

RIGOL

Quick Guide

DG4000 Series
Function/Arbitrary Waveform Generator

Feb. 2014
RIGOL Technologies, Inc.

Guaranty and Declaration

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Publication Number

QGB04106-1110

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Product Certification

RIGOL guarantees this product conforms to the national and industrial standards in China as well as the ISO9001:2008 standard and the ISO14001:2004 standard. Other international standard conformance certification is in progress.

Contact Us

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

E-mail: service@rigol.com

Websites: 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 only specified by this manual.

Use Proper Power Cord.

Only the power cord designed for the instrument and authorized for use within the 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.

Connect the Probe Correctly.

If a probe is used, do not connect the ground lead to high voltage since it has the isobaric electric potential as ground.

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.

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels removed.

Do Not Insert Anything into the Holes of Fan.

Do not insert anything into the holes of the fan to avoid damaging the instrument.

Use Proper Fuse.

Please use the specified fuse.

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.

Proper Use of Battery.

If a battery is supplied, it must not be exposed to high temperature or in contact with fire. Keep it out of the reach of children. Improper change of battery (note: lithium battery) may cause explosion. Use **RIGOL** specified battery only.

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 Used in this Manual. These terms may appear in this manual:



WARNING

Warning statements indicate the conditions or practices that could result in injury or loss of life.



CAUTION

Caution statements indicate the conditions or practices that could result in damage to this product or other property.

Terms Used 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 potential damage to the instrument or other property might occur.

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



**Hazardous
Voltage**



**Safety
Warning**



**Protective
Earth
Terminal**



**Chassis
Ground**



**Test
Ground**

Allgemeine Sicherheits Informationen

Überprüfen Sie die folgenden Sicherheitshinweise sorgfältig um Personenschäden oder Schäden am Gerät und an damit verbundenen weiteren Geräten zu vermeiden. Zur Vermeidung von Gefahren, nutzen Sie bitte das Gerät nur so, wie in diesem Handbuch angegeben.

Um Feuer oder Verletzungen zu vermeiden, verwenden Sie ein ordnungsgemäßes Netzkabel.

Verwenden Sie für dieses Gerät nur das für ihr Land zugelassene und genehmigte Netzkabel.

Erden des Gerätes.

Das Gerät ist durch den Schutzleiter im Netzkabel geerdet. Um Gefahren durch elektrischen Schlag zu vermeiden, ist es unerlässlich, die Erdung durchzuführen. Erst dann dürfen weitere Ein- oder Ausgänge verbunden werden.

Anschluss eines Tastkopfes.

Die Erdungsklemmen der Sonden sind auf dem gleichen Spannungspegel des Instruments geerdet. Schließen Sie die Erdungsklemmen an keine hohe Spannung an.

Beachten Sie alle Anschlüsse.

Zur Vermeidung von Feuer oder Stromschlag, beachten Sie alle Bemerkungen und Markierungen auf dem Instrument. Befolgen Sie die Bedienungsanleitung für weitere Informationen, bevor Sie weitere Anschlüsse an das Instrument legen.

Verwenden Sie einen geeigneten Überspannungsschutz.

Stellen Sie sicher, daß keinerlei Überspannung (wie z.B. durch Gewitter verursacht) das Gerät erreichen kann. Andernfalls besteht für den Anwender die Gefahr eines Stromschlages.

Nicht ohne Abdeckung einschalten.

Betreiben Sie das Gerät nicht mit entfernten Gehäuse-Abdeckungen.

Betreiben Sie das Gerät nicht geöffnet.

Der Betrieb mit offenen oder entfernten Gehäuseteilen ist nicht zulässig. Nichts in entsprechende Öffnungen stecken (Lüfter z.B.)

Passende Sicherung verwenden.

Setzen Sie nur die spezifikationsgemäßen Sicherungen ein.

Vermeiden Sie ungeschützte Verbindungen.

Berühren Sie keine unisolierten Verbindungen oder Baugruppen, während das Gerät in Betrieb ist.

Betreiben Sie das Gerät nicht im Fehlerfall.

Wenn Sie am Gerät einen Defekt vermuten, sorgen Sie dafür, bevor Sie das Gerät wieder betreiben, dass eine Untersuchung durch qualifiziertes Kundendienstpersonal durchgeführt wird. Jedwede Wartung, Einstellarbeiten oder Austausch von Teilen am Gerät, sowie am Zubehör dürfen nur von **RIGOL** autorisiertem Personal durchgeführt werden.

Belüftung sicherstellen.

Unzureichende Belüftung kann zu Temperaturanstiegen und somit zu thermischen Schäden am Gerät führen. Stellen Sie deswegen die Belüftung sicher und kontrollieren regelmäßig Lüfter und Belüftungsöffnungen.

