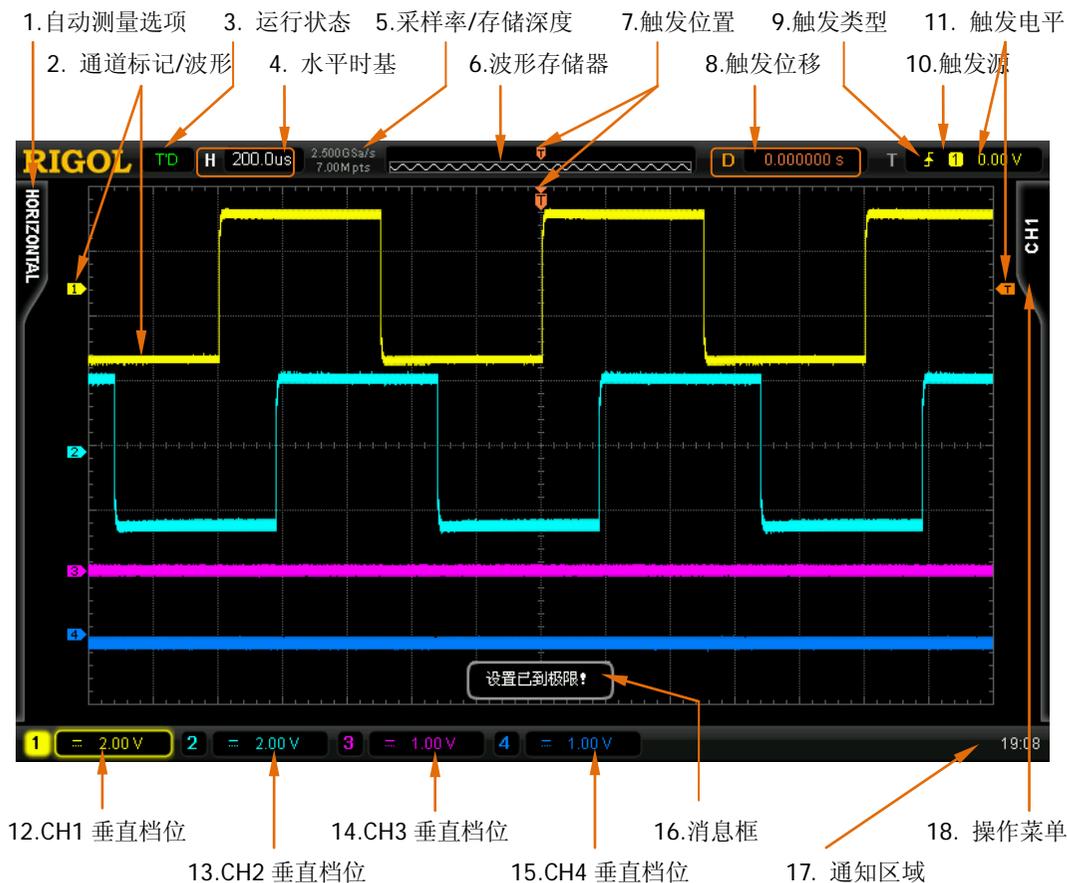
图 13 用户界面

1. 自动测量选项
提供 12 种水平（HORIZONTAL）和 10 种垂直（VERTICAL）测量参数。按下屏幕左侧的软键即可打开相应的测量项。

2. 通道标记/波形
不同通道用不同的颜色表示，通道标记和波形的颜色一致。

3. **运行状态**
   可能的状态包括：RUN（运行）、STOP（停止）、T′D（已触发）、WAIT（等待）
   和 AUTO（自动）。

4. **水平时基**
   ● 表示屏幕水平轴上每格所代表的时间长度。
   ● 使用**水平** ◎ **SCALE** 可以修改该参数，可设置范围为 500 ps 至 50 s。

5. **采样率/存储深度**
   ● 显示当前示波器使用的采样率以及存储深度。
   ● 使用**水平** ◎ **SCALE** 可以修改该参数。

6. **波形存储器**
   提供当前屏幕中的波形在存储器中的位置示意图。

7. **触发位置**
   显示波形存储器和屏幕中波形的触发位置。

8. **触发位移**
   使用**水平** ◎ **POSITION** 可以修调节该参数。按下旋钮时参数自动被设为 0。

9. **触发类型**
   显示当前选择的触发类型及触发条件设置。选择不同触发类型时显示不同的标
   识。
   例如，**⬆** 表示在"边沿触发"的上升沿处触发。

10. **触发源**
    显示当前选择的触发源（CH1-CH4、EXT、EXT/5 或市电）。选择不同触发源时，
    显示不同的标识，并改变触发参数区的颜色。
    例如，**1** 表示选择 CH1 作为触发源。

11. **触发电平**
    ● 屏幕右侧的**T**为触发电平标记，右上角为触发电平值。
    ● 使用**触发** ◎ **LEVEL** 修改触发电平时，触发电平值会随**T**的上下移动而改
      变。
    注意，斜率触发时，有两个触发电平标记（**T1**和**T2**）。

12. **CH1 垂直档位**
    ● 显示屏幕垂直方向 CH1 每格波形所代表的电压大小。
    ● 使用**垂直** ◎ **SCALE** 可以修改该参数。
    ● 此外还会根据当前的通道设置给出如下标记：通道耦合（如**■**）、带宽限制（如
      B）、输入阻抗（如**Ω**）。CH2、CH3、CH4 情况类似。

13. **CH2 垂直档位**
    ● 显示屏幕垂直方向 CH2 每格波形所代表的电压大小。

- 使用**垂直** ◎ **SCALE** 可以修改该参数。
- 此外还会根据当前的通道设置给出如下标记：通道耦合、带宽限制、输入阻抗。

14. CH3 垂直档位
- 显示屏幕垂直方向 CH3 每格波形所代表的电压大小。
- 使用**垂直** ◎ **SCALE** 可以修改该参数。
- 此外还会根据当前的通道设置给出如下标记：通道耦合、带宽限制、输入阻抗。

15. CH4 垂直档位
- 显示屏幕垂直方向 CH4 每格波形所代表的电压大小。
- 使用**垂直** ◎ **SCALE** 可以修改该参数。
- 此外还会根据当前的通道设置给出如下标记：通道耦合、带宽限制、输入阻抗。

16. 消息框
显示提示消息。

17. 通知区域
显示系统时间、声音图标、电池图标和 U 盘图标。
- 系统时间：以"hh:mm（时:分）"的格式显示。在打印或存储波形时，输出文件将包含该时间信息。按 **UTIL** → **系统** → **系统时间**，通过下面格式设置：
  mm-dd-yyyy hh-mm-ss （月-日-年 时-分-秒）
- 声音图标：声音打开时，该区域显示 ◀。按 **UTIL** → **声音** 可以打开或关闭声音。
- 电池图标：当示波器使用电池供电时，该区域显示 ▥。
- U 盘图标：当示波器检测到 U 盘时，该区域显示 ⟷。

18. 操作菜单

按下任一软键可激活相应的菜单。下面的符号可能显示在菜单中：

↻	表示可以用前面板上的多功能旋钮 ↻ 选择参数项。↻ 的背灯在参数选择有效时变亮。
↻	表示可以用 ↻ 修改参数值。↻ 的背灯在参数输入有效时变亮。
◉	表示可以用**导航旋钮**快速调节/定位参数。
↻	表示使用 ↻ 调节参数，然后按下 ↻ 选中参数。
◀	表示当前菜单有若干选项。
▼	表示当前菜单有下一层菜单。
↵	按下该键可以返回上层菜单。

注意，操作菜单左下角的网格中也可能出现下面的方向键：

▽	表示可以打开下一页菜单。
△	表示可以打开上一页菜单。

使用安全锁

如有必要，您可以使用安全锁（请自行购买）将示波器锁在固定位置。方法如下，沿与后面板垂直的方向对准锁孔将锁头插入，顺时针旋转钥匙锁定示波器，然后拔出钥匙。
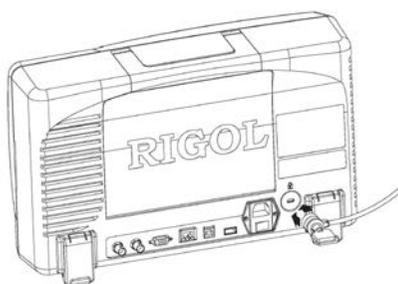
图 14 使用安全锁

使用支撑悬臂

本示波器可通过支撑悬臂安装到工作台上，以节省操作空间。您可以自由调节仪器的高度和角度，以获得最大的舒适度和工作效率，方便测量和观察。如有需要，请购买并安装相应的选件。

图 15 安装悬臂后的效果图

使用机架

本示波器可以安装到符合电子工业协会（EIA）标准的 19 英寸机柜内。如有需要，请购买并安装相应的选件。

部件清单

标号	名称	数量	零件编号	描述
1-1	前面板	1	RM-DS-6-01	
1-2	底板	1	RM-DS-6-02	
1-3	左侧板	1	RM-DS-6-03	
1-4	右侧板	1	RM-DS-6-04	
1-5	后支撑条	2	RM-DS-6-05	
2-1	M4 螺钉	24	RM-SCREW-01	M4 x 6 十一字切沟盘头机械牙螺钉
2-2	M6 螺钉	4	RM-SCREW-02	M6 x 16 十一字切沟盘头机械牙螺钉
2-3	M6 螺母	4	RM-SCREW-03	M6 x 5 带定位锁片机械牙方螺母
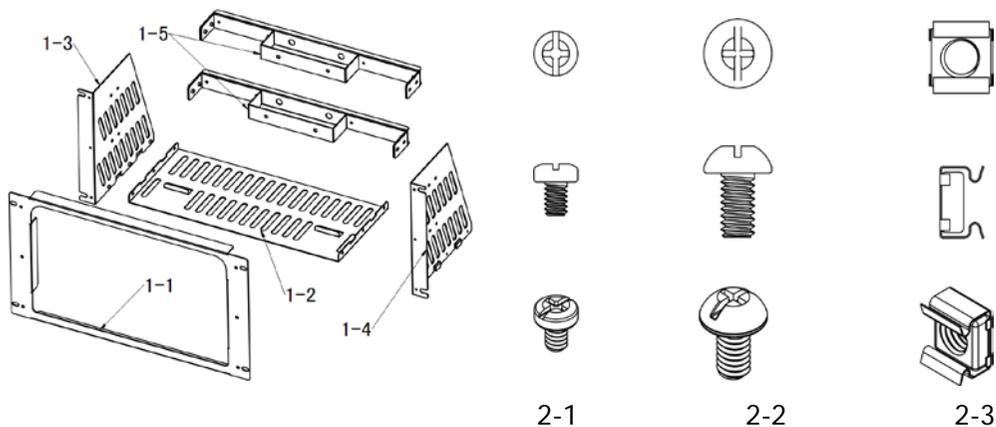
安装工具

