

**RIGOL**

**快速指南**

**DG4000 系列**

**函数/任意波形发生器**

**2011 年 12 月**

**RIGOL Technologies, Inc.**



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服务与支持热线：800 810 0002

网址：[www.rigol.com](http://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。

### 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。

### 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。

### 请勿开盖操作。

请勿在仪器机箱打开时运行本产品。

### 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。

**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



请注意参阅手册



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。清洁带有液晶显示屏的仪器时，请注意不要划伤 LCD 显示屏。



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#### 注意

请勿使任何腐蚀性的液体沾到仪器上，以免损坏仪器。

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#### 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。

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## 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。



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# 快速入门

本章介绍仪器的前后面板、用户界面、参数设置方法以及首次使用仪器的注意事项。

本章内容如下：

- 一般性检查
- 调整支撑脚
- 外观尺寸
- 前面板
- 后面板
- 连接电源
- 用户界面
- 参数设置方法
- 使用内置帮助系统
- 使用防盗锁
- 使用机架

## 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。

## 调整支撑脚

DG4000 允许用户在使用仪器时打开支撑脚以作为支架使仪器向上倾斜，便于操作和观察。在不使用仪器时，用户可以合上支撑脚以方便放置或搬运。

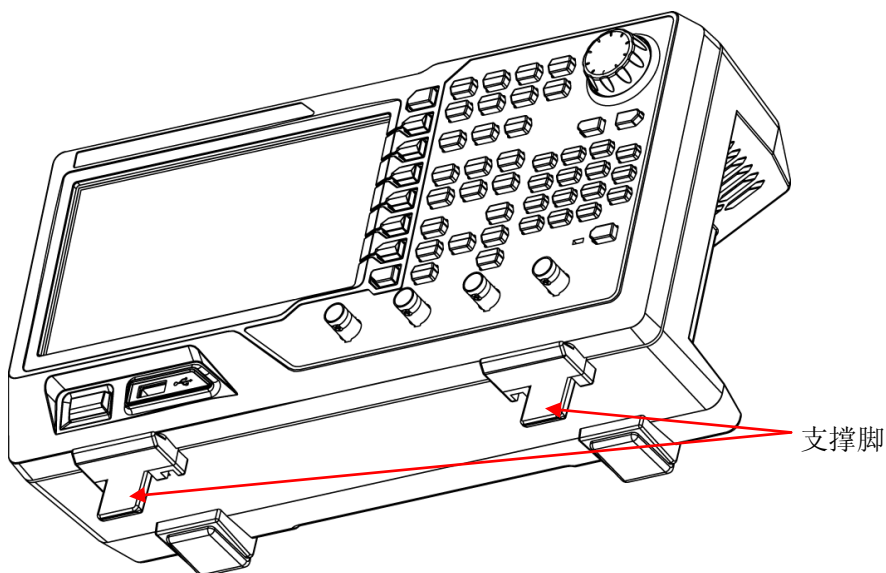


图 1 打开支撑脚

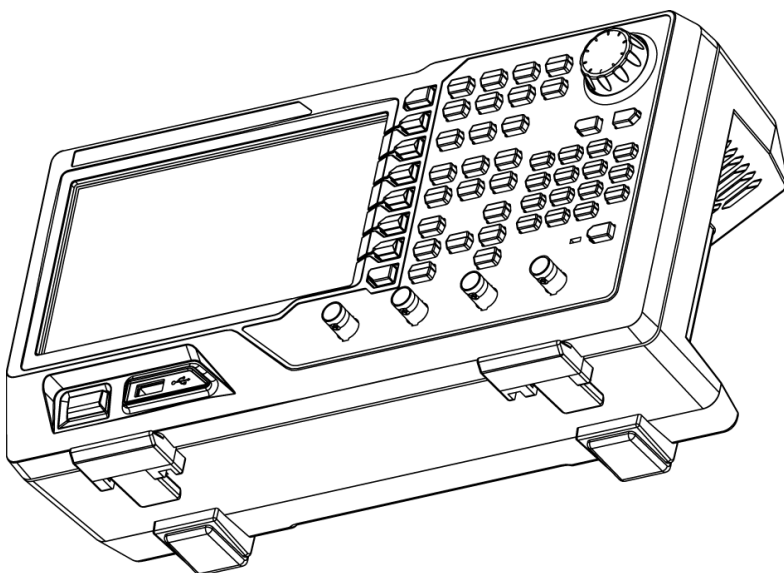


图 2 合上支撑脚

## 外观尺寸

DG4000 的外观与尺寸如图 3、图 4 所示。单位为 mm。

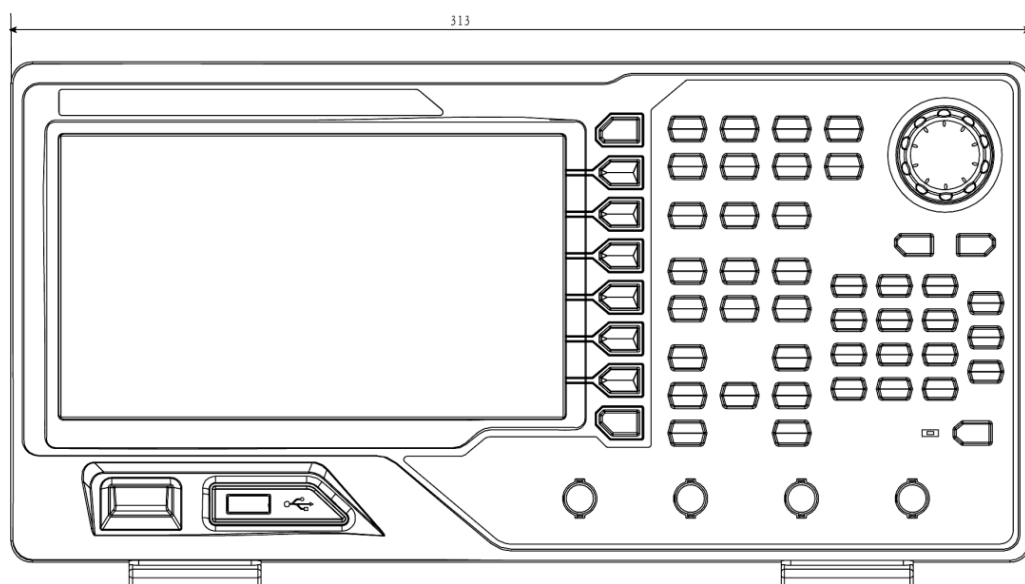


图 3 正视图

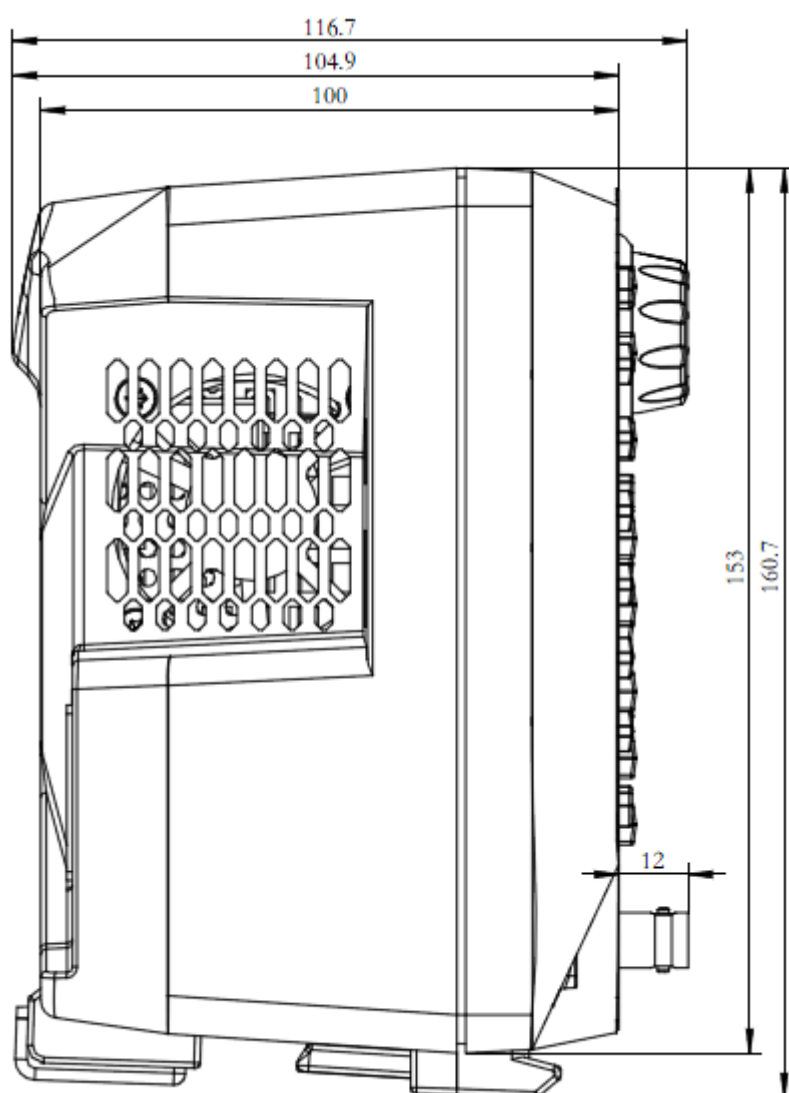


图 4 侧视图

## 前面板

DG4000 前面板布局如下图所示。

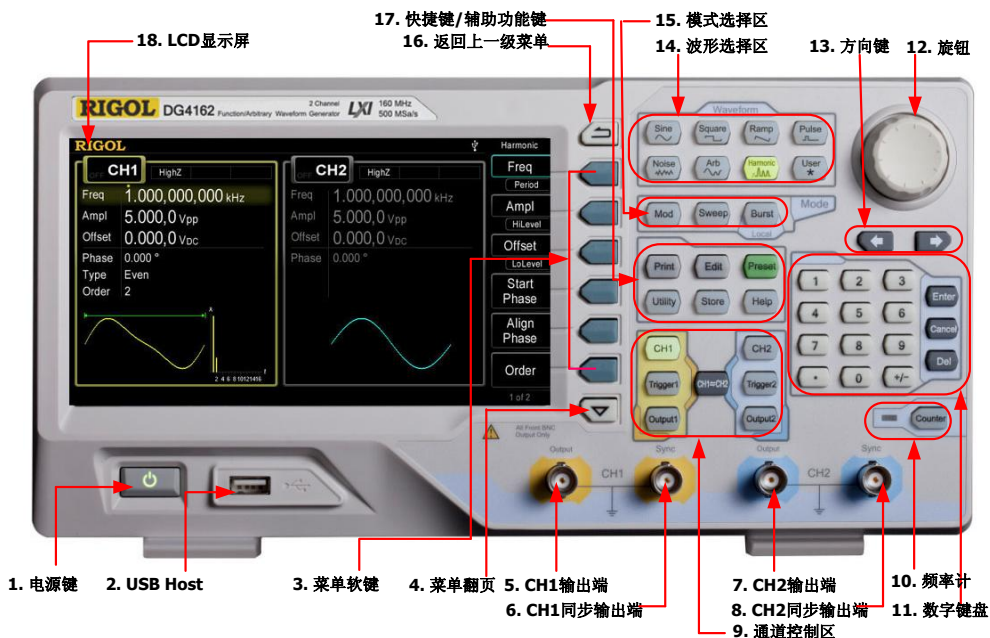


图 5 DG4000 前面板

### 1. 电源键

用于开启或关闭信号发生器。当该电源键关闭时，信号发生器处于待机模式。只有拔下后面板的电源线，信号发生器才会处于断电状态。

您可以启用或禁用该按键自身的功能。启用时，仪器上电后，需要手动按下该按键启动仪器；禁用时，仪器上电后自动启动。

### 2. USB Host

支持 FAT 格式的 U 盘。读取 U 盘中的波形或状态文件，或将当前的仪器状态和编辑的波形数据存储到 U 盘中，也可以将当前屏幕显示的内容以指定的图片格式（.bmp 或.jpeg）保存到 U 盘。

### 3. 菜单软键

与其左侧菜单一一对应，按下任一软键激活对应的菜单。



#### 4. 菜单翻页

打开当前菜单的上一页或下一页。

#### 5. CH1 输出端

BNC 连接器，标称输出阻抗为  $50\Omega$ 。

当 **Output1** 打开时（背灯变亮），该连接器以 CH1 当前配置输出波形。

#### 6. CH1 同步输出端

BNC 连接器，标称输出阻抗为  $50\Omega$ 。

当 CH1 打开同步时，该连接器输出与 CH1 当前配置相匹配的同步信号。

#### 7. CH2 输出端

BNC 连接器，标称输出阻抗为  $50\Omega$ 。

当 **Output2** 打开时（背灯变亮），该连接器以 CH2 当前配置输出波形。

#### 8. CH2 同步输出端

BNC 连接器，标称输出阻抗为  $50\Omega$ 。

当 CH2 打开同步时，该连接器输出与 CH2 当前配置相匹配的同步信号。

#### 9. 通道控制区

**CH1**: 选择通道 CH1。选择后，背灯变亮，用户可以设置 CH1 的波形、参数和配置。

**CH2**: 选择通道 CH2。选择后，背灯变亮，用户可以设置 CH2 的波形、参数和配置。

**Trigger1**: CH1 手动触发按键，在扫频或脉冲串模式下，用于手动触发 CH1 产生一次扫频或脉冲串输出（仅当 **Output1** 打开时）。

**Trigger2**: CH2 手动触发按键，在扫频或脉冲串模式下，用于手动触发 CH2 产生一次扫频或脉冲串输出（仅当 **Output2** 打开时）。

**Output1**: 开启或关闭 CH1 的输出。

**Output2**: 开启或关闭 CH2 的输出。

**CH1 $\leftrightarrow$ CH2**: 执行通道复制功能。

## 10. 频率计

按下 **Counter** 按键，开启或关闭频率计功能。频率计功能开启时，**Counter** 按键背灯变亮，左侧指示灯闪烁。若屏幕当前处于频率计界面，再次按下该键关闭频率计功能；若屏幕当前处于非频率计界面，再次按下该键切换到频率计界面。

## 11. 数字键盘

用于输入参数，包括数字键 0 至 9、小数点“.”、符号键“+/-”、按键“Enter”、“Cancel”和“Del”。注意，要输入一个负数，需在输入数值前输入一个符号“-”。此外小数点“.”还可以用于快速切换单位，符号键“+/-”用于切换大小写（关于如何使用数字键盘输入参数，请参考“参数设置方法”一节介绍）。

## 12. 旋钮

在参数设置时，用于增大（顺时针）或减小（逆时针）当前突出显示的数值。在存储或读取文件时，用于选择文件保存的位置或用于选择需要读取的文件。在输入文件名时，用于切换软键盘中的字符。此外，还可用于选择内置波形。