Nicht in feuchter Umgebung betreiben.

Zur Vermeidung von Kurzschluß im Geräteinneren und Stromschlag betreiben Sie das Gerät bitte niemals in feuchter Umgebung.

Nicht in explosiver Atmosphäre betreiben.

Zur Vermeidung von Personen- und Sachschäden ist es unumgänglich, das Gerät ausschließlich fernab jedweder explosiven Atmosphäre zu betreiben.

Geräteoberflächen sauber und trocken halten.

Um den Einfluß von Staub und Feuchtigkeit aus der Luft auszuschließen, halten Sie bitte die Geräteoberflächen sauber und trocken.

Schutz gegen elektrostatische Entladung (ESD).

Sorgen Sie für eine elektrostatisch geschützte Umgebung, um somit Schäden und Funktionsstörungen durch ESD zu vermeiden. Erden Sie vor dem Anschluß immer Innen- und Außenleiter der Verbindungsleitung, um statische Aufladung zu entladen.

Die richtige Verwendung des Akku.

Wenn eine Batterie verwendet wird, vermeiden Sie hohe Temperaturen bzw. Feuer ausgesetzt werden. Bewahren Sie es außerhalb der Reichweite von Kindern auf. Unsachgemäße Änderung der Batterie (Anmerkung: Lithium-Batterie) kann zu einer Explosion führen. Verwenden Sie nur von RIGOL angegebene Akkus.

Sicherer Transport.

Transportieren Sie das Gerät sorgfältig (Verpackung!), um Schäden an Bedienelementen, Anschlüssen und anderen Teilen zu vermeiden.

Sicherheits Begriffe und Symbole

Begriffe in diesem Guide. Diese Begriffe können in diesem Handbuch auftauchen:



WARNING

Die Kennzeichnung WARNING beschreibt Gefahrenquellen die leibliche Schäden oder den Tod von Personen zur Folge haben können.



CAUTION

Die Kennzeichnung Caution (Vorsicht) beschreibt Gefahrenquellen die Schäden am Gerät hervorrufen können.

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

DANGER weist auf eine Verletzung oder Gefährdung hin, die sofort geschehen kann.

WARNING weist auf eine Verletzung oder Gefährdung hin, die möglicherweise nicht sofort geschehen.

CAUTION bedeutet, dass eine mögliche Beschädigung des Instruments oder anderer Gegenstände auftreten kann.

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



GefährlicheS
pannung



Sicherheits-
Hinweis



Schutz-erde



Gehäusemasse



Erde

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 WEEE Directives 2002/96/EC.



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.

Contents

Guaranty and Declaration	I
Safety Requirement	II
General Safety Summary	II
Safety Terms and Symbols	V
Allgemeine Sicherheits Informationen	VI
Sicherheits Begriffe und Symbole	VIII
General Care and Cleaning	IX
Environmental Considerations	X
Quick Start	1
General Inspection	2
To Adjust the Supporting Legs	3
Appearance and Dimensions	4
Front Panel	6
Rear Panel	13
To Connect to Power	16
To Replace the Fuse	17
User Interface	18
Parameter Setting Method	21
Numeric Keyboard	21
Direction keys and Knob	22
To Use the Built-In Help	23
To Use the Security Lock	24
To Use the Rack Mount Kit	25
Kit Parts List	25
Installation Tool	26
Installation Space	27
Installation Procedure	30
Troubleshooting	34

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
- Dimensions
- Front Panel
- Rear Panel
- To Connect to Power
- To Replace the Fuse
- 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.