推荐使用 PH2 号头十字改锥。

安装空间

本机架安装到机柜内须满足如下要求：
- 机柜必须为 19 英寸标准机柜。
- 机柜至少有 6U 的空间（266.7 mm）。
- 机柜内深度至少 400 mm。

仪器上架后的尺寸如下图所示：
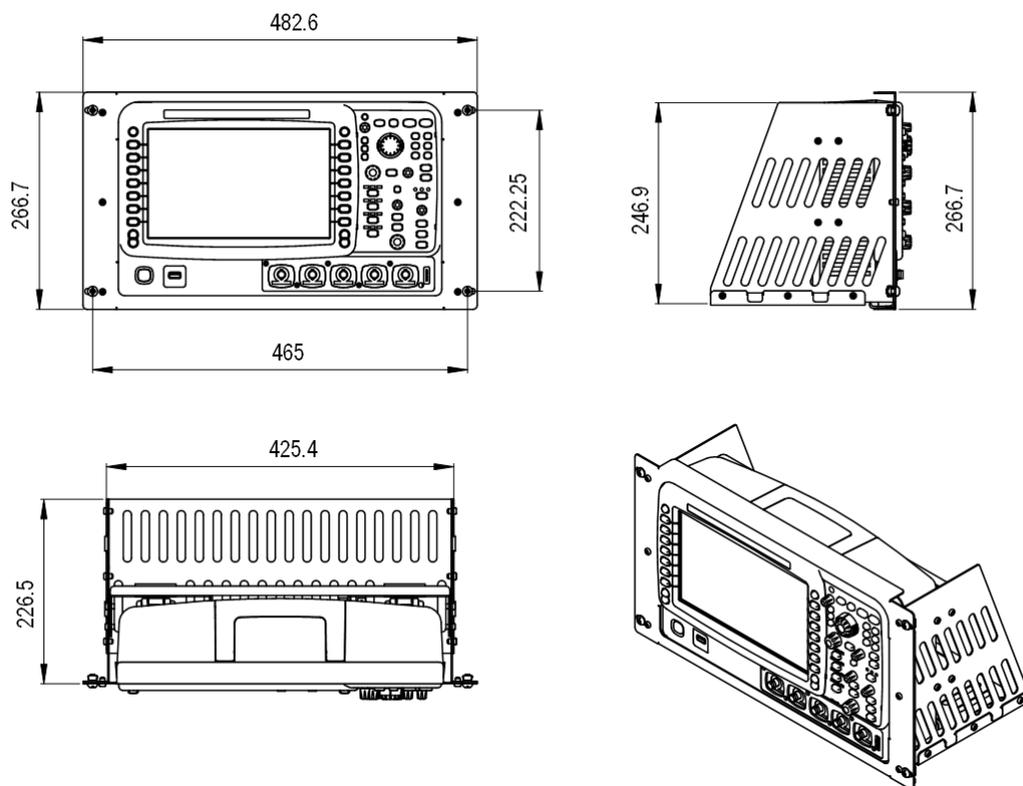
安装步骤

仅授权人员方可执行安装操作，不正确的操作可能导致仪器损坏或者不能正确安装到
机架内。

1. 安装左右侧板：左右侧板的卡位对准底板的豁口后插入底板，用 6 颗 M4 螺钉将
其固定。
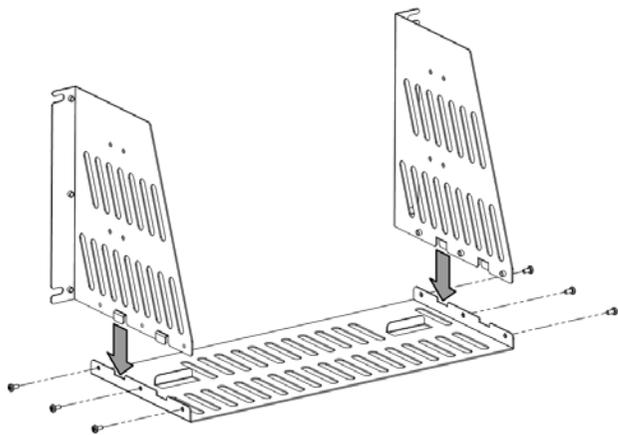
2. 放置仪器：按压仪器电池上方的按钮将电池卸下，再将仪器对准底板上的限位放
置。
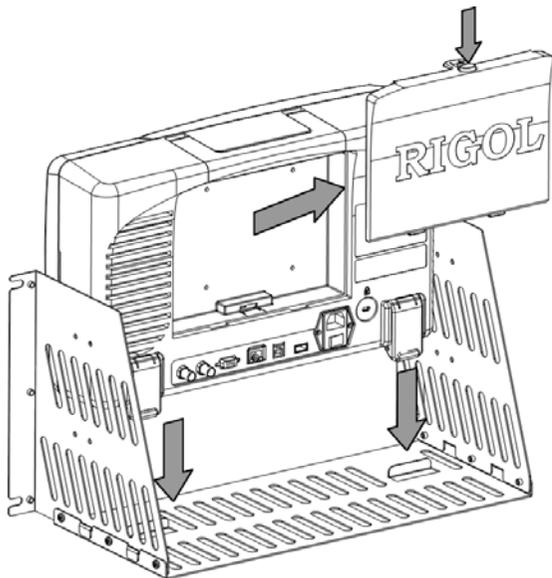
3. 固定仪器：用 2 件后支撑条零件和 12 颗 M4 螺钉把仪器固定在机架上。
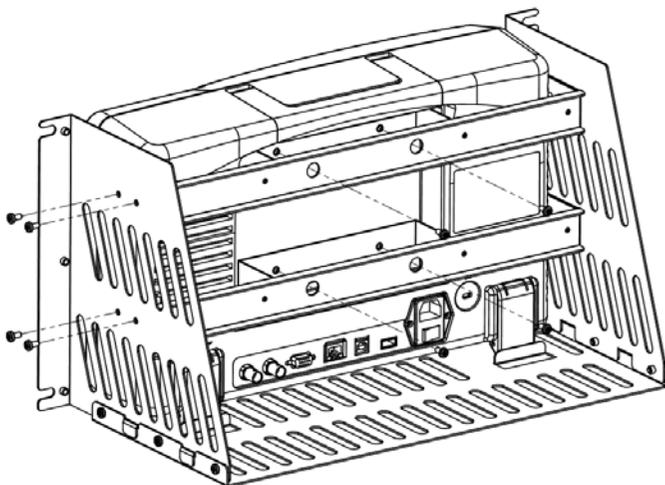
4. 安装前面板：对准螺钉孔把仪器前面板从开口处露出，用 6 颗 M4 螺钉固定。
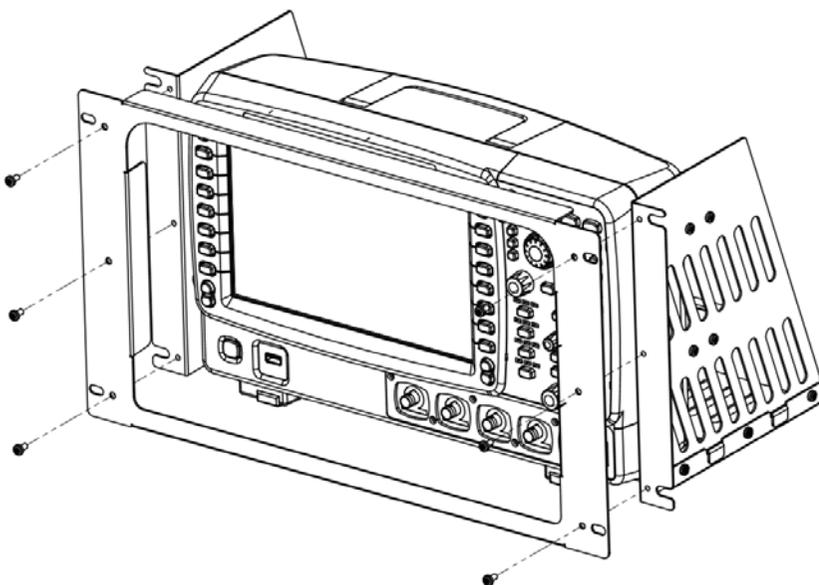
5. 装入机柜：用 4 颗 M6 螺钉和 4 颗 M6 方螺母将固定好仪器的机架安装在 19 英寸标准机柜内。
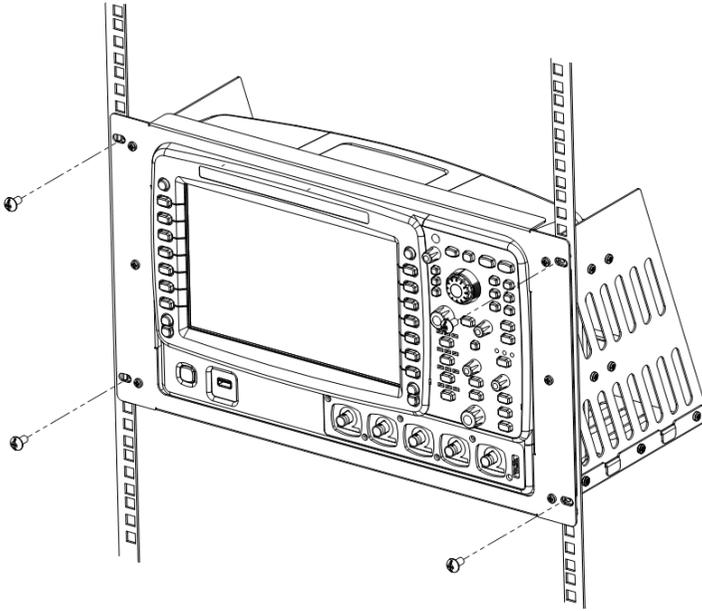
6. 安装后注意：机架占 6U 高度，箭头所指的孔为机架的安装孔，注意对准安装。
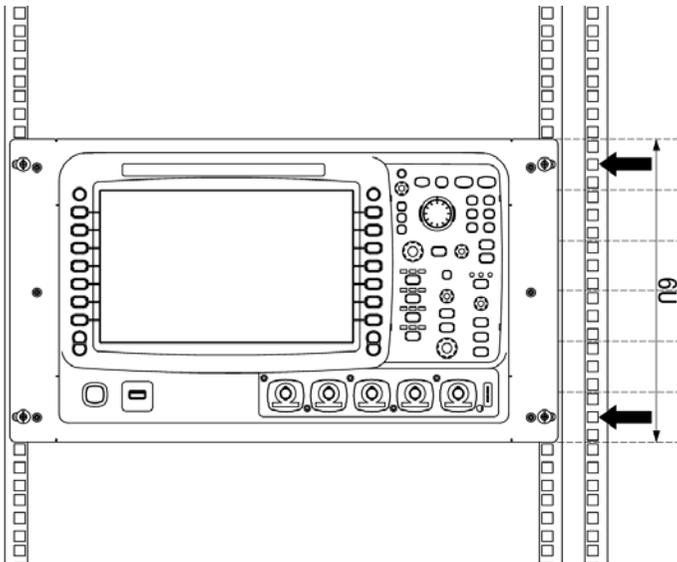
使用内置帮助系统