## 13. 方向键

在使用旋钮和方向键设置参数时，用于切换数值的位。在文件名输入时，用于移动光标的位置。

## 14. 波形选择区

### **Sine**——正弦波

提供频率从 1 $\mu$ Hz 至 160MHz 的正弦波输出。

- 选中该功能时，按键背灯将变亮。
- 可以改变正弦波的“频率/周期”、“幅度/高电平”、“偏移/低电平”和“起始相位”。

### **Square**——方波

提供频率从 1 $\mu$ Hz 至 50MHz 并具有可变占空比的方波输出。

- 选中该功能时，按键背灯将变亮。
- 可以改变方波的“频率/周期”、“幅度/高电平”、“偏移/低电平”、“占空比”和“起始相位”。

### **Ramp**——锯齿波

提供频率从 1 $\mu$ Hz 至 4MHz 并具有可变对称性的锯齿波输出。

- 选中该功能时，按键背灯将变亮。

- 可以改变锯齿波的“频率/周期”、“幅度/高电平”、“偏移/低电平”、“对称性”和“起始相位”。

### **Pulse**——脉冲波

提供频率从 1 $\mu$ Hz 至 40MHz 并具有可变脉冲宽度和边沿时间的脉冲波输出。

- 选中该功能时，按键背灯将变亮。
- 可以改变脉冲波的“频率/周期”、“幅度/高电平”、“偏移/低电平”、“脉宽/占空比”、“上升沿”、“下降沿”和“延迟”。

### **Noise**——噪声

提供带宽为 120MHz 的高斯噪声输出。

- 选中该功能时，按键背灯将变亮。
- 可以改变噪声的“幅度/高电平”和“偏移/低电平”。

### **Arb**——任意波

提供频率从 1 $\mu$ Hz 至 40MHz 的任意波输出。

- 支持逐点输出模式。
- 可输出内建 150 种波形：直流、Sinc、指数上升、指数下降、心电图、高斯、半正矢、洛仑兹、脉冲和双音频等。也可以输出 U 盘中存储的任意波形。
- 还可以输出用户在线编辑（16kpts）或通过 PC 软件编辑后下载到仪器中的任意波。
- 选中该功能时，按键背灯将变亮。
- 可改变任意波的“频率/周期”、“幅度/高电平”、“偏移/低电平”和“起始相位”。

### **Harmonic**——谐波

提供频率从 1 $\mu$ Hz 至 80MHz 的谐波输出。

- 可输出最高 16 次谐波。
- 可以改变谐波的“频率/周期”、“幅度/高电平”、“偏移/低电平”和“起始相位”。
- 可以设置“谐波次数”、“谐波类型”、“谐波幅度”和“谐波相位”。

### **User**——用户自定义波形键

用户可以将该按键定义为最常用的内建波形的快捷键（**Utility** → **用户键**），此后便可以在任意操作界面，按下该键快速打开所需的内建波形并设置其参数。

## 15. 模式选择区

**Mod**——调制

可输出经过调制的波形，提供多种模拟调制和数字调制方式，可产生 AM、FM、PM、ASK、FSK、PSK、BPSK、QPSK、3FSK、4FSK、OSK 和 PWM 调制信号。

- 支持“内部”和“外部”调制源。

**Sweep**——扫频

可产生“正弦波”、“方波”、“锯齿波”和“任意波（DC 除外）”的扫频信号。

- 支持“线性”、“对数”和“步进”3种扫频方式。
- 支持“内部”、“外部”和“手动”3种触发源。
- 提供“标记”功能。
- 选中该功能时，按键背灯将变亮。

**Burst**——脉冲串

可产生“正弦波”、“方波”、“锯齿波”、“脉冲波”和“任意波（DC 除外）”的脉冲串输出。

- 支持“N 循环”、“无限”和“门控”3种脉冲串模式。
- “噪声”也可用于产生门控脉冲串。
- 支持“内部”、“外部”和“手动”3种触发源。
- 选中该功能时，按键背灯将变亮。

注意，当仪器工作在远程模式时，该键用于返回本地模式。

**16. 返回上一级菜单**

该按键用于返回上一级菜单。

**17. 快捷键/辅助功能键****Print**——打印功能键

将屏幕以图片形式保存到 U 盘。

**Edit**——编辑波形快捷键

该键是“**Arb** → **编辑波形**”的快捷键，用于快速打开任意波编辑界面。

**Preset**——恢复预设值

用于将仪器状态恢复到出厂默认值或用户自定义状态。

**Utility**——辅助功能与系统设置

用于设置一些系统参数。

选中该功能时，按键背灯将变亮。

**Store**——存储功能键

可存储/调用仪器状态或者用户编辑的任意波数据。

- 支持文件管理系统，可进行常规文件操作。
- 内置一个非易失性存储器（C 盘），并可外接一个 U 盘（D 盘）。
- 选中该功能时，按键背灯将变亮。

**Help**——帮助

要获得任何前面板按键或菜单软键的上下文帮助信息，按下该键将其点亮后，再按下你所需要获得帮助的按键。

**18. LCD**

800×480 TFT 彩色液晶显示器，显示当前功能的菜单和参数设置、系统状态以及提示消息等内容。

**注意**

通道输出端设有过压保护功能，满足下列条件之一则产生过压保护。

- 仪器幅度设置大于 4Vpp，输入电压大于±11.25V (±0.1V)，频率小于 10kHz。
- 仪器幅度设置小于等于 4Vpp，输入电压大于±4.5V (±0.1V)，频率小于 10kHz。
- 产生过压保护时，仪器屏幕显示提示消息“过载保护，输出关闭!”。

## 后面板

DG4000 的后面板布局如下图所示。

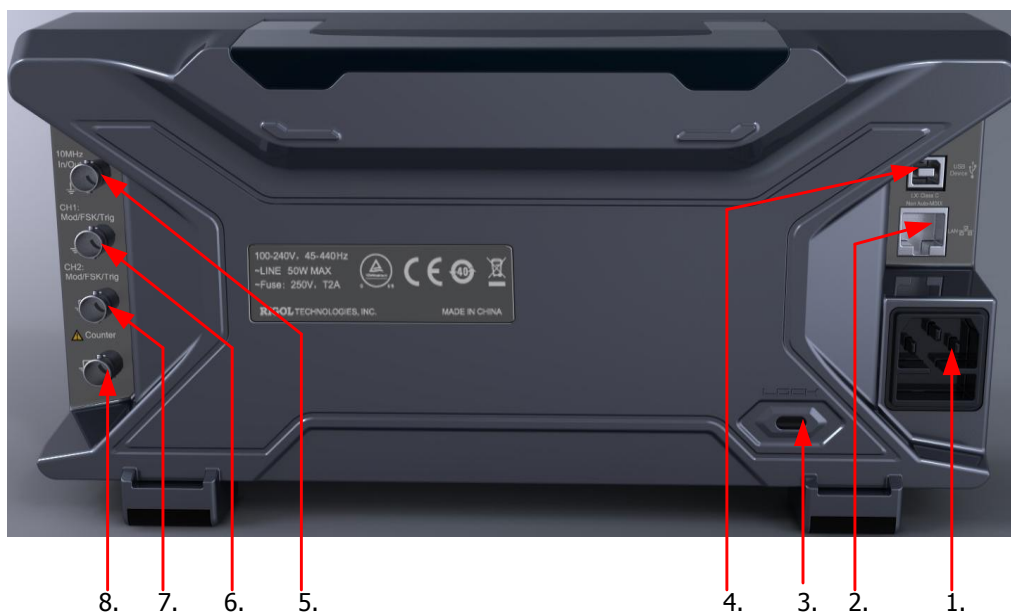


图 6 DG4000 后面板

### 1. AC 电源输入

本信号发生器支持的交流电源规格为：100-240V，45-440Hz。

### 2. LAN

通过该接口将信号发生器连接至局域网中，进行远程控制。本信号发生器符合 LXI-C 类仪器标准，可与其他标准设备快速搭建测试系统，轻松实现系统集成。

### 3. 防盗锁孔

使用防盗锁（请用户自行购买）可将仪器锁定在固定位置。

### 4. USB Device

通过该接口可连接 PC，通过上位机软件对信号发生器进行控制。

### 5. 10MHz 输入/输出端（10MHz In/Out）

BNC 母头连接器，标称阻抗为  $50\Omega$ ，其功能由仪器使用的时钟类型决定。DG4000 可以使用内部时钟或外部时钟。

- 若仪器使用内部时钟源，该连接器（用作 10MHz Out）可输出由仪器内部晶振产生的 10MHz 时钟信号。
- 若仪器使用外部时钟源，该连接器（用作 10MHz In）接收一个来自外部的 10MHz 时钟信号。
- 该连接器通常用于在多台仪器之间建立同步。

## 6. CH1 外调制/触发输入端（CH1: Mod/FSK/Trig）

BNC 母头连接器，标称阻抗为  $50\Omega$ ，其功能由 CH1 当前的工作模式决定。

- **Mod:**  
若 CH1 开启 AM、FM、PM、PWM 或 OSK 且使用外部调制源，该连接器接收一个来自外部的调制信号。
- **FSK:**  
若 CH1 开启 ASK、FSK 或 PSK 且使用外部调制源，该连接器接收一个来自外部的调制信号（可设置该信号的极性）。
- **Trig In:**  
若 CH1 开启扫频或脉冲串功能且使用外部触发源，该连接器接收一个来自外部的触发信号（可设置该信号的极性）。
- **Trig Out:**  
若 CH1 开启扫频或脉冲串功能且使用内部或手动触发源，该连接器输出具有指定边沿的触发信号。

## 7. CH2 外调制/触发输入端（CH2: Mod/FSK/Trig）

BNC 母头连接器，标称阻抗为  $50\Omega$ ，其功能由 CH2 当前的工作模式决定。

- **Mod:**  
若 CH2 开启 AM、FM、PM、PWM 或 OSK 且使用外部调制源，该连接器接收一个来自外部的调制信号。
- **FSK:**  
若 CH2 开启 ASK、FSK 或 PSK 且使用外部调制源，该连接器接收一个来自外部的调制信号（可设置该信号的极性）。
- **Trig In:**  
若 CH2 开启扫频或脉冲串功能且使用外部触发源，该连接器接收一个来自外部的触发信号（可设置该信号的极性）。
- **Trig Out:**  
若 CH2 开启扫频或脉冲串功能且使用内部或手动触发源，该连接器输出具有指定边沿的触发信号。

## 8. 外部信号输入端 (Counter)

BNC 母头连接器，标称阻抗为  $50\Omega$ ，用于接收频率计测量的外部信号。



## 连接电源

DG4000 支持的交流电源规格为 100V 至 240V, 45Hz 至 440Hz。请使用附件提供的电源线将仪器连接至交流电源中（如图 7 所示），此时，信号发生器已处于通电状态，前面板左下角的电源键呈呼吸状态。

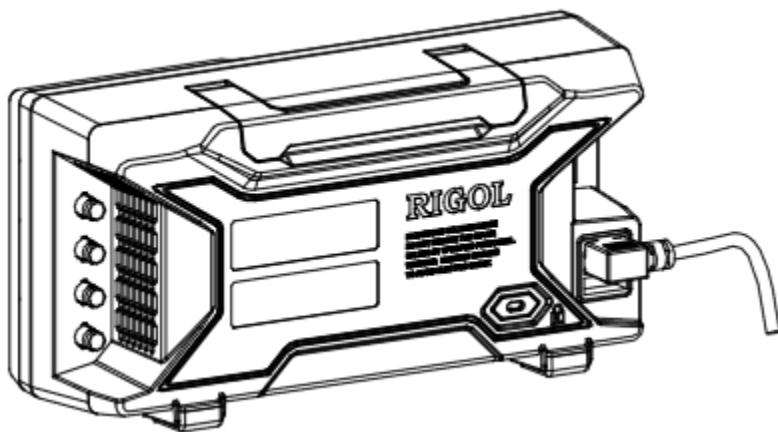


图 7 连接电源



### 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。

## 用户界面

DG4000 用户界面同时显示两个通道的参数和波形。下图所示为 CH1 和 CH2 均选择正弦波时的界面。基于当前功能的不同，界面显示的内容会有所不同。

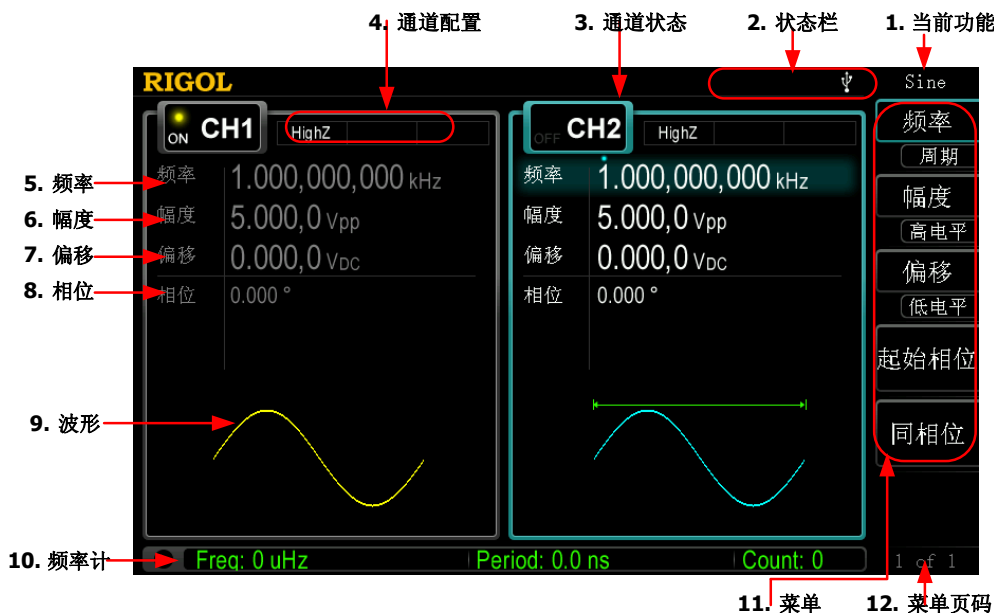


图 8 用户界面

### 1. 当前功能

显示当前已选中功能的名称。例如：“Sine”表示当前选中“正弦波”功能，“ArbEdit”表示当前选中“任意波编辑”功能。

### 2. 状态栏

基于当前的配置，状态栏将显示如下的指示符。



仪器正确连接至局域网时，点亮该标识。



仪器工作于远程模式时，点亮该标识。



仪器检测到 U 盘时，点亮该标识。

### 3. 通道状态

CH1 和 CH2 的显示区域，指示当前通道的选择状态和开关状态（ON/OFF）。

当前已选中通道的显示区域高亮显示；当前已打开通道的开关状态为“ON”。

**注意：**

“选中”通道不同于“打开”通道。“选中 CH1”表示用户可以配置 CH1 的参数，此时 **CH1** 背灯变亮；“打开 CH1”表示 CH1 以当前配置输出波形，此时 **Output1** 背灯变亮。

**4. 通道配置**

显示各通道当前的输出配置，包括输出阻抗的类型、工作模式、调制或触发源的类型。

**● 输出阻抗**

高阻：显示 “HighZ”

负载：显示负载电阻值，默认为 “50Ω”。

**● 工作模式**

调制：显示 “Mod”

扫频：显示 “Sweep”

脉冲串：显示 “Burst”

**● 调制类型/触发源**

内部调制或内部触发源：显示 “Internal”

外部调制或外部触发源：显示 “External”

手动触发源：显示 “Manual”

**5. 频率**

显示各通道当前波形的频率。按相应的 **频率** 菜单后，通过数字键盘或旋钮改变该参数。当前可设置的参数会突出显示，数字上方的亮点表示光标处于当前位。

**6. 幅度**

显示各通道当前波形的幅度。按相应的 **幅度** 菜单后，通过数字键盘或旋钮改变该参数。当前可设置的参数会突出显示，数字上方的亮点表示光标处于当前位。

**7. 偏移**

显示各通道当前波形的直流偏移。按相应的 **偏移** 菜单后，通过数字键盘或旋钮改变该参数。当前可设置的参数会突出显示，数字上方的亮点表示光标处于当前位。

**8. 相位**

显示各通道当前波形的相位。按相应的 **起始相位** 菜单后，通过数字键盘或旋钮改变该参数。当前可设置的参数会突出显示，数字上方的亮点表示光标处于当前位。

## **9. 波形**

显示各通道当前选择的波形。

## **10. 频率计**

仅在开启频率计功能时存在。显示频率计当前的测量状态，包括简要和详细两种显示模式。

- 简要：仅显示频率值、周期值和测量次数。
- 详细：显示当前频率计的配置、5 种测量值（频率、周期、占空比、正脉宽和负脉宽）和测量次数。

## **11. 菜单**

显示当前已选中功能对应的操作菜单。例如：图中显示“正弦波”功能菜单。

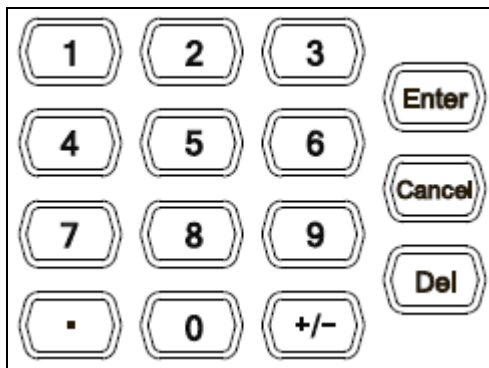
## **12. 菜单页码**

显示当前菜单的页数和页码，如“1 of 1”或“1 of 2”。

## 参数设置方法

参数设置可通过数字键盘或旋钮和方向键完成。

### 数字键盘



数字键盘由以下几部分组成：

- **数字键**  
数字键 0~9 用于直接输入所需的参数值。
- **小数点**  
按下该键，当前光标处插入一个小数点 “.”。
- **符号键**  
符号键 “+/-” 用于改变参数的符号。首次按下该键，参数符号为 “-”，再次按下该键，符号切换为 “+”。  
注意，在编辑文件名时，符号键用于切换大小写。
- **Enter 键**  
用户输入参数过程中，按下该键将结束参数输入，并为参数添加默认的单位。
- **Cancel 键**
  - (1) 参数输入过程中，按下该键将清除活动功能区的输入，同时退出参数输入状态。
  - (2) 关闭活动功能区显示。
- **Del 键**
  - (1) 参数输入过程中，按下该键将删除光标左边的字符。
  - (2) 在编辑文件名时，按下该键删除已输入的字符。

## 方向键和旋钮



方向键功能包括：

1. 在参数输入时，方向键用于移动光标以选择当前编辑的位。
2. 在编辑文件名时，方向键用于移动光标的位置。



旋钮功能包括：

- 在参数可编辑状态，旋转旋钮将以指定步进增大（顺时针）或减小（逆时针）参数。
- 在编辑文件名时，旋钮用于选中软键盘中不同的字符。
- 在 **Arb** → **选择波形** → **内建波形** 中、**Arb** → **编辑波形** → **选择波形** 和 **Utility** → **用户键** 中，旋钮用于选中不同的任意波。
- 在存储与调用功能中，旋钮用于选择文件保存的位置或用于选择需要读取的文件。

## 使用内置帮助系统

要获得任何前面板按键或菜单软键的帮助信息，首先按下 **Help** 键将其点亮，然后再按下您需要获得帮助的按键。

连续按两次 **Help** 键打开如下常用帮助信息。

1. 查看显示的最后一信息
2. 查看远程命令错误队列
3. 获得任意键的帮助
4. 基本波形输出
5. 任意波形输出
6. 调制波形输出
7. 扫频输出
8. 突发输出
9. 存储管理
10. 同步多台仪器
11. RIGOL 技术支持

## 使用防盗锁

使用防盗锁（选件）可将本仪器锁在固定位置。如下图所示，将锁对准仪器上的锁孔插入，顺时针转动钥匙以锁定仪器，然后拔出钥匙。

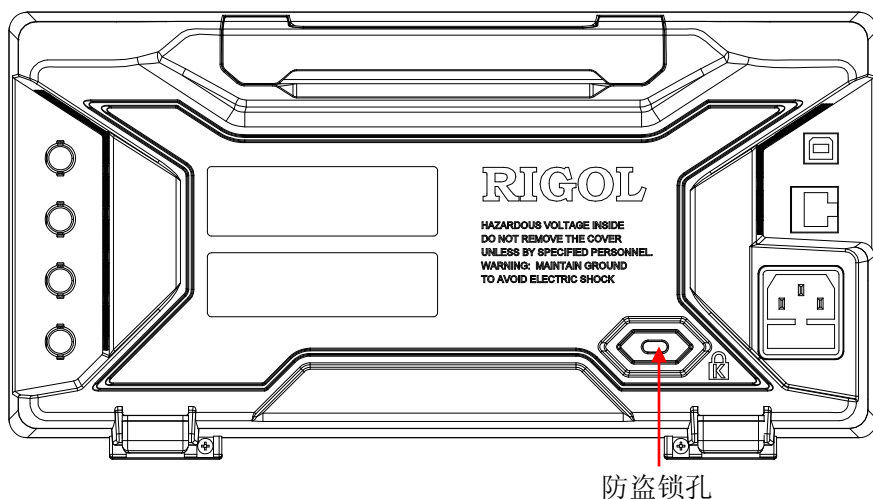


图 9 防盗锁孔



## 使用机架

本仪器可安装到 19 英寸标准机柜内。

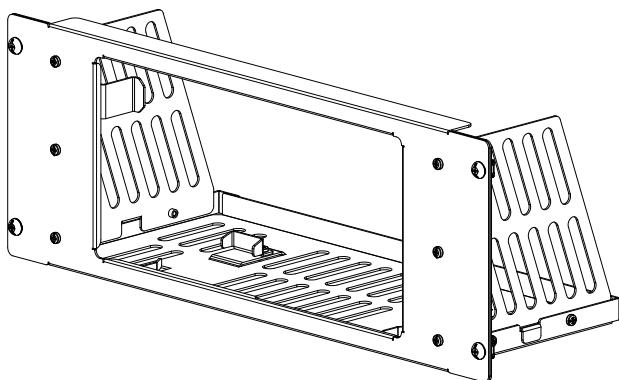


图 10 机架

## 部件清单

DG4000 机架（如图 10 所示）的部件清单如下表所示。其中，“标号”一栏与图 11、图 12 对应。

表 1 机架部件清单

标号	名称	数量	零件编号	描述
1-1	前面板	1	RM-DG4-01	
1-2	底板	1	RM-DG4-02	
1-3	左侧板	1	RM-DG4-03	
1-4	右侧板	1	RM-DG4-04	
1-5	压脚	2	RM-DG4-05	
1-6	固定件	2	RM-DG4-06	
2-1	M4 螺钉	18	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 20 十一字切沟盘头机械牙螺钉
2-3	M6 螺母	4	RM-SCREW-03	M6 x 4 带定位锁片机械牙方螺母