本示波器的帮助系统提供了前面板各功能键（包括菜单键）的说明。按 HELP 键打开帮助界面，再次按下则关闭。帮助界面主要分两部分，左边为"帮助选项"，可使用"Button"或"Index"方式选择，右边为"帮助显示区"。
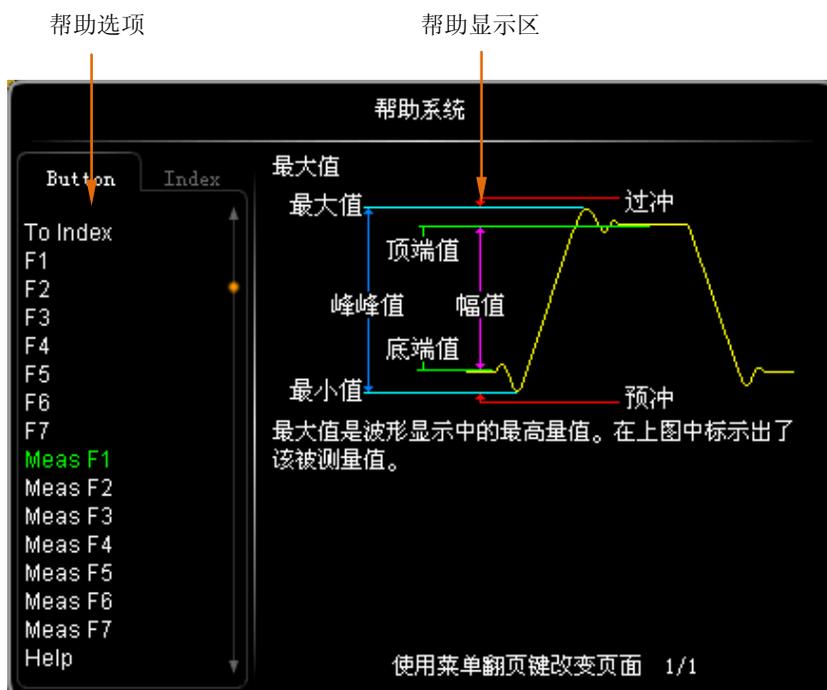
图 16 帮助信息

Button：
默认方式。该方式下，您可以直接按面板上的按键（电源键◉、多功能旋钮↻、菜单翻页键⬆/⬇和导航旋钮◉除外）即可在"帮助显示区"中获得相应按键的帮助信息。使用 ↻ 选择"To Index"后按下旋钮可切换到 **Index** 方式。

Index：
该方式下，使用 ↻ 选择需要获得帮助的选项（例如"带宽"），当前选中的选项显示为绿色，按下旋钮，即可在"帮助显示区"中获得相应的帮助信息。
使用 ↻ 选择"To Button"后按下旋钮可切换到 **Button** 方式。

故障处理

下面列举了示波器在使用过程中可能出现的故障及排查方法。当您遇到这些故障时，请按照相应的步骤进行处理，如不能处理，请与 **RIGOL** 公司联系，同时请提供您机器的设备信息（获取方法：UTIL ➜ 系统 ➜ 系统信息）。

1. **如果按下电源键示波器仍然黑屏，没有任何显示：**
   (1) 检查电源接头是否接好或者电池是否已经正确安装。
   (2) 检查电源开关是否打开。
   (3) 检查保险丝是否熔断。如需更换电源保险丝，请将仪器返厂，由 **RIGOL** 授权的维修人员进行更换。
   (4) 做完上述检查后，重新启动仪器。
   (5) 如果仍然无法正常使用本产品，请与 **RIGOL** 联系。

2. **采集信号后，画面中并未出现信号的波形：**
   (1) 检查探头是否正常接在信号连接线上。
   (2) 检查信号连接线是否正常接在 BNC（即通道连接器）上。
   (3) 检查探头是否与待测物正常连接。
   (4) 检查待测物是否有信号产生（可将探头补偿输出信号连接到有问题的通道确定是通道还是待测物的问题）。
   (5) 再重新采集信号一次。

3. **测量的电压幅度值比实际值大 10 倍或小 10 倍：**
   检查通道衰减系数是否与实际使用的探头衰减比例相符。

4. **有波形显示，但不能稳定下来：**
   (1) 检查触发信源：检查触发面板的 信源选择 是否与实际使用的信号通道相符。
   (2) 检查触发类型：一般的信号应使用"边沿触发"方式，视频信号应使用"视频触发"方式。只有应用适合的触发方式，波形才能稳定显示。
   (3) 尝试改变 耦合 为"高频抑制"或"低频抑制"显示，以滤除干扰触发的高频或低频噪声。
   (4) 改变触发释抑设置。

5. **按下 Run/Stop 键无任何显示：**
   检查触发面板（TRIGGER）的 触发方式 是否为"普通"或"单次"档，且触发

电平是否超出波形范围。如果是，将触发电平居中或者设置 触发方式 为"自动"
档。

注：使用自动设置 **Auto** 按钮可自动完成以上设置。

6. 波形显示呈阶梯状：

(1) 水平时基档位可能过低，增大水平时基以提高水平分辨率，可以改善显示。

(2) 若 显示类型 为"矢量"，采样点间的连线，可能造成波形阶梯状显示。将 显示类型 设置为"点"显示方式，即可解决。

7. 通过 USB 连接 PC 或 PictBridge 打印机失败：

检查 **UTIL** 的 接口设置 菜单中，**USB 设备** 中的设置是否与当前连接的设备匹配。必要时重启示波器。

8. U 盘设备不能被识别：

(1) 检查 U 盘设备是否可以正常工作。

(2) 确认使用的为 Flash 型 U 盘设备，本仪器不支持硬盘型 U 盘设备。

(3) 确认使用的 U 盘容量是否过大，本示波器推荐使用不超过 4 GBytes 的 U 盘。

(4) 重新启动仪器后，再插入 U 盘设备进行检查。

(5) 如果仍然无法正常使用 U 盘，请与 **RIGOL** 联系。

RIGOL

Quick Guide

DS6000 Series Digital Oscilloscope

Feb. 2014
RIGOL Technologies, Inc.

Content

Guaranty and Declaration

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Contact Us
If you have any problem or requirement when using our products or this manual, please contact **RIGOL**.
E-mail: service@rigol.com
Website: www.rigol.com

Safety Requirement

General Safety Summary

Please review the following safety precautions carefully before putting the instrument into operation so as to avoid any personal injuries or damages to the instrument and any product connected to it. To prevent potential hazards, please use the instrument as specified in this manual.

Use Proper Power Cord.
Only use power cords designed for the instrument and authorized by local country.

Ground The Instrument.
The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, make sure that the earth terminal of the power cord is properly connected to the Protective Earth lead before connecting any of the input or output terminals of this instrument.

Connect The Probe Properly.
The earth lead of the probe should be equal to the earth potential. Please do not connect the earth lead to high voltage.

Observe All Terminal Ratings.
To avoid fire or shock hazard, observe all ratings and markers on the instrument and check your manual for detailed information about ratings before connecting the instrument.

Use Proper Overvoltage Protection.
Make sure that no overvoltage (such as that caused by thunderbolt) can reach the product, or else the operator might expose to danger of electric shock.

Do Not Operate Without Covers.
Do not operate the instrument with covers or panels removed.

Change The Power Fuse.
If the power fuse needs to be changed, please return the instrument back to our

factory and the **RIGOL** authorized operator will change it for you.

Avoid Circuit or Wire Exposure.

Do not touch exposed junctions and components when the unit is powered.

Do Not Operate With Suspected Failures.

If you suspect damage occurs to the instrument, have it inspected by qualified service personnel before further operations. Any maintenance, adjustment or replacement of components must be performed by **RIGOL** authorized personnel.

Keep Proper Ventilation.

Inadequate ventilation may cause temperature increase which would damage the instrument. So please keep the instrument well ventilated during operation and inspect the intake and fan regularly.

Do Not Operate In Wet Conditions.

In order to avoid short circuit inside the instrument or electric shock, please do not operate in humid environment.

Do Not Operate in Flammable and Explosive Environment.

In order to avoid damages to the device or personal injuries, please do not operate in flammable and explosive environment.

Keep Product Surfaces Clean and Dry.

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

Protect The Instrument from Static Electricity.

Operate in a static-free area to avoid damages caused by static electricity. Ground both the internal and external conductors of the cable to discharge static electricity before connecting it to the instrument.

Use The Battery Properly.

Do not expose the battery to high temperature or fire. Keep children away from the battery. Improper replacement of battery may cause explosion (warning: lithium battery). Only use batteries specified by **RIGOL**.

Handling Safety

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

Safety Terms and Symbols

Terms in this Manual. The following terms may appear in this manual:

⚠️ **WARNING**
Warning statements indicate the conditions or practices that could result in injuries or loss of life.

⚠️ **CAUTION**
Caution statements indicate the conditions or practices that could result in damage to this product or loss of data.

Terms on the Product. The following terms may appear on the product:

DANGER indicates a hazard may immediately happen.
WARNING indicates potential hazard may happen.
CAUTION indicates damage to the instrument or other devices connected to the instrument may happen.

Symbols on the Product. The following symbols may appear on the product:

High Voltage	**Refer to Manual**	**Protective Earth Terminal**	**Chassis Ground Terminal**	**Test Ground Terminal**

Measurement Category

Measurement Category
DS6000 series digital oscilloscopes can make measurements in Measurement Category I.

⚠	**WARNING** This oscilloscope can only be used for measurements within its specified measurement categories.

Measurement Category Definitions
Measurement category I is for measurements performed on circuits not directly connected to MAINS. Examples are measurements on circuits not derived from MAINS, and specially protected (internal) MAINS derived circuits. In the latter case, transient stresses are variable; for that reason, the transient withstand capability of the equipment is made known to the user.

Measurement category II is for measurements performed on circuits directly connected to the low voltage installation. Examples are measurements on household appliances, portable tools and similar equipment.

Measurement category III is for measurements performed in the building installation. Examples are measurements on distribution boards, circuit-breakers, wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, and equipment for industrial use and some other equipment, for example. Stationary motors with permanent connection to the fixed installation.

Measurement category IV is for measurements performed at the source of the low-voltage installation. Examples are electricity meters and measurements on primary overcurrent protection devices and ripple control units.

Ventilation Requirement

This oscilloscope uses fan to force cooling. Please make sure that the air intake and exhaust areas are free from obstructions and have free air. When using the oscilloscope in a bench-top setting, provide at least 10 cm clearance beside, above and behind the instrument for adequate ventilation.

⚠️ **WARNING**
Inadequate ventilation may cause temperature increase which would damage the instrument. So please keep the instrument well ventilated during operation and inspect the intake and fan regularly.

Working Environment

Temperature
Operating: 0℃ to +50℃
Non-operating: -20℃ to +70℃

Humidity
Under +35℃: ≤90％ relative humidity
+35℃ to +40℃: ≤60％ relative humidity

⚠️ **WARNING**
To avoid short circuit inside the instrument or electric shock, please do not operate in humid environment.

Altitude
Operating: less than 3 km
Non-operating: less than 15 km

Installation (overvoltage) Category
This product is powered by MAINS conforming to installation (overvoltage) category II.

> ⚠ **WARNING**
> Make sure that no overvoltage (such as that caused by thunderbolt) can reach the product, or else the operator might expose to danger of electric shock.

Installation (overvoltage) Category Definitions

Installation (overvoltage) category I refers to signal level which is applicable to equipment measurement terminals connected to the source circuit. In these terminals, precautions are done to limit the transient voltage to the corresponding low level.

Installation (overvoltage) category II refers to the local power distribution level which is applicable to equipment connected to the AC line (AC power).