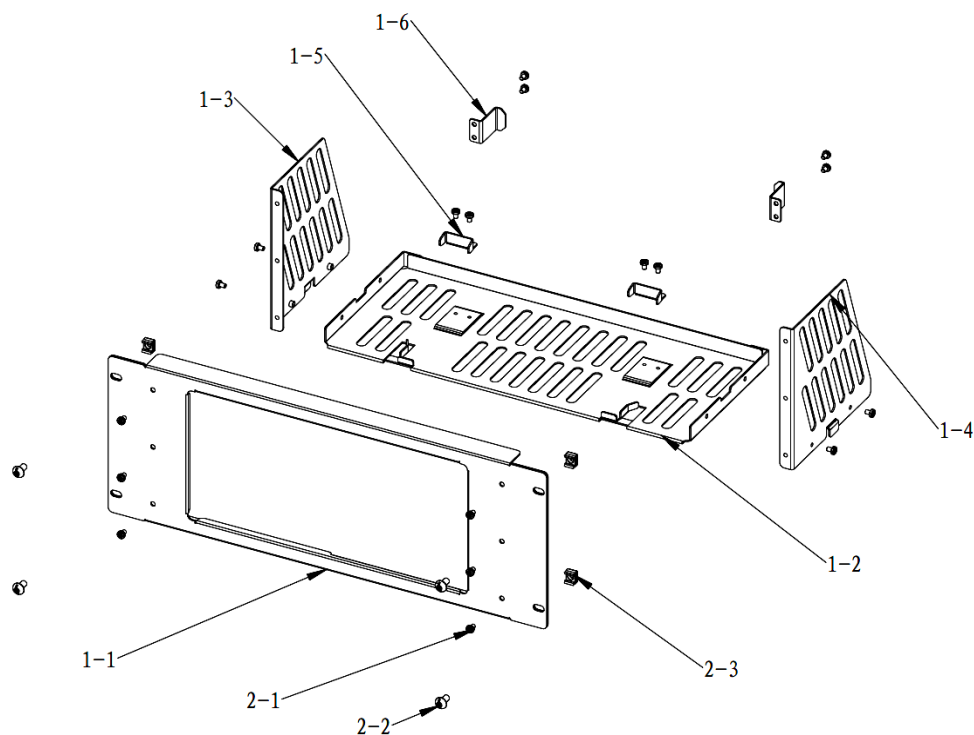


图 11 机架部件

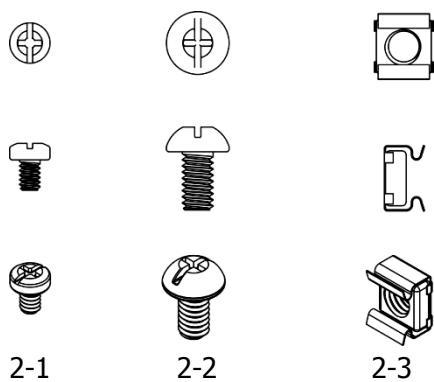


图 12 螺钉与螺母

## 安装工具

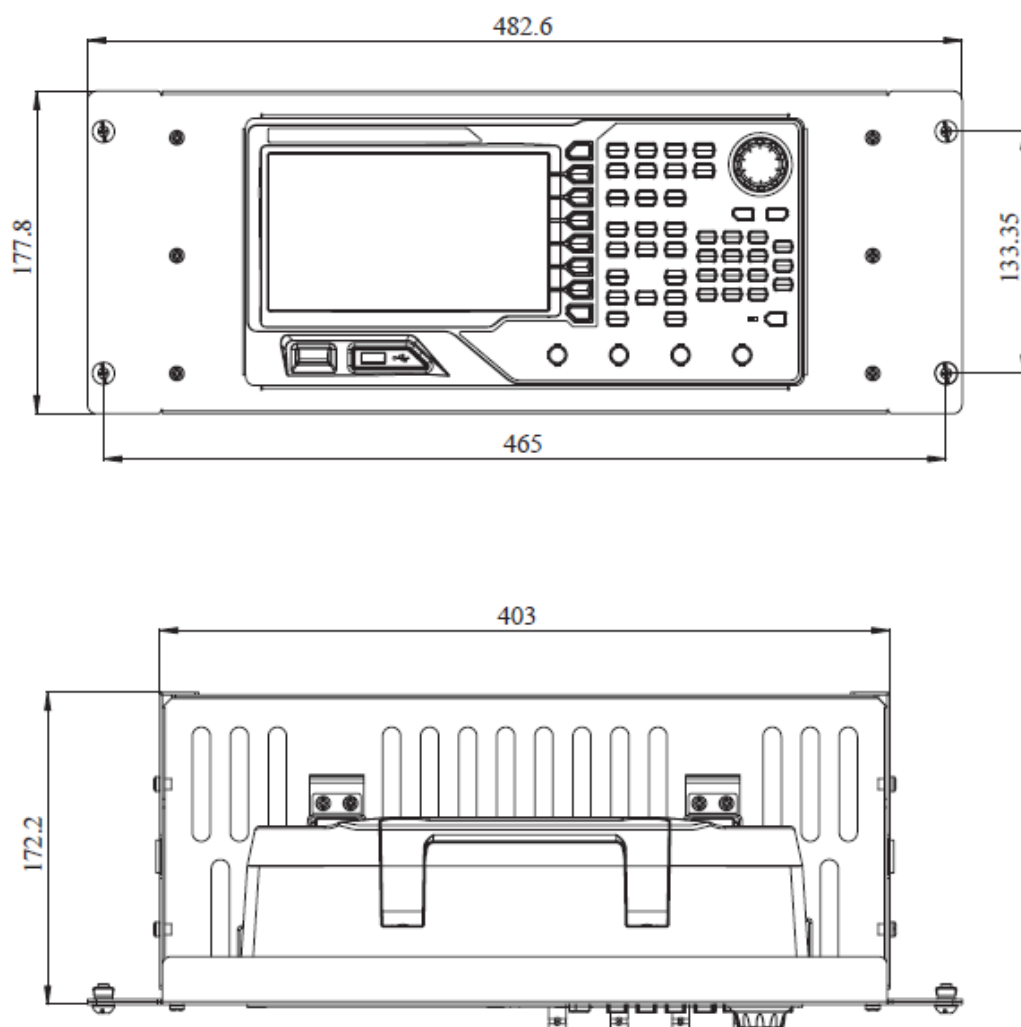
推荐使用 PH2 号头十字改锥。

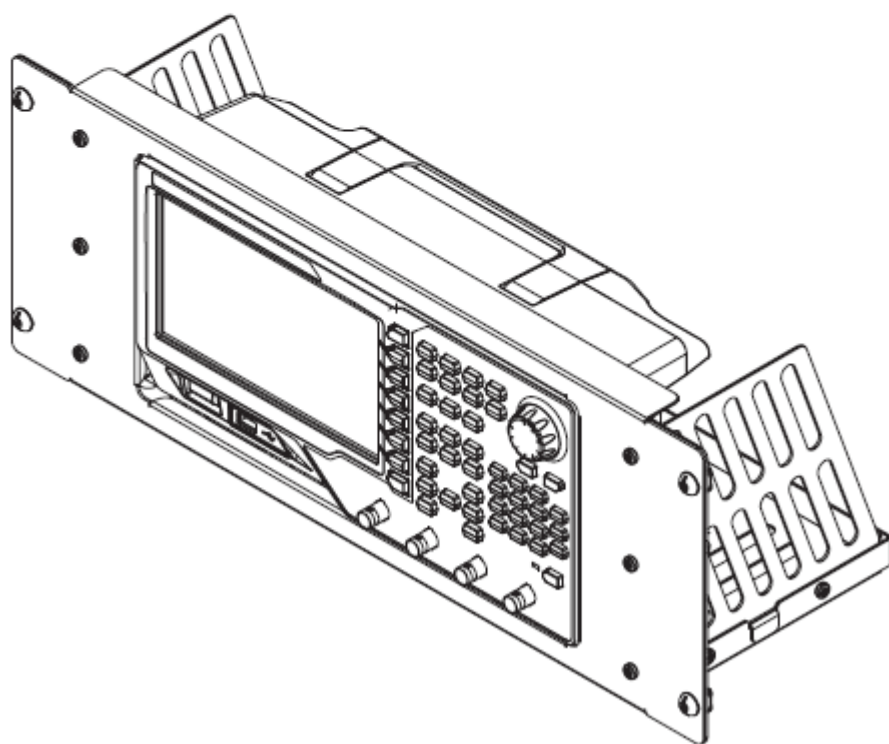
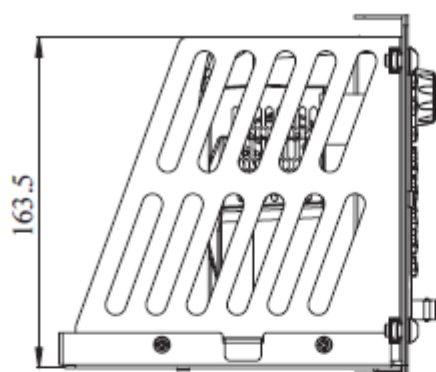
## 安装空间

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 4U 的空间（177.8 mm）。
- 机柜内深度至少 180 mm。

仪器上架后的尺寸如下图所示：

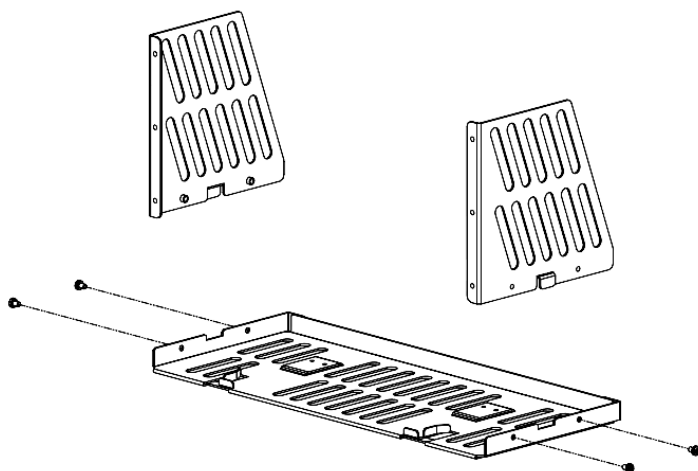




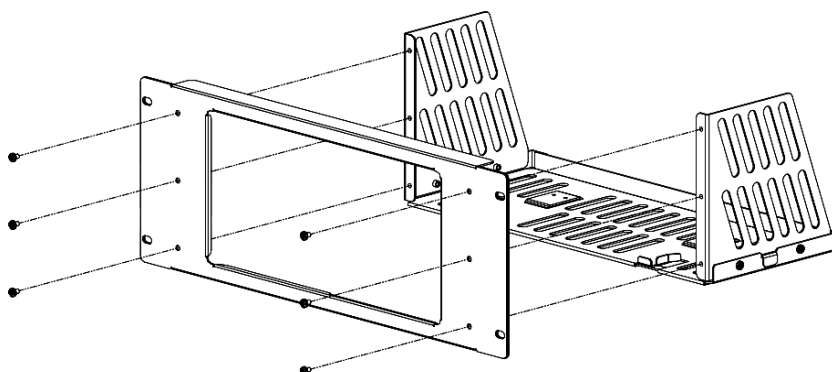
## 安装步骤

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。

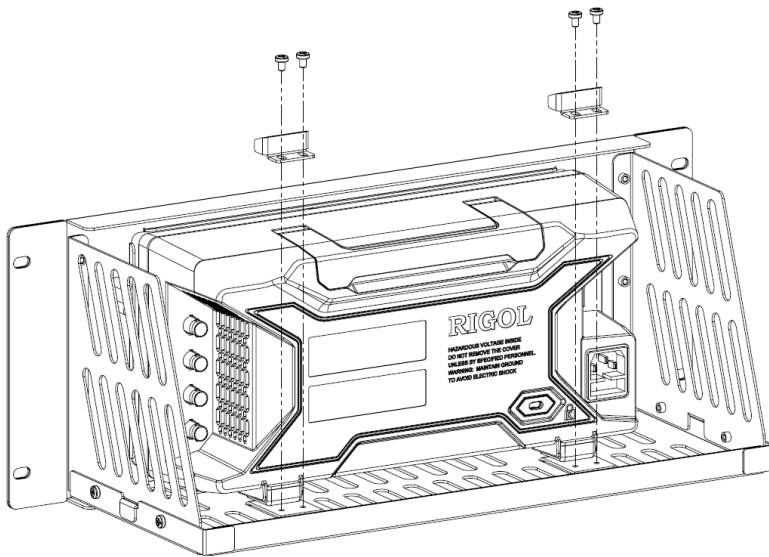
1. 安装左右侧板：左右侧板的卡位对准底板的豁口后插入底板，用 4 颗 M4 螺钉将其固定。



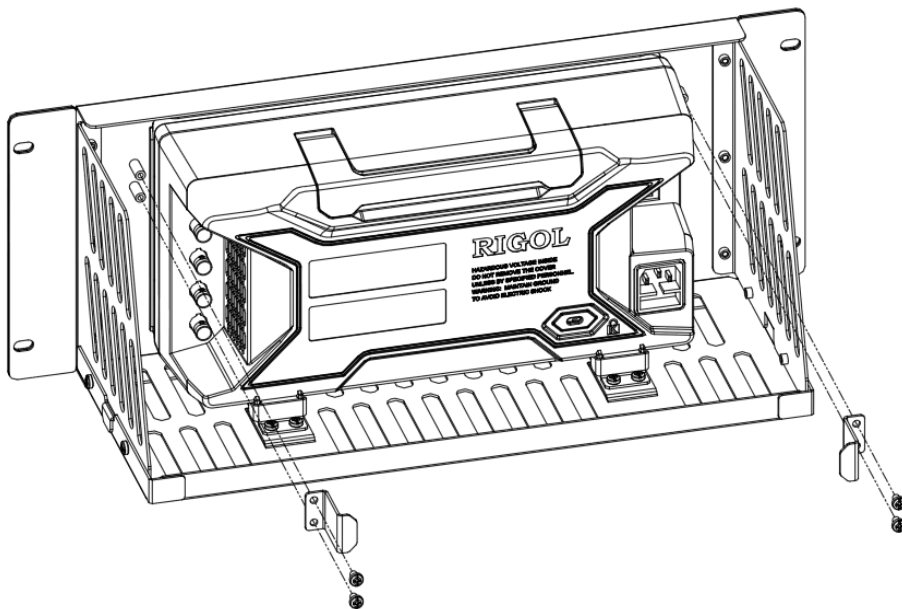
2. 安装机架前面板：将前面板用 6 颗 M4 螺钉固定在上一步装好的框架上。



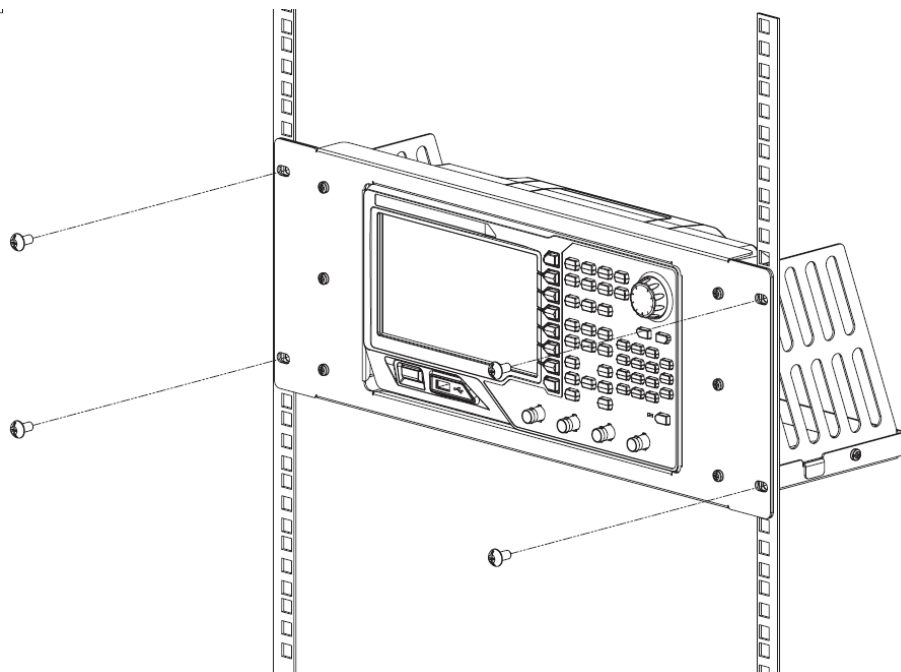
3. 固定仪器脚部：用两个压脚将仪器紧扣在底板上，用 4 颗 M4 螺钉将其固定。



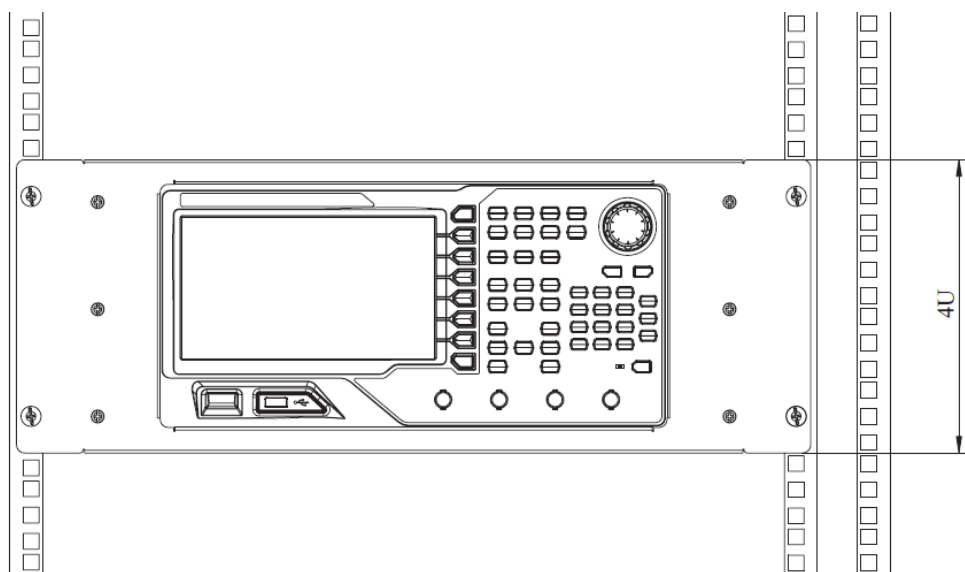
4. 固定仪器上部：将两个固定件压紧仪器上部，用 4 颗 M4 螺钉固定。



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 4U 高度，箭头所指的孔为机架的安装孔，注意对准安装。



## 故障处理

下面列举了 DG4000 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，同时请提供您仪器的设备信息（获取方法：**Utility** → **System** → **系统信息**）。

### 1. 如果按下电源开关信号发生器仍然黑屏，没有任何显示：

- (1) 检查电源接头是否接好。
- (2) 检查电源开关是否按实。
- (3) 做完上述检查后，重新启动仪器。
- (4) 如果仍然无法正常使用本产品，请与 **RIGOL** 联络。

### 2. 设置正确但无波形输出：

- (1) 检查 BNC 电缆是否正常接在通道输出端口上([**Output1**] 或 [**Output2**])。
- (2) 检查 BNC 线是否能够正常工作。
- (3) 检查 **Output1** 或 **Output2** 键是否打开。
- (4) 做完上述检查后，将 **开机设置** 设为“上次值”，然后重新启动仪器。
- (5) 如果仍然无法正常使用本产品，请与 **RIGOL** 联络。

### 3. U 盘不能被识别：

- (1) 检查 U 盘是否可以正常工作。
- (2) 确认使用的为 **Flash** 型 U 盘，本仪器不支持硬盘型 U 盘。
- (3) 重新启动仪器后，再插入 U 盘进行检查。
- (4) 如果仍然无法正常使用 U 盘，请与 **RIGOL** 联络。





## **Quick Guide**

# **DG4000 Series Function/Arbitrary Waveform Generator**

**Dec. 2011  
RIGOL Technologies, Inc.**



# Guaranty and Declaration

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## Publication Number

QGB04105-1110

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# 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 only specified by this manual.

### **Use Proper Power Cord.**

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

### **Ground The Instrument.**

The instrument is grounded through the Protective Earth lead of the power cord. To avoid electric shock, it is essential to connect the earth terminal of power cord to the Protective Earth terminal before any inputs or outputs.

### **Observe All Terminal Ratings.**

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

### **Use Proper Overvoltage Protection.**

Make sure that no overvoltage (such as that caused by a thunderstorm) can reach the product, or else the operator might expose to danger of electrical shock.

### **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.

### **Do Not Operate Without Covers.**

Do not operate the instrument with covers or panels removed.

### **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 especially to circuits or accessories must be performed by **RIGOL** authorized personnel.

**Keep Well Ventilation.**

Inadequate ventilation may cause increasing of temperature or damages to the device. So please keep well ventilated and inspect the intake and fan regularly.

**Do Not Operate In Wet Conditions.**

In order to avoid short circuiting to the interior of the device or electric shock, please do not operate in a humid environment.

**Do Not Operate in an Explosive Atmosphere.**

In order to avoid damages to the device or personal injuries, it is important to operate the device away from an explosive atmosphere.

**Keep Product Surfaces Clean and Dry.**

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

**Electrostatic Prevention.**

Operate in an electrostatic discharge protective area environment to avoid damages induced by static discharges. Always ground both the internal and external conductors of the cable to release static before connecting.

**Handling Safety**

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

## Safety Terms and Symbols

**Terms in this Manual.** These 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 other property.

---

**Terms on the Product.** These terms may appear on the product:

**DANGER** indicates an injury or hazard may immediately happen.

**WARNING** indicates an injury or hazard may be accessible potentially.

**CAUTION** indicates a potential damage to the instrument or other property might occur.

**Symbols on the Product.** These symbols may appear on the product:



**Hazardous  
Voltage**



**Refer to  
Instructions**



**Protective  
Earth  
Terminal**



**Chassis  
Ground**



**Test  
Ground**

## General Care and Cleaning

### General Care

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

### Cleaning

Clean the instrument regularly according to its operating conditions. To clean the exterior surface, perform the following steps:

1. Disconnect the instrument from all power sources.
2. Clean the loose dust on the outside of the instrument with a lint- free cloth (with mild detergent or water). When cleaning the LCD, take care to avoid scarifying it.



#### **CAUTION**

To avoid damages to the instrument, do not expose them to liquids which have causticity.

---



#### **WARNING**

To avoid injury resulting from short circuit, make sure the instrument is completely dry before reconnecting into a power source.

---

## Environmental Considerations

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



### Product End-of-Life Handling

The equipment may contain substances that could be harmful to the environment or human health. In order to avoid release of such substances into the environment and harmful to human health, we encourage you to recycle this product in an appropriate system that will ensure that most of the materials are reused or recycled appropriately. Please contact your local authorities for disposal or recycling information.



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# Quick Start

This chapter introduces the front/rear panel, user interface and parameter setting method, as well as announcements during first use of the instrument.

Subjects in this chapter:

- General Inspection
- To Adjust the Supporting Legs
- Appearance and Dimensions
- Front Panel
- Rear Panel
- To Connect to Power
- User Interface
- Parameter Setting Method
- To Use the Built-In Help
- To Use the Security Lock
- To Use the Rack Mount Kit

## General Inspection

### 1. **Inspect the shipping container for damage.**

If there are damages in the container or foam, keep them until the whole machine and the accessories pass the electrical and mechanical tests.

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.**

In case of any mechanical damage or defect, or if the instrument does not operate properly or pass the electrical and mechanical tests, contact your local sales representative of **RIGOL**.

### 3. **Check the Accessories**

If the contents are incomplete or damaged, please contact your local sales representative of **RIGOL**.

## To Adjust the Supporting Legs

DG4000 allows users to unfold the supporting legs as stands to tilt the generator upwards for easier operation and observation during operation. Users can fold the supporting legs for easier storage or carry when the instrument is not in use.

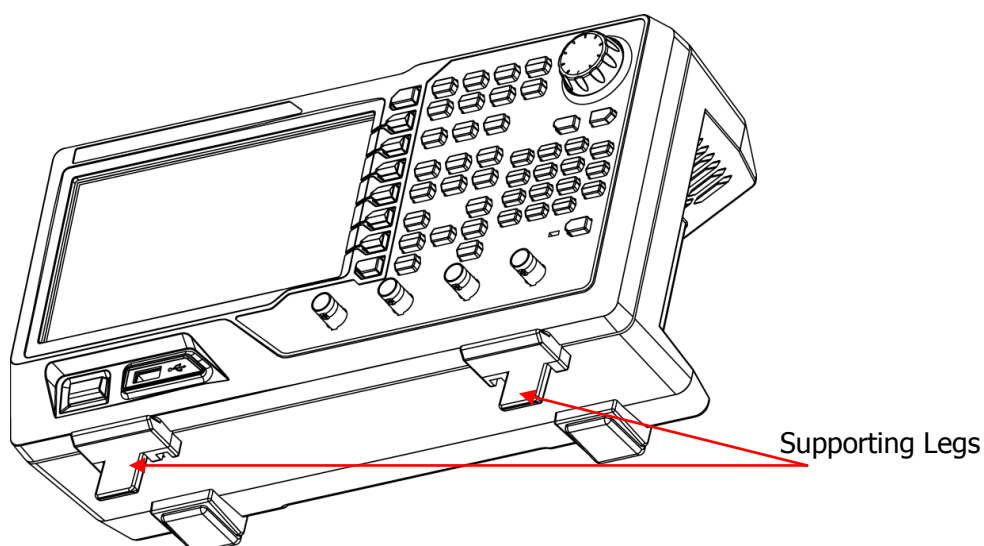


Figure 1 Unfold the Supporting Legs

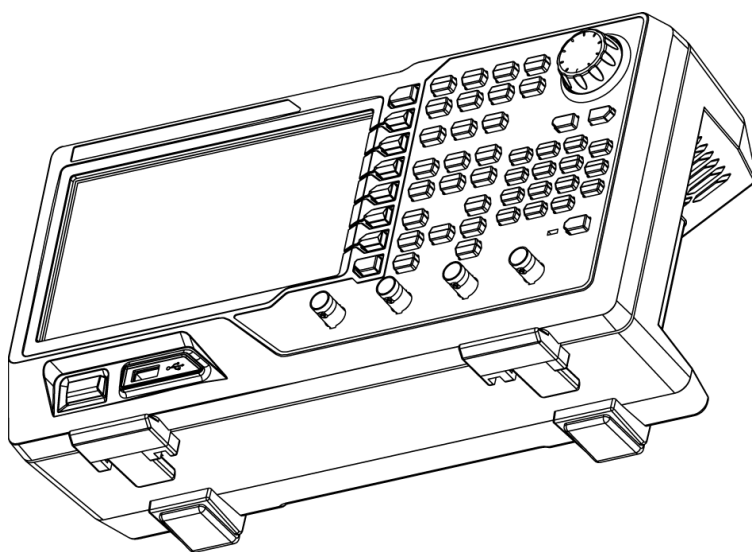


Figure 2 Fold the Supporting Legs

## Appearance and Dimensions

The appearance and dimensions of DG4000 are as shown in Figure 3 and Figure 4 and the unit is mm.

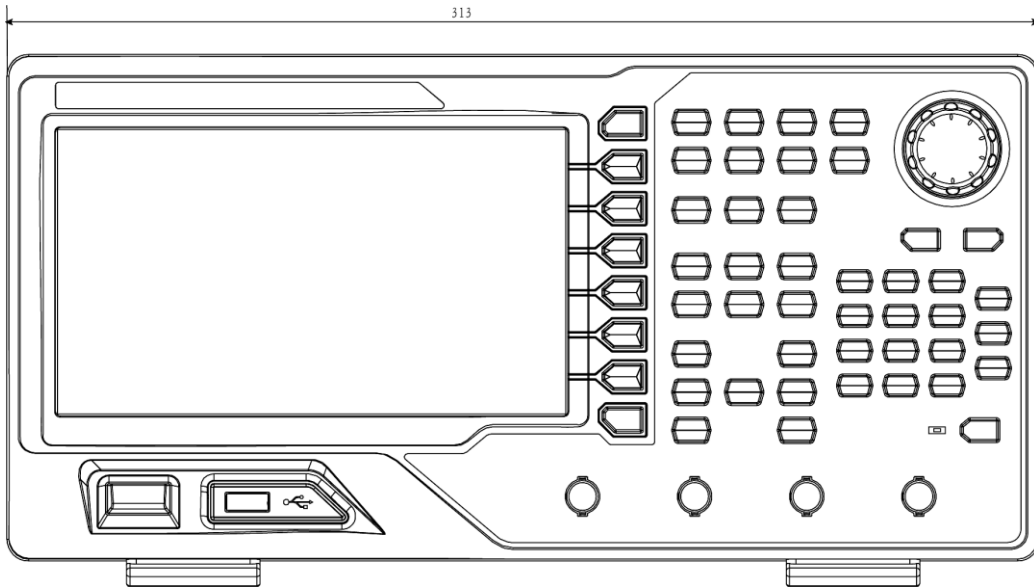


Figure 3 Front View

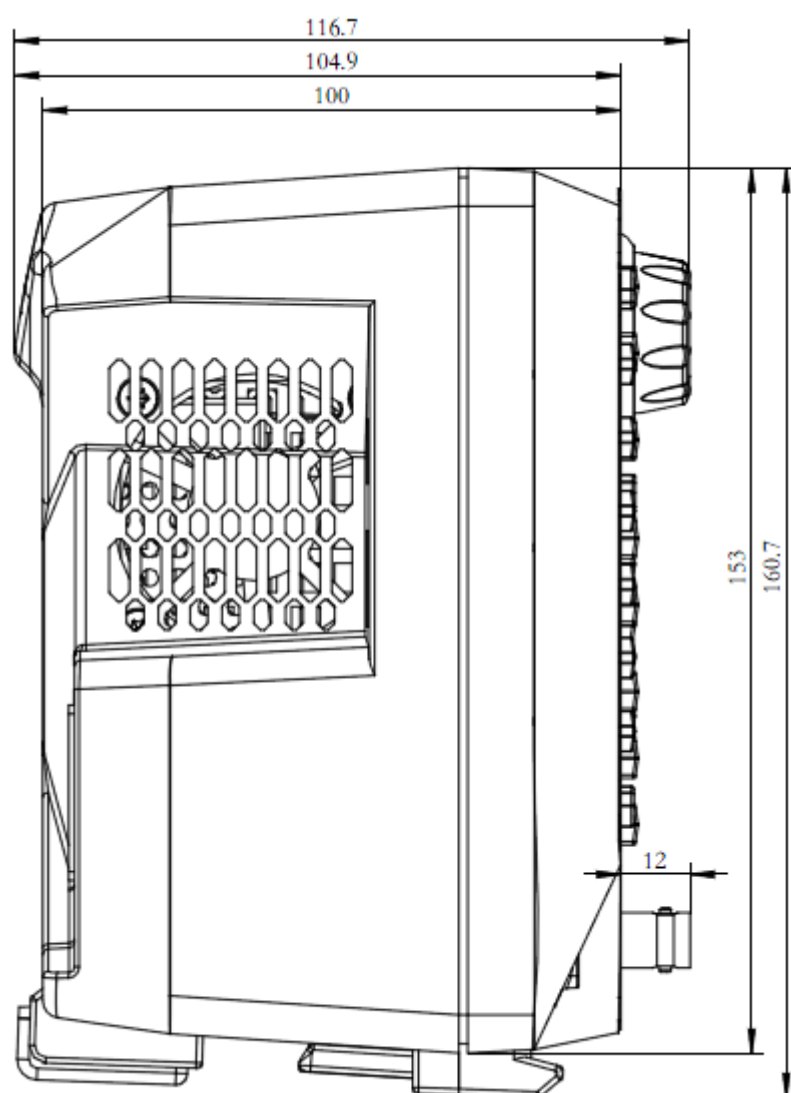


Figure 4 Side View

## Front Panel

The front panel of DG4000 is shown below.

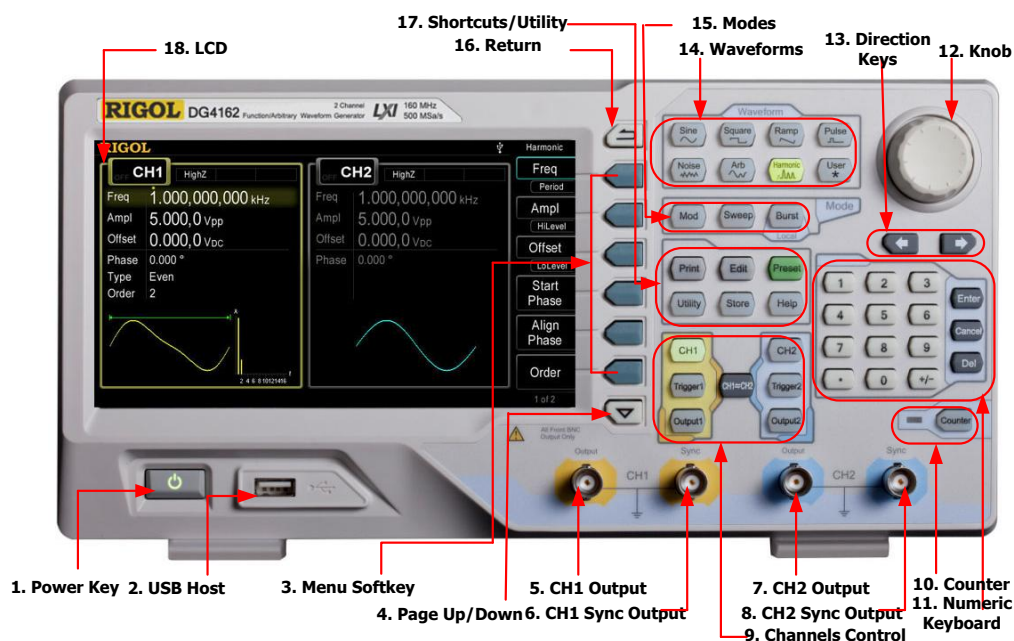


Figure 5 DG4000 Front Panel

### 1. Power Key

The power softkey is used to turn the generator on or off. When the power softkey is turned off, the generator is in standby mode and the generator is in power-off mode only when the power cable at the rear panel is pulled out.

Users can enable or disable the function of this softkey. When enabled, users need to press this softkey to start the instrument after power-on; when disabled, the instrument starts automatically after power-on.

### 2. USB Host

Support FAT file format USB storage device. Read the waveform or state files from the USB storage device, or store the current instrument state and edited waveform data into the USB storage device, or store the content currently displayed on the screen in specified picture format (.bmp or .jpeg) in USB



storage device.

### 3. Menu Softkey

Correspond to the left menus respectively. Press any softkey to activate the corresponding menu.

### 4. Page Up/Down

Open the previous or next page of the current function menu.

### 5. CH1 Output

BNC connector with 50Ω nominal output impedance.

When **Output1** is enabled (the backlight turns on), this connector outputs waveform according to the current configuration of CH1.

### 6. CH1 Sync Output

BNC connector with 50Ω nominal output impedance.

When the sync output of CH1 is enabled, this connector outputs the sync signal corresponding to the current settings of CH1.