Pollution Degree

Degree 2

Pollution Degree Definitions

Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence. For example: a clean room or air-conditioned office environment.

Pollution degree 2: Normally only dry, non-conductive pollution occurs. Occasionally a temporary conductivity caused by condensation may occur. For example: general indoor environment.

Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. For example: Sheltered outdoor environment.

Pollution degree 4: Pollution that generates persistent conductivity through conductive dust, rain, or snow. For example: outdoor locations.

Safety Class

Class 1 – Grounded Product

General Care and Cleaning

General Care
Do not leave the instrument exposed to direct sunlight for long period of time.

Cleaning
Clean the instrument regularly according to its use condition. To clean the oscilloscope:
1. Disconnect the instrument from power.
2. Clean the floating dust on the exterior of the instrument with a wet, drip-free and soft cloth (could use mild detergent or clear water). When cleaning an instrument with LCD, take care to avoid scratching the protective screen.

⚠️ **CAUTION**
To avoid damages to the instrument, do not expose it to corrosive liquids.

⚠️ **WARNING**
To avoid short circuit or even personal injury resulting from moisture content, make sure the instrument is completely dry before reconnecting it to a power source.

Environmental Considerations

The following symbol indicates that this product complies with the requirements of European Union according to Directives 2002/96/EC on waste electrical and electronic equipment (WEEE).

Instrument Recycle
Some substances contained in this product might be harmful to the environment or human health. To avoid the harmful substances being released into the environment or harming human health, we encourage you to recycle this product in an appropriate way to make sure that most of the materials are reused or recycled appropriately. Please contact your local authorities for disposal or recycle information.

Quick Start

General Inspection

1. **Inspect the shipping container for damage.**
   If your shipping container appears to be damaged, keep the shipping container or cushioning material until you have inspected the contents of the shipment for completeness and have checked the oscilloscope electrically and mechanically.

   If your instrument has damaged during shipping, please contact your shipper and carrier for compensation. **RIGOL** will provide no free repair or replacement.

2. **Inspect the instrument.**
   If there is any mechanical damage or defect, or if the instrument does not pass electrical and mechanical tests, please contact your **RIGOL** sales representative.

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

Appearance and Dimensions
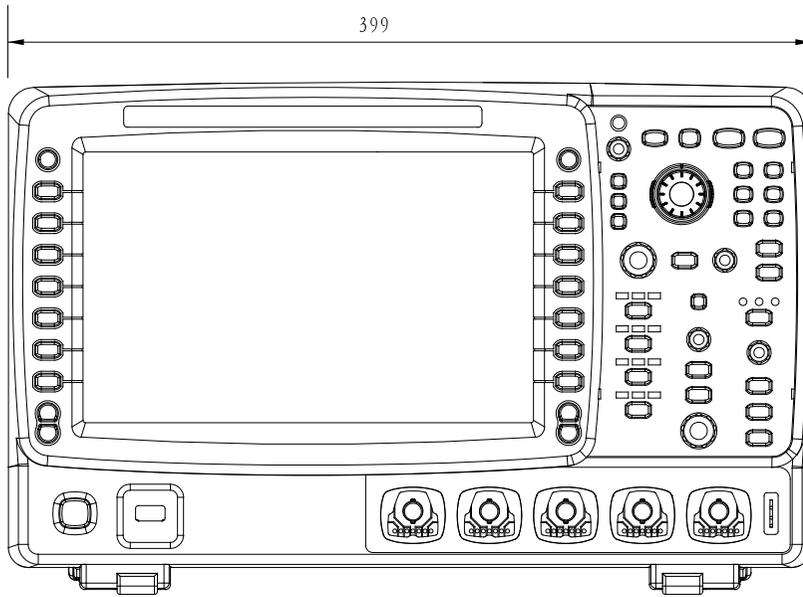
<div align="center">Figure 1 Front View</div>   Unit: mm
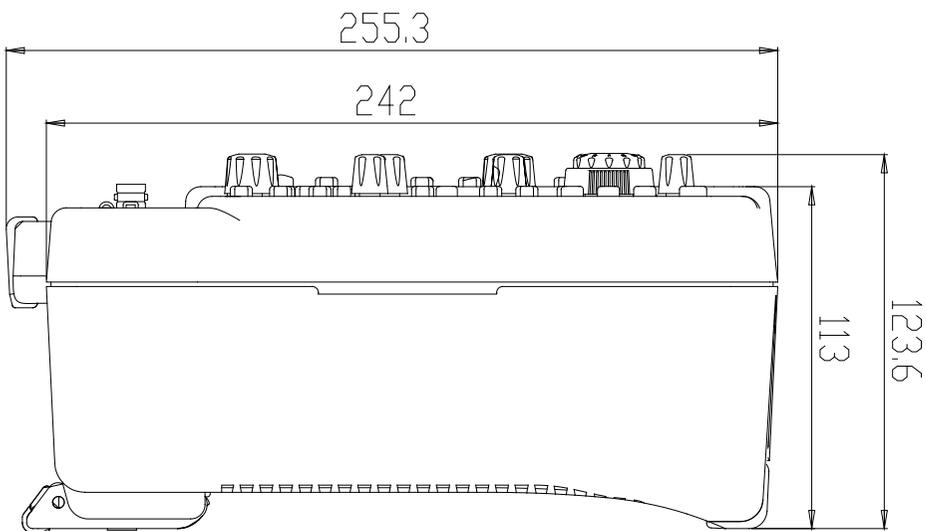
<div align="center">Figure 2 Side View</div>   Unit: mm

To Prepare for Operation

To Remove the Cover

Before using the oscilloscope, remove the front panel cover by grasping the transverse grab on each side and pull them in the arrow directions as shown in the figure below.
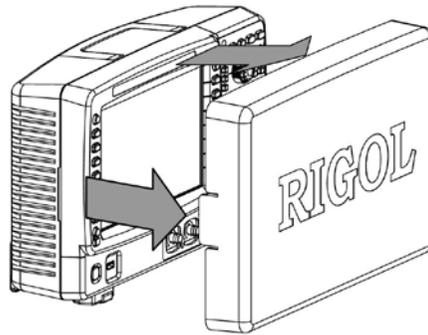
Figure 3 To Remove the Cover

To Adjust the Supporting Legs

Adjust the supporting legs properly to use them as stands to tilt the oscilloscope upwards, thus to place the oscilloscope stably and to operate and observe the display better.

Figure 4 To Adjust the Supporting Legs

To Connect to AC Power Supply

This oscilloscope accepts two kinds of AC power supply: 100-127V, 45-440Hz or 100-240V, 45-65Hz. Please use the power cord supplied with the accessories to connect the oscilloscope to the power source as shown in the figure below. After the power switch under the power plug is turned on, the oscilloscope is energized and the power key 🔘 at the lower-left corner of the front panel is in breath state.
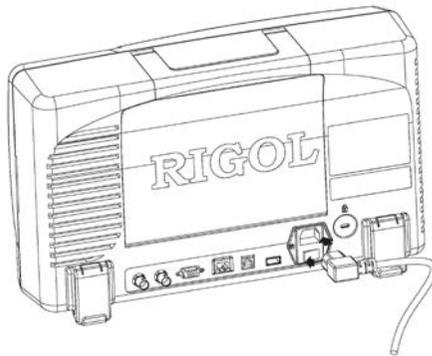
Figure 5 To Connect to AC Power Supply

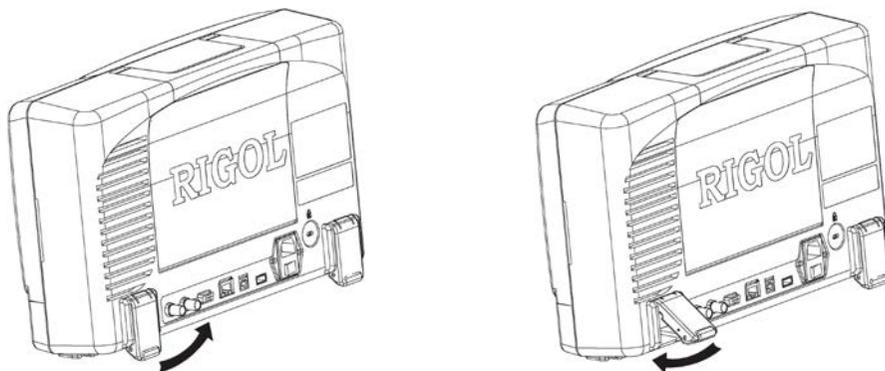| ⚠	**CAUTION** If the power fuse needs to be changed, please return the instrument back to our factory and the **RIGOL** authorized operator will change it for you.

To Use the Battery

This oscilloscope also provides rechargeable battery on your option. Please install the battery as shown in the figure below. When leaving the factory, the battery holds certain electric quantity. When use the battery only, a battery icon 🔋 will be displayed at the lower-right corner of the screen and the remaining electric quantity is indicated (no display when the AC power and battery are used at the same time). When the electric quantity of the battery is too low, a message box would pop up indicating "Low Battery!".

If recharge is needed, please install the battery correctly and then follow the **"To Connect to AC Power Supply"** instruction to connect the oscilloscope to AC power supply to recharge the battery. It needs about 15 hours for the battery to finish recharging.
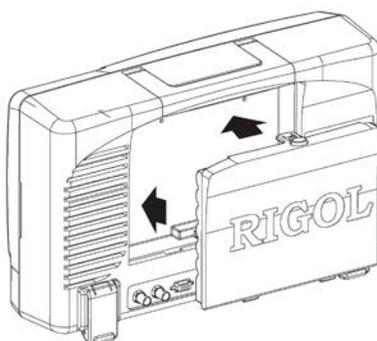
Figure 6 To Install the Battery

Power-on Inspection

When the oscilloscope is energized, press the power key ⊚ at the lower-left corner of the front panel to turn on the oscilloscope. During the start-up process, the oscilloscope performs a series of self-tests and you can hear the sound of relay switching. After the self-test, the start-up image is displayed. Press $\boxed{\textbf{UTIL}}$ → **System** → $\boxed{\textbf{SelfCalInfo}}$ to view the self-test results.

To Connect the Probe

RIGOL provides passive and active probes for the DS6000 series oscilloscopes. For detailed technical information of the probes, please refer to corresponding Probe User's Guide. The following are the probes recommended for use with this oscilloscope.

Model	Description
RP5600	600 MHz, passive probe, standard, auto detection
RP3500	500 MHz, passive probe, optional, auto detection
RP6150	1.5 GHz, passive probe, DS610X standard, auto detection
RP7150	1.5 GHz, active probe, optional, auto detection

Connect the Probe:
1. Connect the BNC terminal of the probe to a channel BNC connector of the oscilloscope at the front panel.
2. Connect the probe tip to the circuit point under test and connect the ground alligator clip of the probe to the circuit ground terminal.
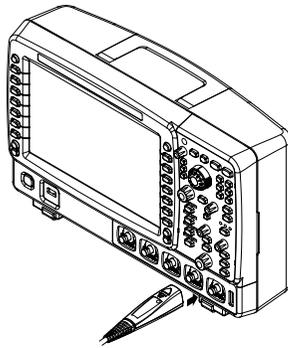
Figure 7 To Connect the Probe

Function Inspection

1. Press **SAVE** → **Factory** to restore the oscilloscope to its default configuration.
2. Use the probe to connect the input terminal of channel 1 (CH1) of the oscilloscope and the "Compensation Signal Output Terminal" of the probe.