### 7. CH2 Output

BNC connector with 50Ω nominal output impedance.

When **Output2** is enabled (the backlight turns on), this connector outputs waveform according to the current configuration of CH2.

### 8. CH2 Sync Output

BNC connector with 50Ω nominal output impedance.

When the sync output of CH2 is enabled, this connector outputs the sync signal corresponding to the current settings of CH2.

### 9. Channels Control

**CH1**: used to select CH1. When CH1 is selected (the backlight turns on), users can set the waveform and parameters of CH1.

**CH2**: used to select CH2. When CH2 is selected (the backlight turns on), users can set the waveform and parameters of CH2.

**Trigger1**: in sweep or burst mode, it is used to trigger CH1 to generate a sweep

or burst output manually (only when **Output1** is enabled).

**Trigger2**: in sweep or burst mode, it is used to trigger CH2 to generate a sweep or burst output manually (only when **Output2** is enabled).

**Output1**: enable or disable the output of CH1.

**Output2**: enable or disable the output of CH2.

**CH1 $\rightleftharpoons$ CH2**: execute channel copy.

## 10. Counter

Press **Counter** to turn the counter on or off. When the counter is turned on, the backlight of the key is illuminated and the left indicator flickers. If the counter interface is currently displayed, press this key again to disable counter function; if the screen currently displays interfaces other than the counter interface, press this key again to switch to counter interface.

## 11. Numeric Keyboard

It is used to input parameters and consists of numbers (0 to 9), decimal point (.), operators (+/-) and buttons ("Enter", "Cancel" and "Del"). If a negative is required, please input an operator "-" before the numbers. In addition, the decimal point "." can be used to switch units quickly and the operators "+/-" can be used to switch between uppercase and lowercase (for the use method of the numeric keyboard, refer to the introduction in **Parameter Setting Method**).

## 12. Knob

During parameter setting, it is used to increase (clockwise) or decrease (counterclockwise) the current highlighted number.

It is used to select file storage location or select the file to be recalled when storing or recalling file.

It is used to switch the character in the soft keyboard when entering filename.

In addition, it is also used to select built-in waveform.

## 13. Direction Keys

When using the knob and direction keys to set parameters, the direction keys are used to switch the digits of the number.

During filename input, they are used to move the cursor.

## 14. Waveforms

### **Sine**----Sine

Generate a Sine waveform with frequency from 1 $\mu$ Hz to 160MHz.

- When the function is enabled, the backlight of the button turns on.
- Enable to change Frequency/Period, Amplitude/High Level, Offset/Low Level and Start Phase of the Sine waveform.

### **Square**----Square

Generate a Square waveform with frequency from 1 $\mu$ Hz to 50MHz and variable duty cycle.

- When the function is enabled, the backlight of the button turns on.
- Enable to change Frequency/Period, Amplitude/High Level, Offset/Low Level, Duty Cycle and Start Phase of the Square waveform.

### **Ramp**----Ramp

Generate a Ramp waveform with frequency from 1 $\mu$ Hz to 4MHz and variable symmetry.

- When the function is enabled, the backlight of the button turns on.
- Enable to change Frequency/Period, Amplitude/High Level, Offset/Low Level, Symmetry and Start Phase of the Ramp waveform.

### **Pulse**----Pulse

Generate a Pulse waveform with frequency from 1 $\mu$ Hz to 40MHz and variable pulse width and edge time.

- When the function is enabled, the backlight of the button turns on.
- Enable to change Frequency/Period, Amplitude/High Level, Offset/Low Level, Pulse Width/Duty Cycle, Leading Edge Time, Trailing Edge Time and Delay of the Pulse waveform.

### **Noise**----Noise

Generate a Gauss Noise with 120MHz bandwidth.

- When the function is enabled, the backlight of the button turns on.
- Enable to change Amplitude/High Level and Offset/Low Level of the Noise.

### **Arb**----Arbitrary Waveforms

Generate an arbitrary waveform with frequency from 1μHz to 40MHz.

- Provide Step-by-Step output mode.
- Generate 150 built-in waveforms: DC, Sinc, Exponential Rise, Exponential Fall, ECG, Gauss, Haversine, Lorentz, Pulse, Dual-Tone etc.; output arbitrary waveforms stored in USB storage device.
- Generate arbitrary waveforms (16kpts) edited online or through PC software and then downloaded to the instrument by the users.
- When the function is enabled, the backlight of the button turns on.
- Enable to change Frequency/Period, Amplitude/High Level, Offset/Low Level and Start Phase of the arbitrary waveform.

### **Harmonic**----**Harmonic**

Generate harmonics with frequency from 1μHz to 80MHz.

- Output up to 16<sup>th</sup> order of harmonic.
- Enable to change Frequency/Period, Amplitude/High Level, Offset/Low Level and Start Phase of harmonics.
- Users can set the harmonic "Order", "Type", "Ampl" and "Phase".

### **User**----**User-defined Waveform Key**

Users can define the built-in waveform frequently used as shortcut (**Utility**→**UserKey**). And then, in any operation interface, press **User** to quickly open the desired waveform and set its parameters.

## **15. Modes**

### **Mod**----**Modulation**

Generate the modulated waveforms. Provide various analog modulation and digital modulation modes and can generate AM, FM, PM, ASK, FSK, PSK, BPSK, QPSK, 3FSK, 4FSK, OSK or PWM modulated signal.

- Support internal and external modulations.

### **Sweep**----**Sweep**

Generate the frequency sweeping signal of Sine, Square, Ramp and Arbitrary Waveforms (except DC).

- Support three sweep types: Linear, Log and Step.
- Support three trigger sources: Internal, External and Manual.
- Provide the "Mark" function.
- When the function is enabled, the backlight of the button turns on.

**Burst----Burst**

Generate burst waveforms of Sine, Square, Ramp, Pulse and Arbitrary waveform (except DC).

- Support three burst types: N Cycle, Infinite and Gated.
- Noise can also be used to generate Gated burst.
- Support three trigger sources: Internal, External and Manual.
- When the function is enabled, the backlight of the button turns on.

Note: when the instrument is working in remote mode, press this key to return to local mode.

**16. Return**

This key is used to return to the previous menu.

**17. Shortcuts/Utility**

**Print**: save the content shown on the screen as image in USB storage device.

**Edit**: this key is the shortcut of "**Arb** → **Edit Wform**" and is used to enter the ArbEdit interface quickly.

**Preset**: used to return the instrument state to default or user-defined states.

**Utility**: used to set the parameters of system. When this function is enabled, the backlight of the button turns on.

**Store**: store or recall the instrument state or user-defined arbitrary data.

- Support file management system to execute normal file operations.
- Provide a built-in non-volatile memory (C Disk) and an external USB storage device (D Disk).
- When the function is enabled, the backlight of the button turns on.

**Help**: to get context help information about any front-panel key or menu softkey, press this key until it is illuminated and then press the desired key.

**18. LCD**

800 × 480 TFT color LCD is used to display the current function menu and parameters setting, system state as well as prompt messages.

**CAUTION**

Overvoltage protection of the output channel will take effect once any of the following conditions is met.

- Amplitude setting in the generator is greater than 4 Vpp; the input voltage is greater than  $\pm 11.25\text{ V}$  ( $\pm 0.1\text{ V}$ ) and frequency is lower than 10kHz.
  - Amplitude setting in the generator is lower than or equal to 4 Vpp; the input voltage is greater than  $\pm 4.5\text{ V}$  ( $\pm 0.1\text{ V}$ ) and frequency is lower than 10kHz.
  - The message "OverLoad protect, The output is off!" will appear on the screen when overvoltage protection takes effect.
-

## Rear Panel

The rear panel of DG4000 is as shown in the figure below.

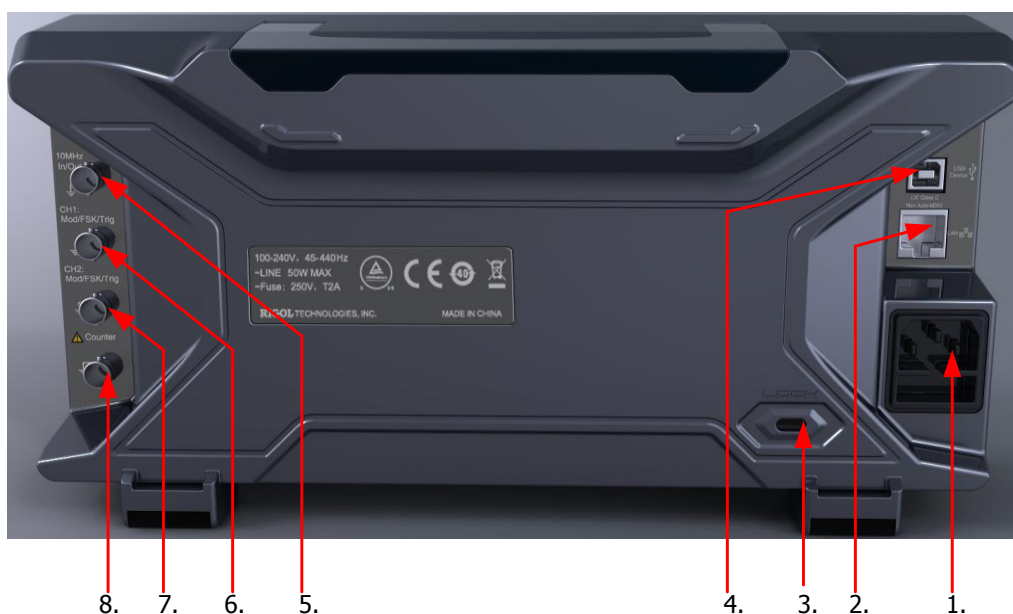


Figure 6 DG4000 Rear Panel

### 1. AC Power Input

This generator accepts the AC power supply: 100-240V, 45-440Hz.

### 2. LAN

Connect the generator to the local area network for remote control through this interface. This generator conforms to LXI-C class instrument standards and can quickly build test system with other devices to easily realize system integration.

### 3. Security Lock Hole

Users can use the security lock (buy it by themselves) to lock the instrument at a fixed location.

### 4. USB Device

PC can be connected through this interface to control the generator remotely through PC software.

## 5. 10MHz In/Out

BNC female connector with 50Ω nominal impedance. The function of this connector is determined by the type of clock used by the generator. DG4000 can use internal or external clock.

- When internal clock source is used, the connector (used as 10MHz Out) can output 10MHz clock signal generated by the internal crystal oscillator of the generator.
- When external clock source is used, the connector (used as 10MHz In) accepts a 10MHz external clock signal.
- This connector is usually used to synchronize multiple instruments.

## 6. CH1: Mod/FSK/Trig

BNC female connector with 50Ω nominal impedance. Its function is determined by the current working mode of CH1.

- **Mod:**  
If AM, FM, PM, PWM or OSK is enabled for CH1 and external modulation source is used, this connector accepts an external modulation signal.
- **FSK:**  
If ASK, FSK or PSK is enabled for CH1 and external modulation source is used, this connector accepts an external modulation signal (users can set the polarity of the signal).
- **Trig In:**  
If CH1 is in sweep or burst mode and external trigger source is used, this connector accepts an external trigger signal (users can set the polarity of the signal).
- **Trig Out:**  
If CH1 is in sweep or burst mode and internal or manual trigger source is used, this connector outputs a trigger signal with specified edge.

## 7. CH2: Mod/FSK/Trig

BNC female connector with 50Ω nominal impedance. Its function is determined by the current working mode of CH2.

- **Mod:**  
If AM, FM, PM, PWM or OSK is enabled for CH2 and external modulation source is used, this connector accepts an external modulation signal.
- **FSK:**



If ASK, FSK or PSK is enabled for CH2 and external modulation source is used, this connector accepts an external modulation signal (users can set the polarity of the signal).

- **Trig In:**

If CH2 is in sweep or burst mode and external trigger source is used, this connector accepts an external trigger signal (users can set the polarity of the signal).

- **Trig Out:**

If CH2 is in sweep or burst mode and internal or manual trigger source is used, this connector outputs a trigger signal with specified edge.

## **8. External Signal Input (Counter)**

BNC female connector with 50 $\Omega$  nominal impedance. It is used to accept an external signal to be measured by the counter.

## To Connect to Power

DG4000 accepts the AC power supply: 100V to 240V, 45Hz to 440Hz. Please use the power cable provided in the accessories to connect the instrument to AC power (as shown in Figure 7). At this point, the generator is powered on and the power button at the lower-left corner of the front panel is in breathing state.

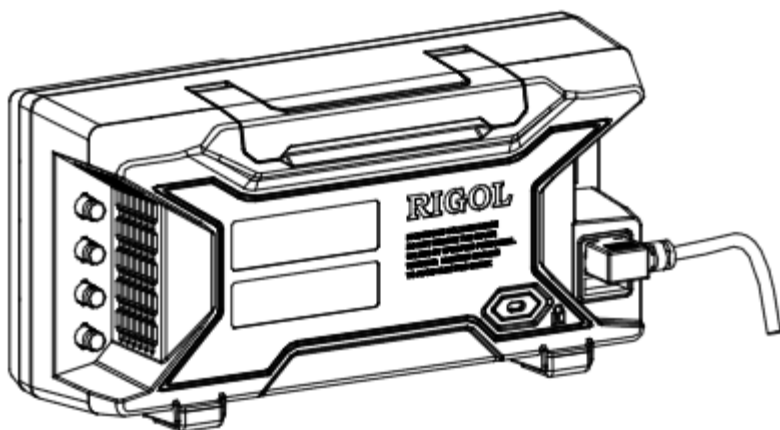


Figure 7 To Connect to Power



---

### 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.

---

## User Interface

DG4000 user interface displays the parameters and waveforms of the two channels at the same time. The figure below is the interface when both CH1 and CH2 select Sine. Different contents will be displayed when different functions are enabled.

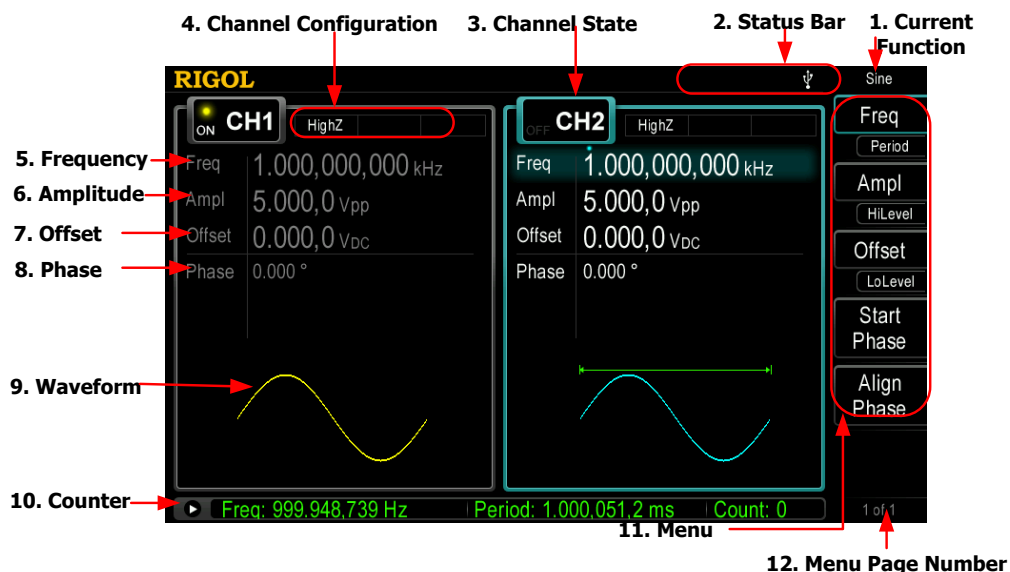


Figure 8 User Interface

### 1. Current Function

Display the name of the function currently selected. For example, "Sine" indicates that "Sine" waveform function is currently selected and "ArbEdit" indicates that "Arbitrary Waveform Edit" function is currently selected.

### 2. Status Bar

The following indicators would be displayed according to the current configuration.



When the instrument is connected into LAN successfully, this indicator will light.



When the generator works in remote mode, this indicator will light.



When the generator detects connected USB storage device, this indicator will light.

### 3. Channel Status

Display areas of CH1 and CH2. Indicate whether the channel is selected and turned on (ON/OFF).

The area of the channel currently selected is highlighted and the on/off state of the channel currently turned on is "ON".

#### **Note:**

When a channel is "Selected", it does not mean that the channel is turned on. When CH1 is selected, users can configure the parameters of CH1 and the backlight of **CH1** turns on. When CH1 is turned on, CH1 can output waveform according to the current configuration and the backlight of **Output1** turns on.

### 4. Channel Configurations

Display the current output configuration in each channel, including output resistance, mode and type of modulating source or trigger source.

- **Output Resistance**

High Impedance: display "HighZ"

Load: display the resistance value, the default is "50Ω"

- **Mode**

Modulation: display "Mod"

Sweep: display "Sweep"

Burst: display "Burst"

- **Modulating/Trigger Source Type**

Internal modulating/trigger: display "Internal"

External modulating/trigger: display "External"

Manual Trigger: display "Manual"

### 5. Frequency

Display the current waveform frequency in each channel. Press the corresponding softkey **Freq** and use the numeric keyboard or direction keys and knob to modify this parameter. The parameter that can be modified currently will be highlighted and the lightspot above the number indicates current cursor location.

### 6. Amplitude

Display the current waveform amplitude in each channel. Press the

corresponding softkey **Ampl** and use the numeric keyboard or direction keys and knob to modify this parameter. The parameter that can be modified currently will be highlighted and the lightspot above the number indicates current cursor location.

## 7. Offset

Display the current waveform DC offset in each channel. Press the corresponding softkey **Offset** and use the numeric keyboard or direction keys and knob to modify this parameter. The parameter that can be modified currently will be highlighted and the lightspot above the number indicates current cursor location.

## 8. Phase

Display the current waveform phase in each channel. Press the corresponding softkey **Start Phase** and use the numeric keyboard or direction keys and knob to modify this parameter. The parameter that can be modified currently will be highlighted and the lightspot above the number indicates current cursor location.

## 9. Waveform

Display the currently selected waveform shape in each channel.

## 10. Counter

Only available when the counter is turned on and can display the current measurement state of the counter briefly or in detail.

- Brief: only display frequency, period and the number of measurements performed.
- Detail: display the configurations of the counter, five measurement values (Frequency, Period, Duty Cycle, Positive Pulse Width and Negative Pulse Width) and the number of measurements performed.

## 11. Menu

Display the operation menu corresponding to the function currently selected. For example, the "Sine" function menu is displayed in the above figure.

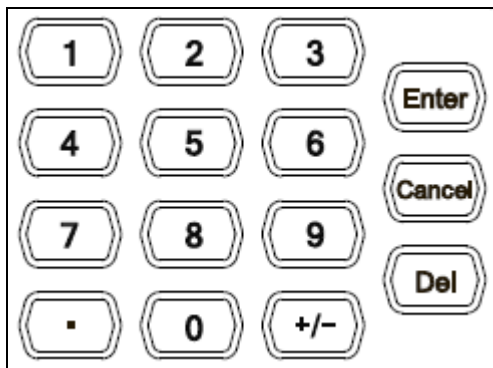
## 12. Menu Page Number

Display the total number of pages and the current page number of the menu, such as "1 of 1" or "1 of 2".

## Parameter Setting Method

Users can use the numeric keyboard or knob and direction keys to set parameters.

### Numeric Keyboard



The numeric keyboard consists of:

- **Number Keys**

The 0 to 9 number keys are used to directly input the desired parameter value.

- **Decimal Point**

Press this key to insert a decimal point "." at the current position of the cursor.

- **Operator Key**

The operator key "+/-" is used to modify the operator of the parameter. Press this key to set the parameter operator to "-"; press this key again to switch the operator to "+". Note that the operator key is used to switch between uppercase and lowercase in filename edit.

- **Enter Key**

Press this key to finish parameter input and add the default unit for the parameter.

- **Cancel Key**

- (1) During parameter input, press this key to clear the input in the active function area and exit parameter input.
- (2) Turn the display in the active function area off.

- **Del Key**

- (1) During parameter input, press this key to delete the character at the left of

the cursor.

(2) During filename edit, press this key to delete the characters input.

## Direction keys and Knob



Functions of the direction keys:

1. During parameter input, use the direction keys to move the cursor to select the digit to be edited.
2. During filename edit, use the direction keys to move the cursor.



Functions of the knob:

- When the parameter is in editable state, turn the knob to increase (clockwise) or reduce (counterclockwise) the parameter with specified step.
- During filename edit, use the knob to select the characters in the soft keyboard.
- In **Arb** → **Select Wform** → **BuiltIn**, **Arb** → **Edit Wform** → **Select Wform** and **Utility** → **UserKey**, use the knob to select arbitrary waveform.
- In store and recall, use the knob to select the storage location of the file or to select the file to be recalled.

## To Use the Built-In Help

To get context help information about any front-panel key or menu softkey, press **Help** to illuminate the key and then press the desired key to get corresponding help.

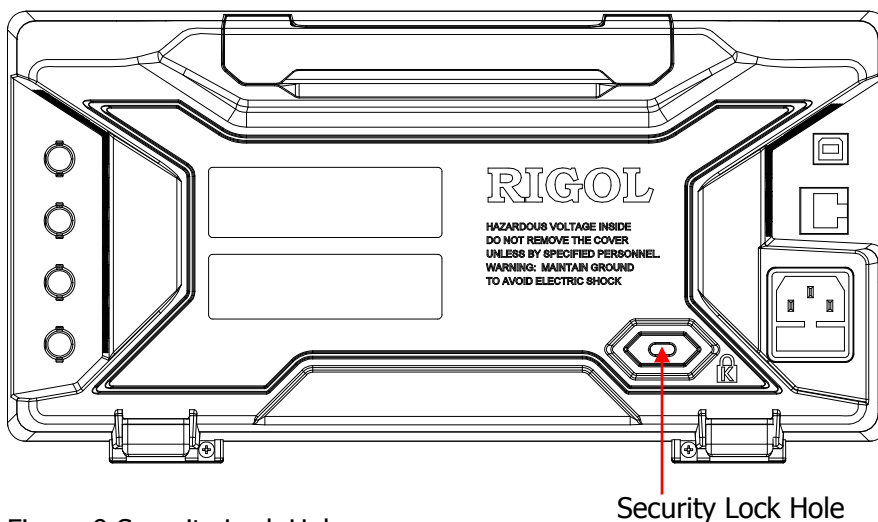
Pressing **Help** twice will get the following common help.

- 1. View the last displayed message.**
- 2. View error queue of the remote commands.**
- 3. Get the help information of a key.**
- 4. Generate a basic waveform.**
- 5. Generate an arbitrary waveform.**
- 6. Generate a modulated waveform.**
- 7. Generate a frequency Sweep.**
- 8. Generate a Burst waveform.**
- 9. Storage management.**
- 10. Synchronize multiple Generators.**
- 11. Get technical support from RIGOL.**



## To Use the Security Lock

Use the security lock (option) to lock the generator at a fixed location. As shown in the figure below, align the lock with the lock hole and plug it into the lock hole vertically, turn the key clockwise to lock the instrument and then pull the key out.



## To Use the Rack Mount Kit

This instrument can be installed into a standard 19 inches cabinet.

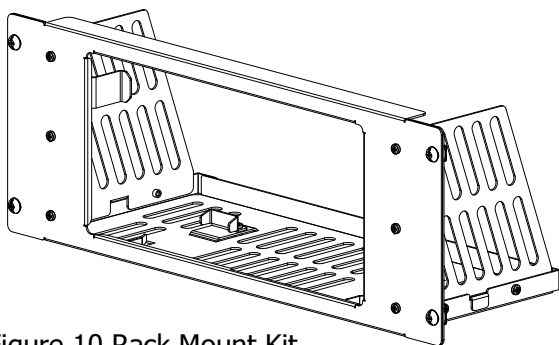


Figure 10 Rack Mount Kit

## Kit Parts List

The part list of the rack mount kit (as shown in Figure 10) of DG4000 is as shown in the table below. Wherein, the “No.” column corresponds to Figure 11 and Figure 12.

Table 1 Kit Parts List

No.	Name	Qty	Part No.	Description
1-1	Front Panel	1	RM-DG4-01	
1-2	Support Board	1	RM-DG4-02	
1-3	Left Plate	1	RM-DG4-03	
1-4	Right Plate	1	RM-DG4-04	
1-5	Pressure Feet	2	RM-DG4-05	
1-6	Built-in Fitting	2	RM-DG4-06	
2-1	M4 Screw	18	RM-SCREW-01	M4 x 6 Phil-Slot Pan Head Machine Screw
2-2	M6 Screw	4	RM-SCREW-02	M6 x 20 Phil-Slot Pan Head Machine Screw
2-3	M6 Nut	4	RM-SCREW-03	M6 x 4 Square Machine Lock Nuts

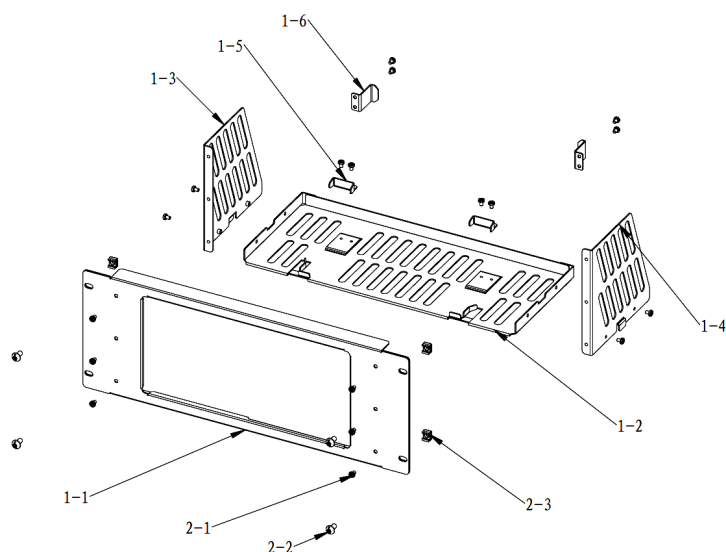


Figure 11 Parts of Rack Mount Kit

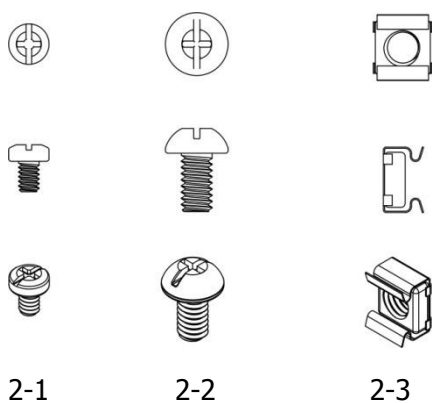


Figure 12 Screws and Nuts

## Installation Tool

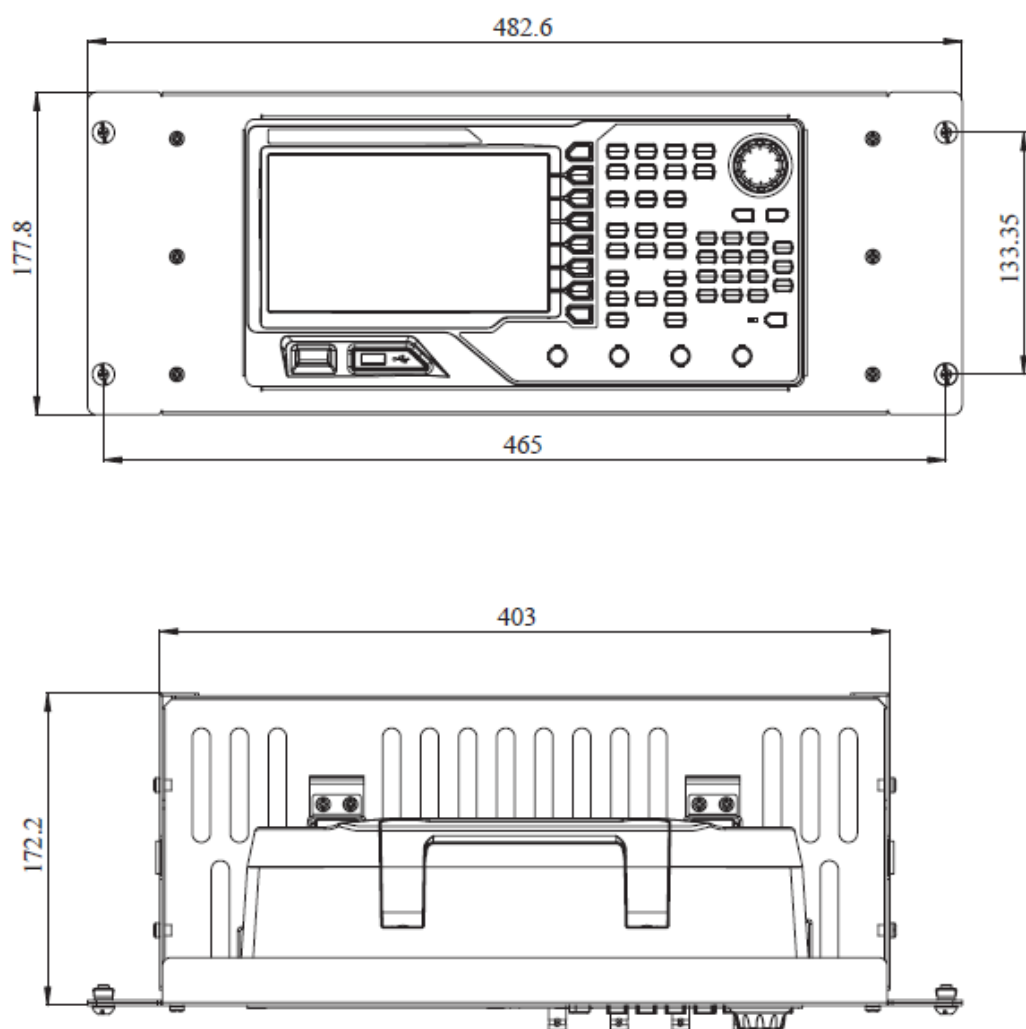
PH2 Phillips Screwdriver (recommended).