Compensation Signal Output Terminal

Ground Terminal

Figure 8 To Use the Compensation Signal

3. Connect the earth alligator clip of the probe to the "Ground Terminal" under the probe compensation signal output terminal.
4. Press the **Auto** key.
5. Observe the waveform on the display. In normal condition, the display should be a square waveform as shown in the figure below:
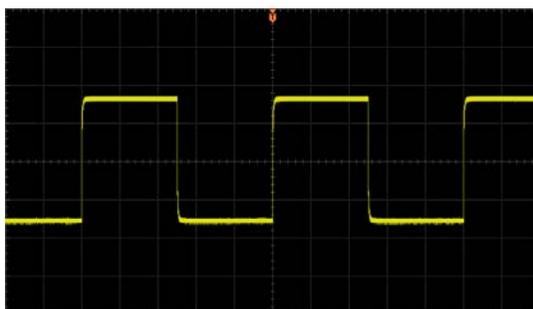
Figure 9 Square Waveform Signal

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"** in the next section.

⚠️ **WARNING**
To avoid electric shock during the use of 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.

Tip
The signal output from the probe compensation connector can only be used for probe compensation adjustment and can not be used for calibration.
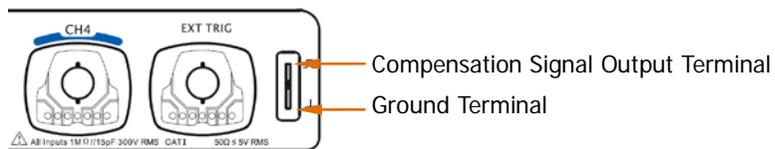

Probe Compensation

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

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

Over compensated   Perfectly compensated   Under compensated
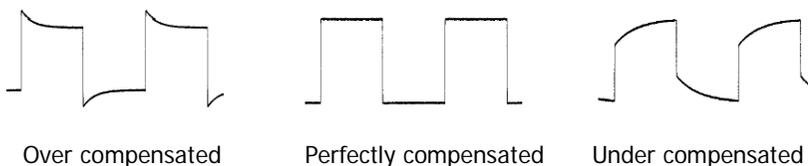
Figure 10 Probe Compensation

3. Use a nonmetallic driver to adjust the variable capacitor on the probe until the displayed waveform is as the "**Correctly compensated**" in the figure above.

Front Panel Overview
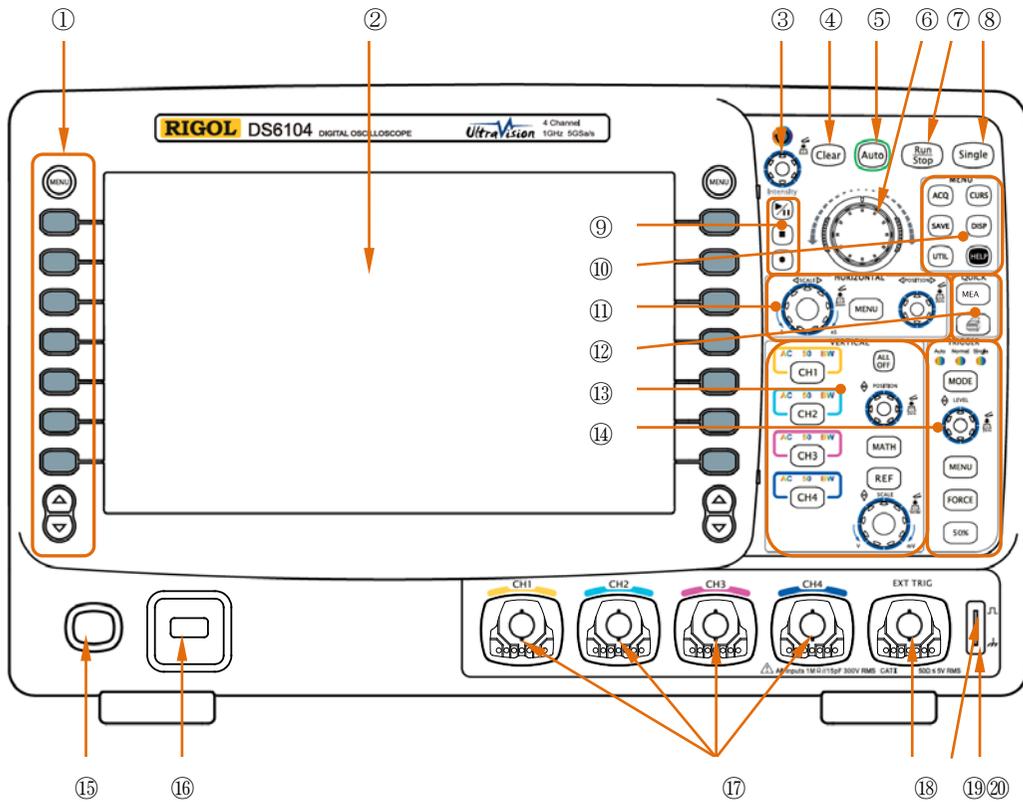
Figure 11 Front Panel Overview

No.	Description	No.	Description
①	Menu	⑪	HORIZONTAL Area
②	LCD	⑫	Measurement Setting and Quick Print
③	Knob	⑬	VERTICAL Area
④	Clear	⑭	TRIGGER Area
⑤	Auto	⑮	Power Key
⑥	WaveFinder	⑯	USB HOST Port
⑦	Run/Stop	⑰	Analog Channel Input Terminal
⑧	Single	⑱	EXT TRIG Input Terminal
⑨	Record/Playback	⑲	Probe Compensation Signal Output Terminal
⑩	Function Menu	⑳	Probe Compensation Ground Terminal

Rear Panel Overview

1. Trig Out/Calibration   3.Video Output   5.USB DEVICE   7. AC Input/Switch

2. Reference Clock   4. LAN   6.USB HOST   8. Lock Hole
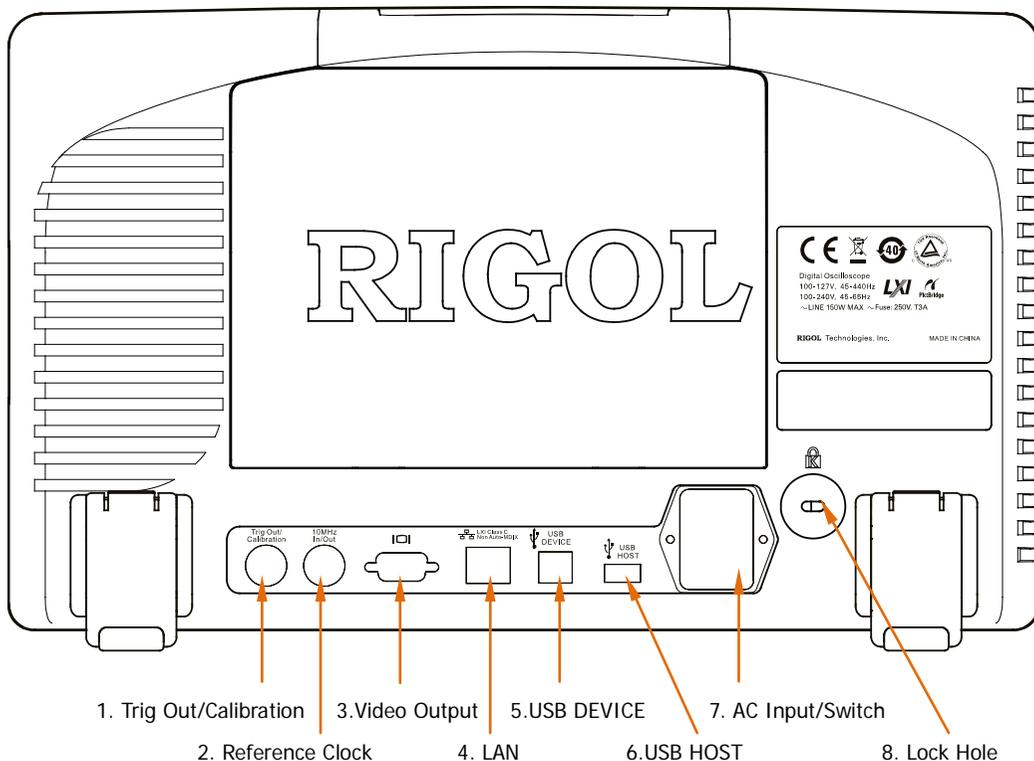
Figure 12 Rear Panel Overview

1. **Trig Out/Calibration**

    This connector can output various signals (press **UTIL** → **Aux Output** to select the desired output type.):

    1) **TrigOut:** After this type is selected, the oscilloscope output a signal that can reflect the current capture rate of the oscilloscope at each trigger.

    2) **Quick Edge:** After this type is selected, the oscilloscope can output a quick edge signal which can be used in the self-calibration of the oscilloscope.

    3) **GND:** After this type is selected, the oscilloscope can output a ground level.

    4) **PassFail:** After this type is selected, the oscilloscope will output a pulse signal when failed waveforms are detected. Connect this signal to other control systems to conveniently view the test results.

2. **Reference Clock**

   Provide more precise sample clock signal for the oscilloscope and it can also synchronize two or more oscilloscope clocks.

3. **Video Output**

   Through this interface, the oscilloscope can be connected to external monitors such as projector to get clearer waveform display. Note that the display of the oscilloscope is still valid.

4. **LAN**

   Through this interface, the oscilloscope can be connected to the network for remote control. As the oscilloscope conforms to the LXI-C instrument standard, a test system can be built quickly.

5. **USB DEVICE**

   Through this interface, the oscilloscope can be connected to PictBridge printer to print waveform data or be connected to PC to control the oscilloscope through PC software.

6. **USB HOST**

   Through this interface, the oscilloscope can be connected to normal printers to print waveform data or be connected to a USB flash device to store waveform files.

   GPIB interface communication can be realized by using the USB-GPIB module (optional) provided by **RIGOL**.

   Note that the front panel also provides this interface.
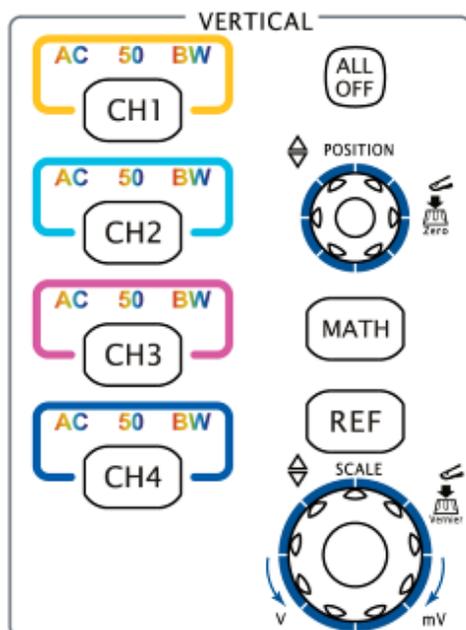
7. **AC Input/Switch**

   When using AC power supply, please insert the power cord plug into the socket vertically and use the switch under the socket to power the oscilloscope on or off.

8. **Lock Hole**

   Use the security lock (please buy it yourself) to lock the oscilloscope in fixed location.