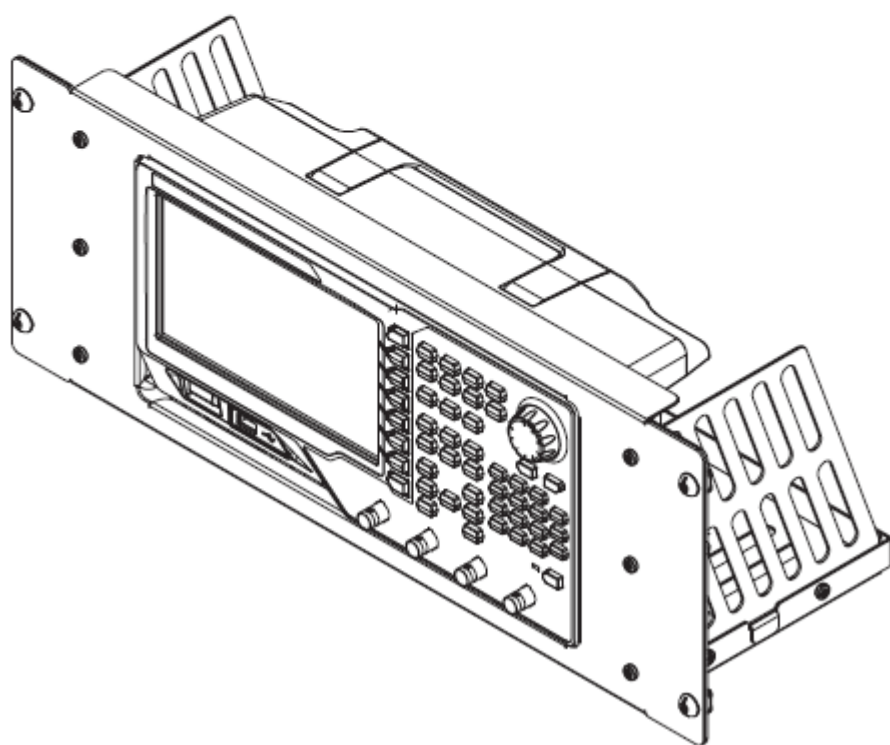
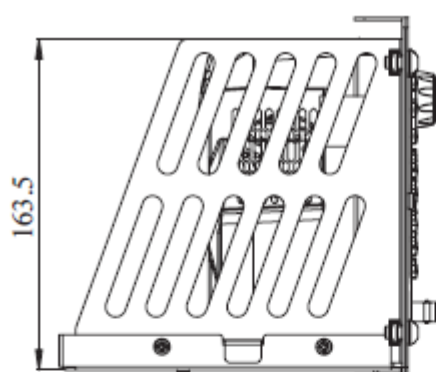
## **Installation Space**

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 4U (177.8 mm) space should be provided by the machine cabinet.
- The depth inside the machine cabinet should not be less than 180 mm.

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

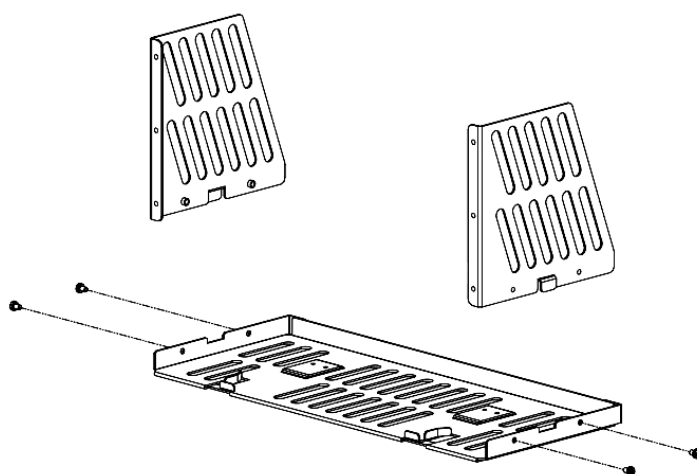




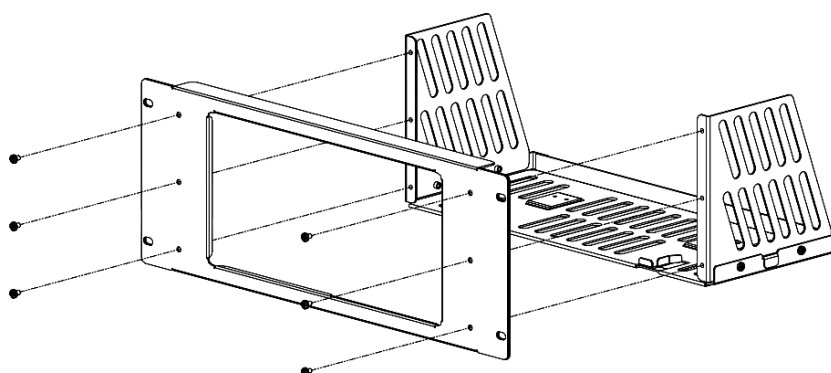
## Installation Procedure

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.

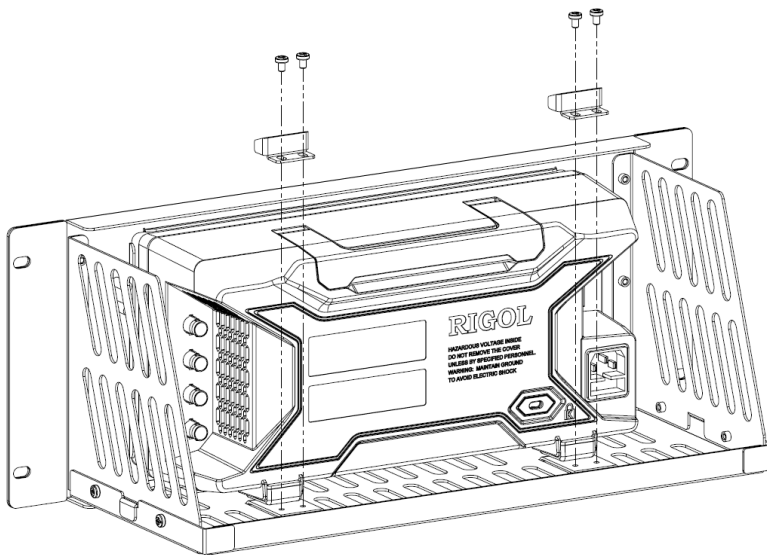
1. Install the right and left plates: align the detents of the right and left plates with the openings on the support board and insert them into the support board respectively, then fix them with four M4 screws.



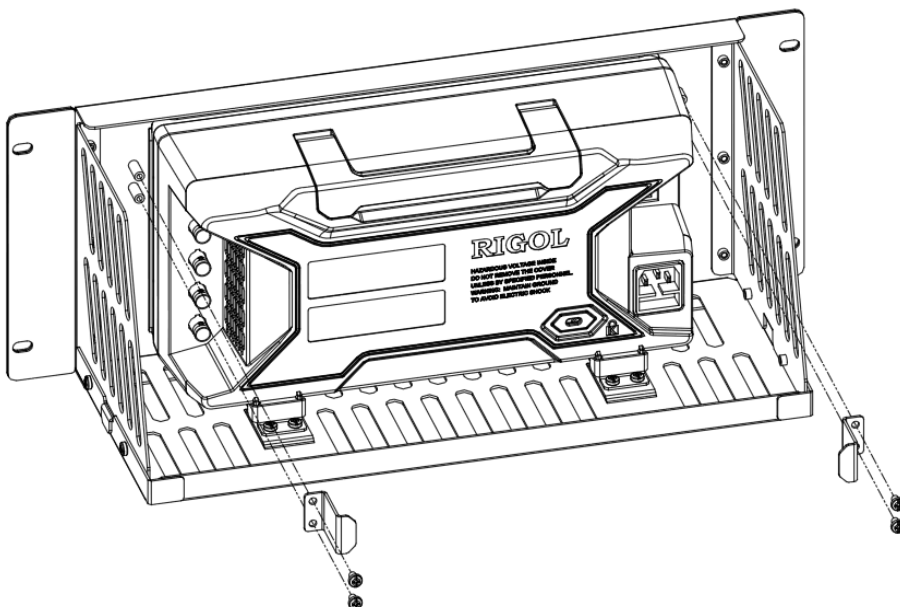
2. Install the front panel of the rack mount kit: fix the front panel onto the frame installed in the previous step using six M4 screws.



- 3.** Fix the bottom of the instrument: fix the instrument onto the support board using two pressure feet and four M4 screws.

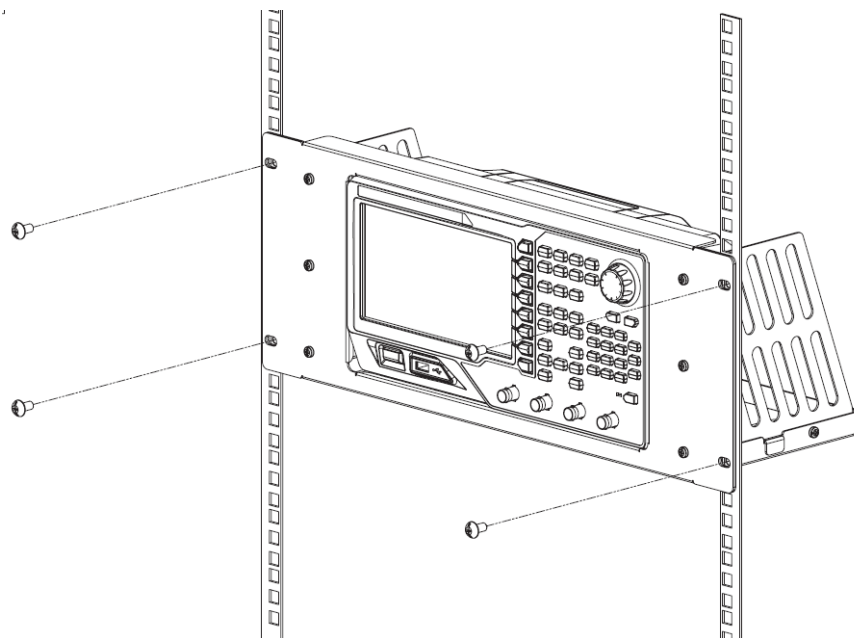


- 4.** Fix the top of the instrument: fix the top of the instrument using two built-in fittings and four M4 screws.

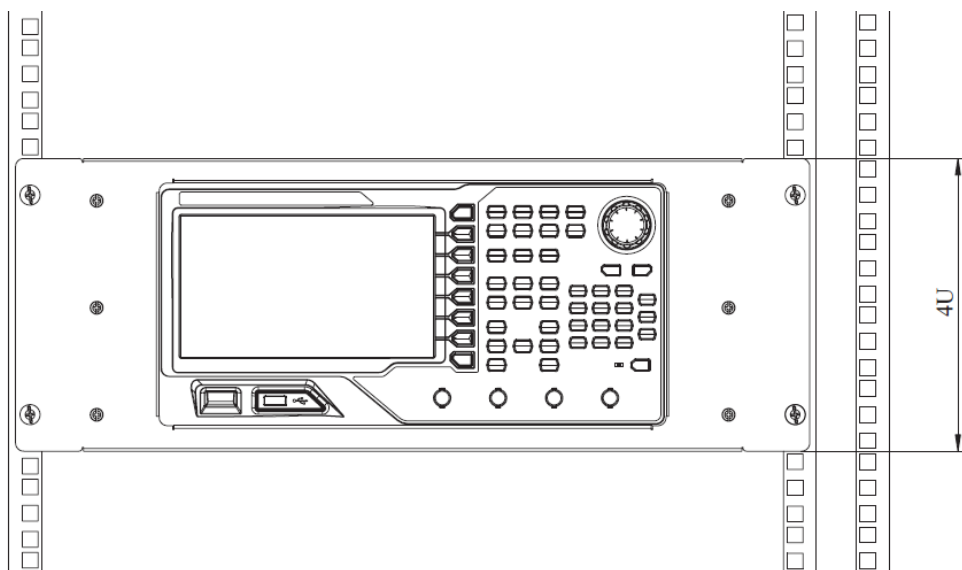




5. Load into the machine cabinet: mount the rack with the instrument fixed to it into a standard 19-inch machine cabinet with four M6 screws and four M6 square nuts.



6. Post-installation notice: the rack occupies a height of 4U. The holes pointed out by the arrows are installation holes. Note that they should be aligned with during installation.



# Troubleshooting

This chapter lists the commonly encountered failures of DG4000 and their solutions. When you encounter those problems, please solve them following the corresponding steps. If the problem persists, please contact **RIGOL** and provide your device information (**Utility** → **System** → **Sys Info**).

## 1. The screen is still dark (no display) after power on:

- (1) Check if the power is correctly connected.
- (2) Check if the power switch is really on.
- (3) Restart the instrument after finishing the above inspections.
- (4) If it does not work correctly, contact **RIGOL** for our service.

## 2. The settings are correct but no waveform is generated:

- (1) Check if the BNC cable is correctly connected to the channel output terminal (**[Output1]** or **[Output2]**).
- (2) Check if the BNC cable can work correctly.
- (3) Check the **Output1** or **Output2** button, if it is turned on.
- (4) Set **PowerOn** as "Last" and then restart the instrument after finishing the above inspections.
- (5) If it does not work correctly, contact **RIGOL** for our service.

## 3. The USB storage device cannot be recognized:

- (1) Check if the USB storage device can work normally.
- (2) Make sure the USB storage device is USB flash storage device. The generator doesn't support hard drive-based USB storage device.
- (3) Restart the instrument, reinsert the USB storage device and check it.
- (4) If the USB storage device still can not be recognized, please contact **RIGOL**.