Front Panel Function Overview

VERTICAL

CH1, **CH2**, **CH3**, **CH4**: analog input channels. The four channels are marked by different colors which are also used to mark both the waveforms on the screen and the channel input connectors. Press any key to turn on the corresponding channel menu and press again to turn off the channel.

AC: illuminated when AC channel coupling mode is enabled.

50: illuminated when the channel input impedance is 50Ω.

BW: illuminated when the bandwidth limit is turned on.

**ALL OFF**: press this key to turn off all the channels that have been turned on.

MATH: press this key to turn on the math operation and decoding function menus under which to perform (add, subtract, multiply, divide) operations, FFT operation, logic operation, advanced operation and (parallel, RS232, SPI, I2C) decoding.

REF: press this key to turn on the reference waveform function to compare the waveform actually tested with the reference waveform to decide circuit failures.

VERTICAL ⊚ POSITION: modify the vertical position of the current channel waveform. Turn clockwise to increase the position and turn counterclockwise to decrease. During the modification, the waveform would move up and down and the position message (e.g. `POS:-136.0mV`) prompts at the lower-left corner of the screen would change accordingly. Press down this knob to restore the vertical position quickly.

VERTICAL ⊚ SCALE: modify the vertical scale of the current channel. Turn clockwise to decrease the scale and turn counterclockwise to increase. During the modification, the amplitude of the waveform would enlarge or reduce and the scale information (e.g. `100mV`) at the lower side of the screen would change accordingly. Press down this knob to quickly switch the vertical scale adjustment modes between "Coarse" and "Fine".

HORIZONTAL
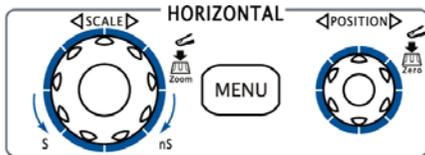
MENU: press this key to turn on the horizontal control menu under which to turn on or off the delayed sweep function, switch between different time base modes, switch between "Coarse" and "Fine" of scale as well as modify the horizontal reference setting.

HORIZONTAL ⬡ SCALE: modify the horizontal time base. Turn clockwise to reduce the time base and turn counterclockwise to increase the time base. During modification, waveforms of all the channels will be displayed in expanded or compressed mode and the time base message (e.g. **H 500.0us**) at the upper side of the screen would change accordingly. Press down this knob to quickly switch to delayed sweep state.

HORIZONTAL ⬡ POSITION: modify the trigger position. The trigger point move left or right relative to the center of the screen when you turn the knob. During modification, waveforms of all the channels would move right or left and the trigger position message (e.g. **D 680.0000us**) at the upper-right corner of the screen would change accordingly. Press down this knob to quickly restore the trigger position (or the delayed sweep position).

TRIGGER

MODE: press this key to switch the trigger mode to **Auto**, **Normal** or **Single** and the corresponding state light backlight of the current trigger mode would be illuminated.

TRIGGER ⊙ **LEVEL**: modify the trigger level. Turn clockwise to increase the level and turn counterclockwise to reduce the level. During modification, the trigger level line moves up and down and the value in the trigger level message box (e.g. `Trig Lvl: 284mV`) at the lower-left corner of the screen changes accordingly. Press down the knob to quickly reset the trigger level to zero point.

MENU: press this key to turn on the trigger operation menu. This oscilloscope provides various trigger types.

FORCE: in **Normal** and **Single** trigger modes, press this key to generate a trigger signal forcefully.

50%: press this key to set the trigger level to the vertical midpoint of the trigger signal amplitude.

Run/Stop

Press this key to set the state of the oscilloscope to "Run" or "Stop". In "Run" state, the key is illuminated in yellow and red in "Stop" state.

Single

Press this key to set the trigger mode to "Single". In single trigger mode, press the **FORCE** key to generate a trigger signal immediately.

Auto

Press this key to turn on the waveform auto setting function. The oscilloscope will automatically adjust the vertical scale, horizontal time base and trigger mode according to the input signal to realize optimum waveform display. Note that auto setting requires that the frequency of the signal under test should be no lower than 50 Hz, the duty cycle be greater than 1% and the amplitude be at least 20 mVpp.
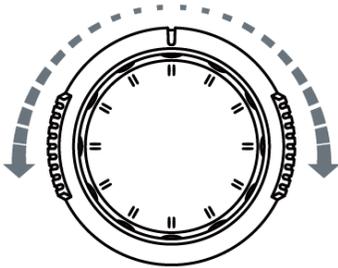
Knob

Adjust waveform brightness:
In non-menu-operation mode (menu is hidden), turn this knob to adjust the brightness of waveform display. The adjustable range of the brightness is from 0% to 100%. Turn clockwise to increase the brightness and counterclockwise to reduce. Press down this knob to reset the brightness to 50%.
You can also press **DISP** → **Brightness** and use the knob to adjust the waveform brightness.

Multifunctional Knob (the backlight goes on during operation):
In menu operation, press some menu softkey and turn the knob to select the submenus under this menu and then press down the knob to select the currently selected submenu. It can also be used to modify parameters and filename input.

Navigation Knob

This knob provides quick Adjust/Locate function for numerical parameters with relatively large settable range. Turn clockwise (counter-clockwise) to increase (reduce) the value. Note that the inner knob is used for fine adjustment and the outer knob for coarse adjustment.

For example, this knob can be used to quickly locate the waveform frame ("Current Frame" menu) to be played back in the waveform playback function. Similar menus include: trigger holdoff, pulse width setting, slope time etc.

Menu
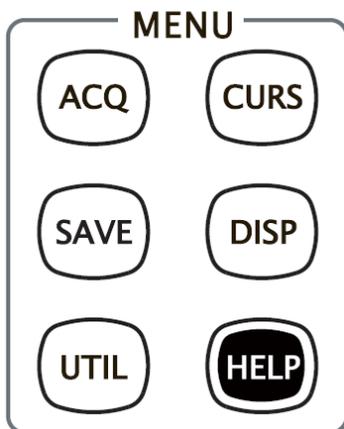
ACQ: press this key to enter sample setting menu to set the acquisition mode, the sampling mode, the memory depth and the antialiasing function of the oscilloscope.

CURS: press this key to enter cursor measurement menu. The oscilloscope provides three cursor modes: manual, track and auto.

SAVE: press this key to enter file store and recall interface. The storable file types including: traces, waveforms, setups, picture and CSV. Support internal and external storage as well as disk management.

DISP: press this key to enter display setting menu to set the display type, persistence time, brightness, grid type, grid brightness and menu display time of the waveform.

UTIL: press this key to enter the system function setting menu to set the system-related functions or parameters, such as I/O setting, sound, language. Support some advanced functions such as pass/fail test, record and print setting.

HELP: press this key to turn on the help interface. For detailed information, please refer to the introduction in **"To Use the Built-in Help System"**.

Record

Play/Pause: press this key to play the recorded or paused waveform and press again to pause the play. The backlight is illuminated in yellow.

Stop: press this key to stop the waveform in record or play back mode. The backlight is illuminated in orange.

Record: press this key to start recording the waveform. The backlight is illuminated in red.

MEAS

Press this key to enter the measurement menu which supports measure setting, all measure, statistic and counter. Press the **MENU** key at the left of the screen to quickly turn on the selecting menu of the 22 measurement parameters and easily realize "one-key" measurement of common parameters.

Clear

Press this key to clear all the waveforms on the screen. If the oscilloscope is in "Run" state, the screen will be refreshed after that and new waveforms will be displayed.

Print

Press this key to execute print function or save the screen in the USB flash device. If the oscilloscope is currently connected to a printer (PictBridge or normal) and the printer is in idle state, press this key to execute print function. If no printer but an USB flash device is currently connected, press this key to save the screen to the USB flash device in ".bmp" format. When printer and USB flash device are connected at the same time, the printer enjoys higher priority.

User Interface

DS6000 oscilloscope provides 10.1 inches, WVGA (800*480) 260,000 color TFT LCD. It supports standard display mode and persistence display mode. What is worth mentioning is that the 14-grid ultra-wide screen makes you view "longer" waveform.
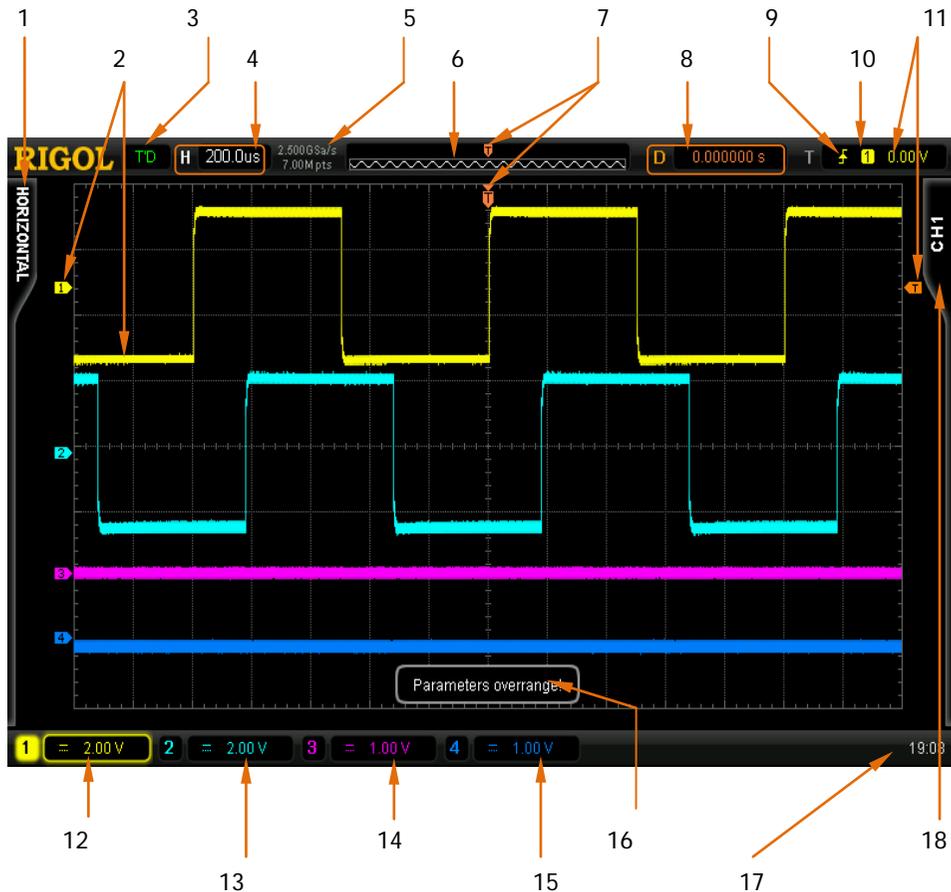

Figure 13 User Interface

1. Measurement Menu

Provide 12 horizontal (HORIZONTAL) and 10 vertical (VERTICAL) measurement parameters. Press the softkey at the left of the screen to activate corresponding measurement item.

2. Channel Label/Waveform

Different channels are marked by different colors and the color of the waveform complies with the color of the channel.

3. Status

Available states include: RUN, STOP, T'D (triggered), WAIT and AUTO.

4. Horizontal Time Base

- Represent the time per grid on the horizontal axis on the screen.
- Use **HORIZONTAL** ⚙ **SCALE** to modify this parameter. The range available is from 500 ps to 50 s.

5. Sample Rate/Memory Depth

- Display the current sample rate and memory depth of the oscilloscope.
- Use **HORIZONTAL** ⚙ **SCALE** to modify this parameter.

6. Waveform Memory

Provide the schematic diagram of the memory position of the waveform currently on the screen.

waveform on the screen
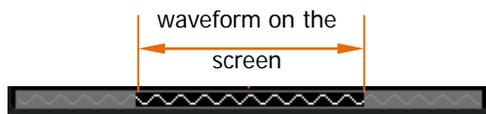
7. Trigger Position

Display the trigger positions of the waveform in the waveform memory and on the screen.

8. Trigger Position

Use **HORIZONTAL** ⚙ **POSITION** to modify this parameter. Press down the knob to automatically set the parameter to zero.

9. Trigger Type

Display the currently selected trigger type and trigger condition setting. Different labels are displayed when different trigger types are selected. For example: 🔼 represents triggering on the rising edge in "Edge" trigger.

10. Trigger Source

Display the trigger source currently selected (CH1-CH4, EXT, EXT/5 or AC Line). Different labels are displayed when different trigger sources are selected and the color of the trigger parameter area will change accordingly.

For example: ⬛ denotes that CH1 is selected as the trigger source.

11. Trigger Level

- ⬛ at the right of the screen is the trigger level label and the trigger level value is displayed at the upper-right corner of the screen.
- When Using **TRIGGER** ⚙ **LEVEL** to modify the trigger level, the trigger level value will change with the up and down of ⬛.

Note that in slope trigger, there are two trigger level labels (⬛ and ⬛).

12. CH1 Vertical Scale

- Display the voltage value per grid of CH1 waveform vertically.
- Use **VIRTICAL** ⚙ **SCALE** to modify this parameter.

- The following labels will be provided according to the current channel setting: channel coupling (e.g. ⬛), bandwidth limit (e.g. ⬛) and input impedance (e.g. ⬛). The situations of CH2, CH3 and CH4 are similar to this.

13. CH2 Vertical Scale

- Display the voltage value per grid of CH2 waveform vertically.
- Use **VIRTICAL** ⚙ **SCALE** to modify this parameter.
- The following labels will be provided according to the current channel setting: channel coupling, bandwidth limit and input impedance.

14. CH3 Vertical Scale

- Display the voltage value per grid of CH3 waveform vertically.
- Use **VIRTICAL** ⚙ **SCALE** to modify this parameter.
- The following labels will be provided according to the current channel setting: channel coupling, bandwidth limit and input impedance.

15. CH4 Vertical Scale

- Display the voltage value per grid of CH4 waveform vertically.
- Use **VIRTICAL** ⚙ **SCALE** to modify this parameter.
- The following labels will be provided according to the current channel setting: channel coupling, bandwidth limit and input impedance.

16. Message Box

Display prompt messages.

17. Notification Area

Display system time, sound icon, battery icon and USB flash device icon.

● System Time: displayed in "hh:mm (hour:minute)" format. When printing and storing the waveform, the output file will contain this time message. Press **UTIL** → **System** → **System Time** to set through the following format:

mm-dd-yyyy hh-mm-ss

(month-date-year hour-minute-second)

● Sound Icon: when sound is turned on, this area displays ◩. Press **UTIL** → **Sound** to turn the sound on or off.

● Battery Icon: when the battery is used for power supply, this area displays ▥.

● USB flash device: when the oscilloscope detects a USB flash device, this area displays ⛁.

18. Operation MENU

Press any softkey to activate the corresponding menu. The following symbols might be displayed in the menu:

↻	Denote that ↻ on the front panel can be used to select parameter items. The backlight of ↻ turns on when parameter selection is valid.
↻	Denote that ↻ can be used to modify parameter values. The backlight of ↻ turns on when parameter input is valid.
◉	Denote that you can use the **Navigation Knob** to quickly adjust/locate parameters.
↻	Denote that ↻ can be used to adjust parameters and then press ↻ to select the parameter.
◀	Denote that the current menu has several options.
▼	Denote that the current menu has a lower level menu.
↵	Press this key to return to the previous menu.

Note that the following direction keys might appear in the grid at the lower-left corner of the menu bar:

▽	Denote that you can turn on the next page menu.
△	Denote that you can turn on the previous page menu.

To Use the Security Lock

If needed, you can use the security lock (please buy it yourself) to lock the oscilloscope to a fixed location. The method is as follows, align the lock with the lock hole and plug it into the lock hole vertically, turn the key clockwise to lock the oscilloscope and then pull the key out.
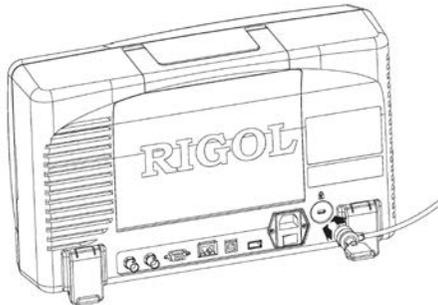

Figure 14 To Use the Security Lock

To Use the Desk Mount Instrument Arm

Using an arm, the oscilloscope could be mounted on the work desk to save your operation space. The height and angle of the instrument could be adjusted freely to acquire supreme comfort and efficiency and to convenient your measurement and view. If needed, please buy and install corresponding option.


Figure 15 Working Sketch

To Use the Rack Mount Kit

This oscilloscope can be mounted in a standard 19-inch rack cabinet that conforms to the Electric Industrial Association (EIA) standard. If needed, please buy and install the corresponding option.

Kit Parts List

| NO.	Name	Qty	Part No.	Description
1-1	Front Panel	1	RM-DS-6-01	
1-2	Support Board	1	RM-DS-6-02	
1-3	Left Plate	1	RM-DS-6-03	
1-4	Right Plate	1	RM-DS-6-04	
1-5	Fixed Figure	2	RM-DS-6-05	
2-1	M4 Screw	24	RM-SCREW-01	M4 x 6 Phil-Slot Pan Head Machine Screw Nail
2-2	M6 Screw	4	RM-SCREW-02	M6 x 16 Phil-Slot Pan Head Machine Screw Nail
2-3	M6 Screw	4	RM-SCREW-03	M6 x 5 Square Machine Female Screw Contain Lock Blade
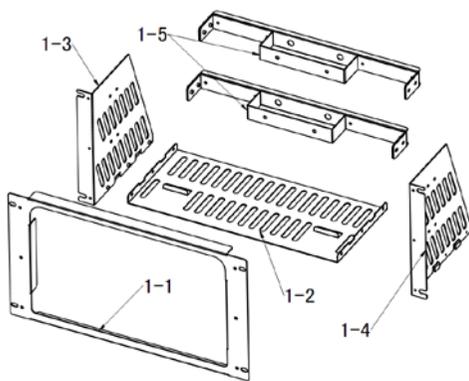
Installation Tool

PH2 Phillips Screwdriver (recommended).

Installation Space

The following requirements must be fulfilled by the machine cabinet in which the instrument is mounted.

- The machine cabinet must be a standard 19-inch one.
- At least 6U (266.7 mm) space should be provided by the machine cabinet.
- The depth inside the machine cabinet should not be less than 400 mm.

The dimension of the instrument after being installed is shown below.
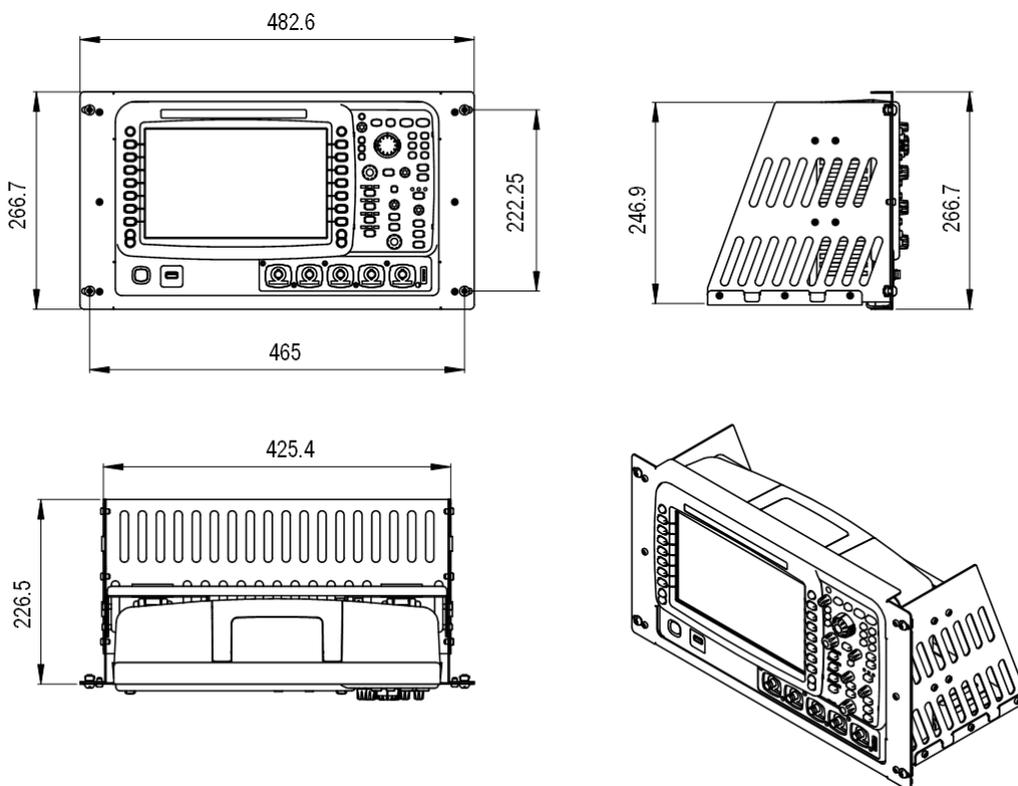
Installation Procedures

Only authorized operators can execute the installation operation. Improper installation might result in damage of the instrument or incorrect installation of the instrument on the rack.
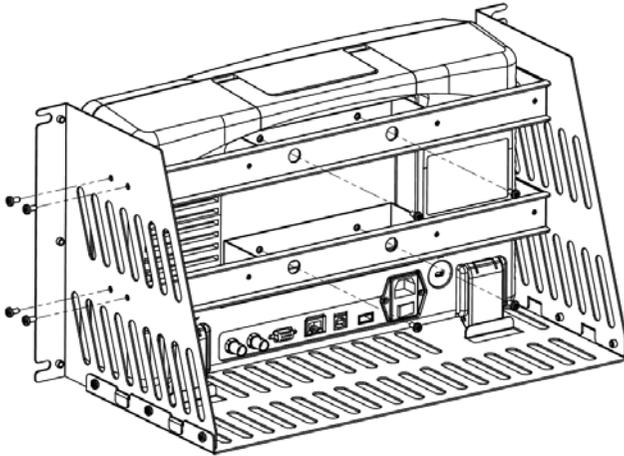
1. Install the right and left plates: align the detents of the right and left plates with the openings on the support board and insert them into the support board respectively, then fix them with six M4 screws.
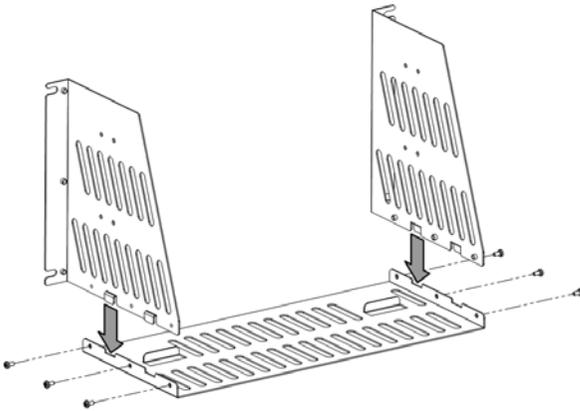

2. Place the Instrument: press the button above the battery on the instrument to remove the battery. Then align the instrument with the spacing on the support board and place it on the support board.
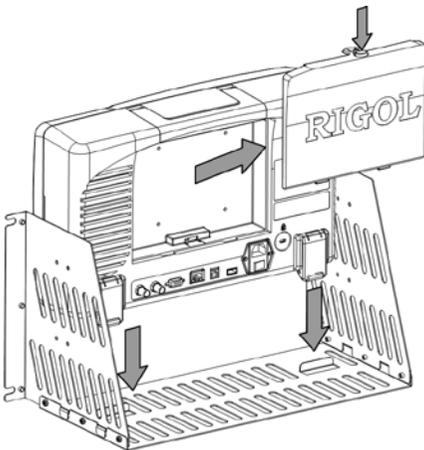
3. Fix the instrument: fix the instrument on the support board with two back battens and twelve M4 screws.

4. Install the front panel: align the screw holes on the right and left plates with the screw holes on the front panel of the rack and let the front panel of the oscilloscope protrude from the opening. Then fix them with six M4 screws.
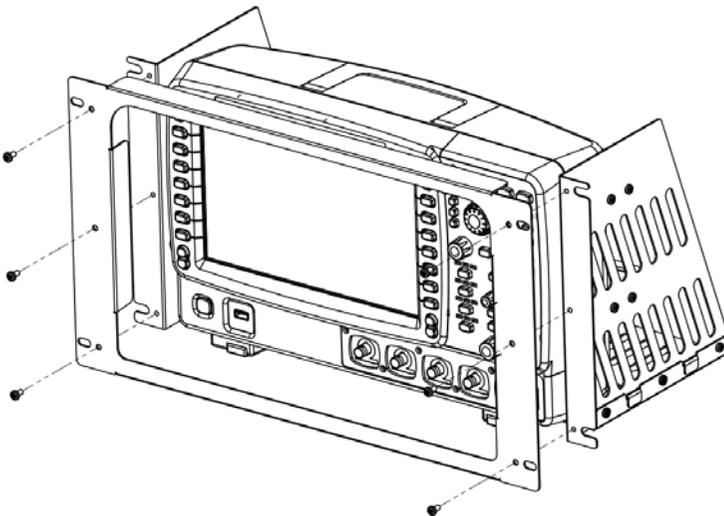
5. Load into the machine cabinet: mount the rack with the instrument fixed to it into a standard 19-inch machine cabinet with four M6 screws and four M6 square nuts.
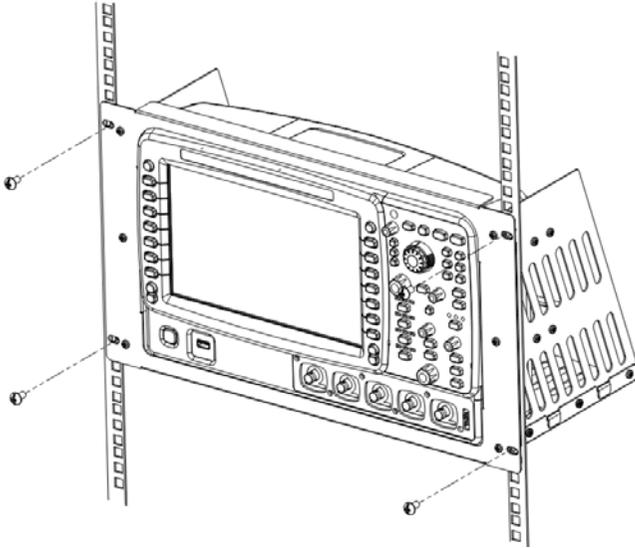
6. Post-installation notice: the rack occupies a height of 6U. The holes pointed out by the arrows are installation holes. Note that they should be aligned with during installation.
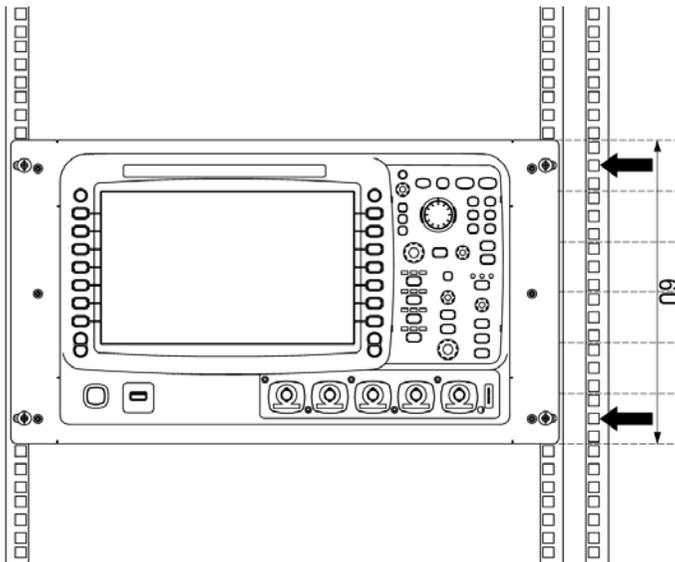
To Use the Built-in Help System

The help system of this oscilloscope provides instructions for all the function keys (including menu keys) at the front panel. Press **HELP** to open the help interface and press again to close the interface. The help interface mainly consists of two parts. The left is "Help Options" and you can use "Button" or "Index" to select. The right is "Help Display Area".

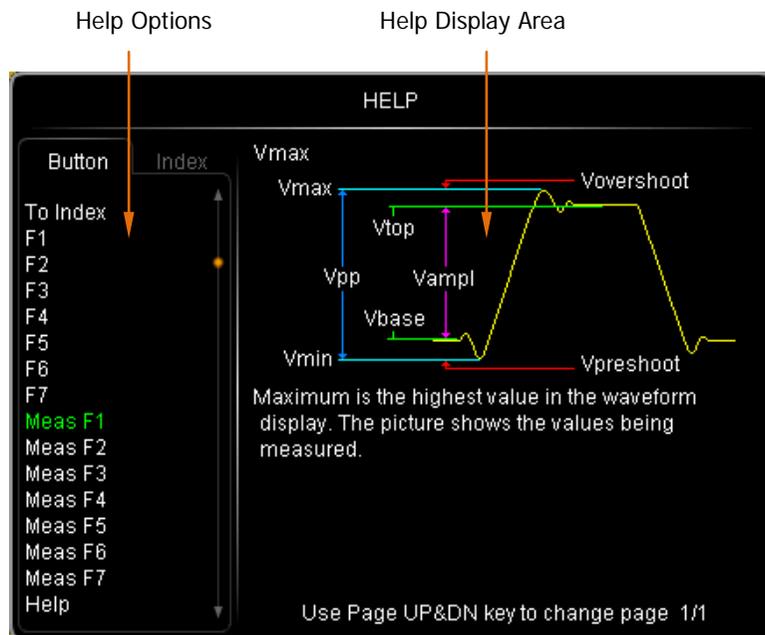Help Options   Help Display Area

Figure 16 Help Information

Button:

Default mode. In this mode, you can press the buttons (except the power key, the knob ↻, menu page up/down key ⌂/⌄ and the Wavefinder knob ◎) at the front panel directly to get the corresponding help information of that button in the "Help Display Area".

Use ↻ to select "To Index" and then press the knob to switch to **Index** mode.

Index:

In this mode, use ↻ to select the item that needs to get help (for example: "Band Width"). The item being selected currently is displayed in green. Press the knob to get the corresponding help information in the "Help Display Area".

Use ↻ to select "To Button" and then press the knob to switch to **Button** mode.

Troubleshooting

The commonly encountered failures and their solutions are listed below. When you encounter those problems, please solve them following the corresponding steps. If the problem remains still, please contact **RIGOL** and provide your device information (acquisition method: **Utility** ➔ **System** ➔ **Sys Info**).

1. **The screen still dark (no display) after power on:**
   (1) Check if the power is correctly connected or if the battery is correctly installed.
   (2) Check if the power switch is really on.
   (3) Check if the fuse is burned out. If the fuse needs to be changed, please return the instrument to the factory and the RIGOL authorized personnel will change the fuse for you.
   (4) Restart the instrument after finishing the above inspections.
   (5) If it still does not work correctly, please contact **RIGOL**.

2. **The signal is sampled but no waveform of the signal is displayed:**
   (1) Check if the probe is correctly connected to the signal connecting wire.
   (2) Check if the signal connecting wire is correctly connected to the BNC (namely channel connector).
   (3) Check if the probe is correctly connected to the item under test.
   (4) Check if there are signals generated from the item under test (you can connect the probe compensation signal to the problematic channel to determine which has problems, the channel or the item under test).
   (5) Resample the signal.

3. **The voltage tested amplitude is ten times higher or lower than the actual value:**
   Check whether the attenuation coefficient of the channel complies with the attenuation ratio of the probe.

4. **There is waveform display but not stable:**
   (1) Check the trigger signal source: check whether the **Source** item at the front panel complies with the signal channel actually used.
   (2) Check the trigger type: general signals should use "Edge" trigger and video

signal should use "Video" trigger. Only when the proper trigger type is used, can the waveform be displayed stably.

(3) Try to change the **Coupling** to "HF Reject" or "LF Reject" to filter out the high-frequency or low-frequency noise that disturbs the trigger.

(4) Change the trigger holdoff setting.

5. **No display after pressing Run/Stop :**
Check if the **MODE** at the trigger panel (TRIGGER) is on "Normal" or "Single" and if the trigger level exceeds the waveform range. If yes, set the trigger level to the middle or set the **MODE** to "Auto".
Note that using the **Auto** button could automatically finish the above setting.

6. **The display of waveform is ladder-like:**
(1) The horizontal time base might be too low. Increase the horizontal time base to increase the horizontal resolution and improve the display.
(2) If **Type** is "Vectors", the lines between the sample points may cause ladder-like display. Set **Type** to "Dots" to solve the problem.

7. **Fail to connect PC or PictBridge through USB:**
Check the **IO Setting** menu in **UTIL** to make sure whether the setting in **USB Device** matches the currently connected device. If needed, restart the oscilloscope.

8. **The USB flash device can not be recognized:**
(1) Check if the USB flash device can work normally.
(2) Make sure that the USB device being used is flash storage type. This oscilloscope does not support hardware storage type.
(3) Make sure if the capacity of the USB flash device is too large. It is recommended that the capacity of the USB flash device being used with this oscilloscope is no larger than 4 GBytes.
(4) Restart the instrument and then insert the USB flash device to check it.
(5) If the USB flash device still can not be used normally, please contact **RIGOL**.