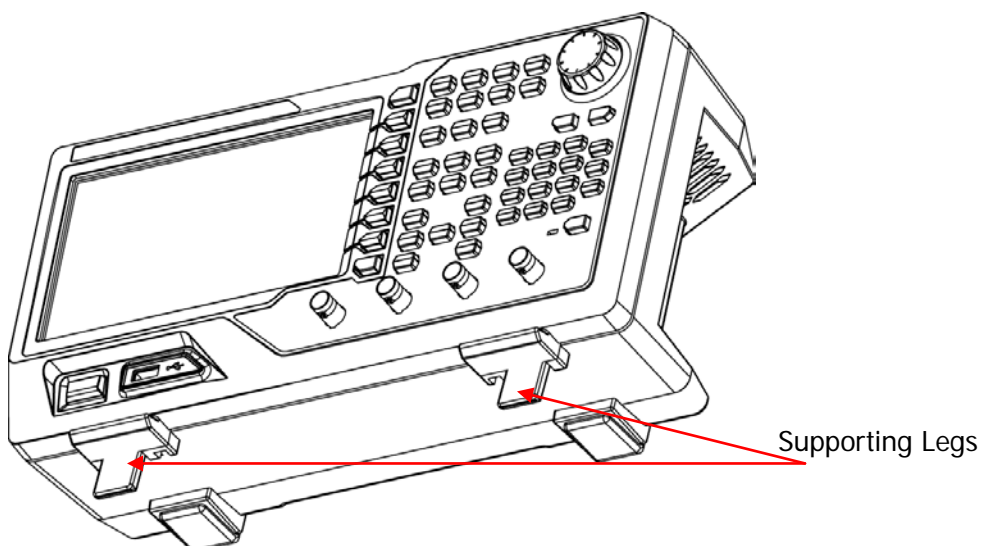


Figure 1 Unfold the Supporting Legs

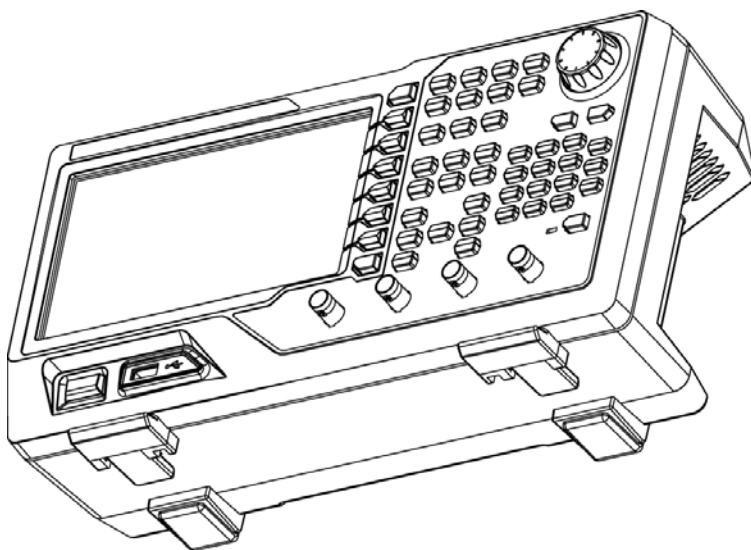


Figure 2 Fold the Supporting Legs

Appearance and Dimensions

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

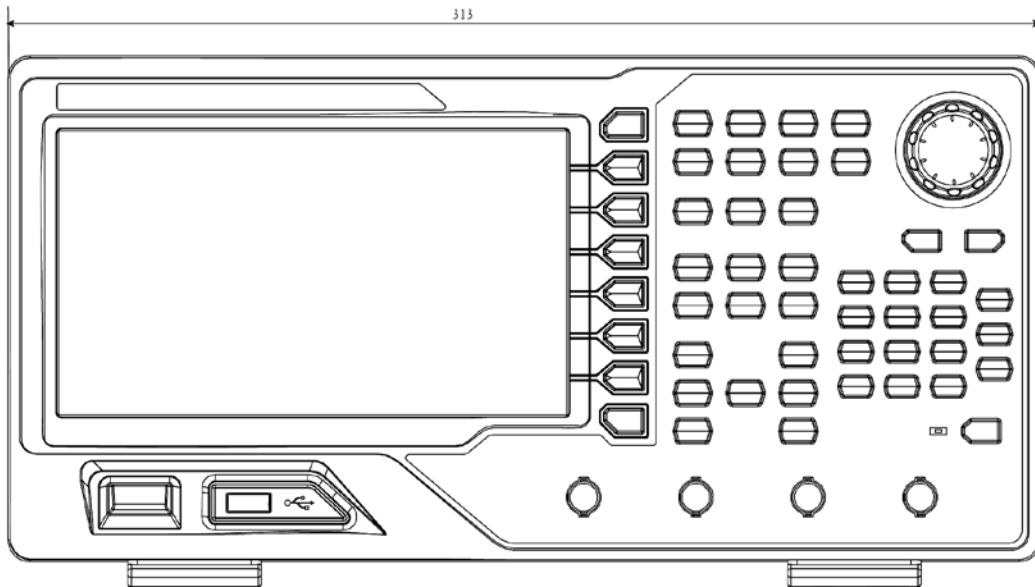


Figure 3 Front View

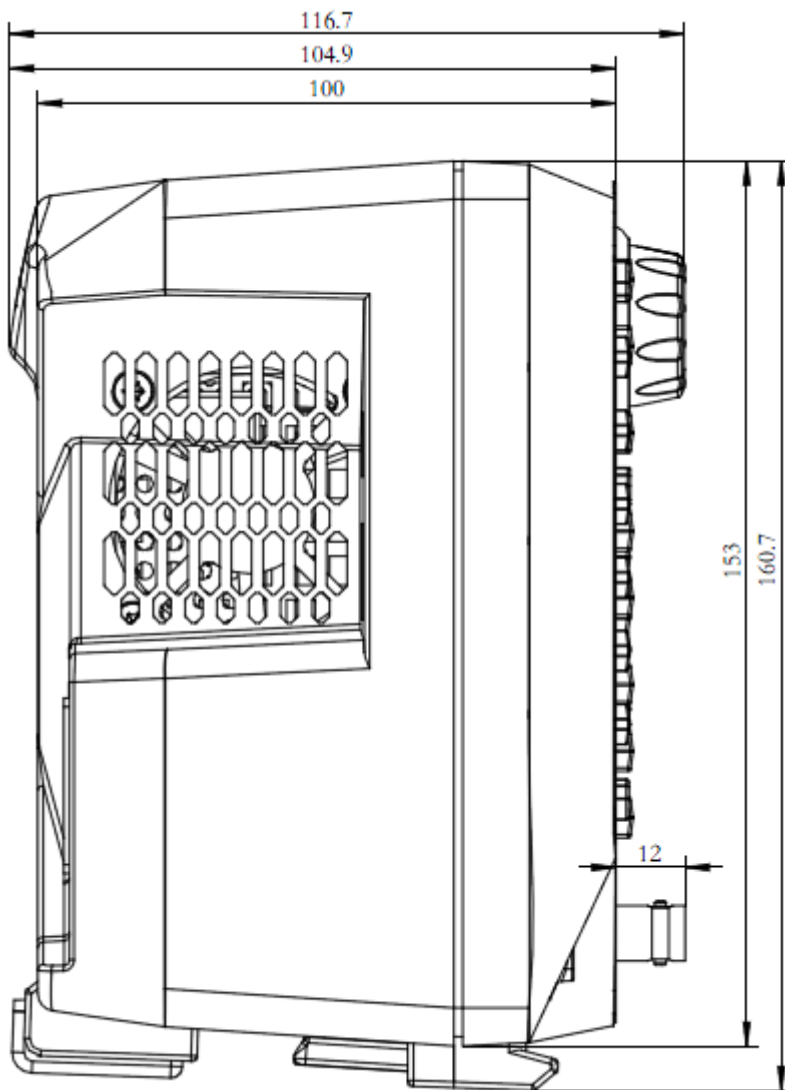


Figure 4 Side View

Front Panel

The front panel of DG4000 is shown below.

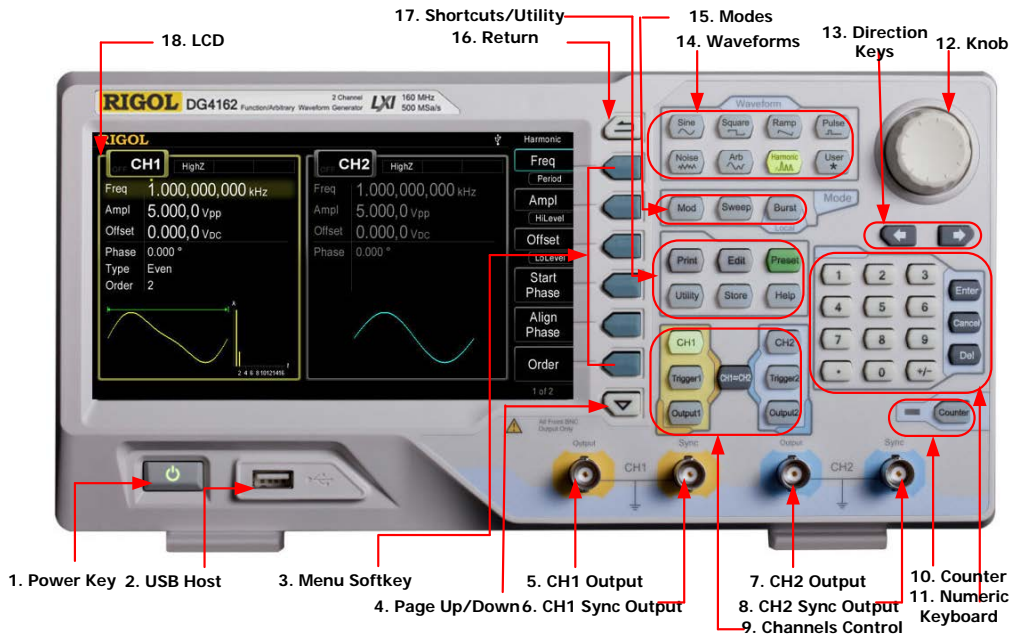


Figure 5 DG4000 Front Panel

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≐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 additional, 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 μ 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 μ 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 μ 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 μ 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 1 μ Hz 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 1 μ Hz to 80MHz.

- Output up to 16th 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 ± 11.25 V (± 0.1 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 ± 4.5 V (± 0.1 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 50Ω 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.

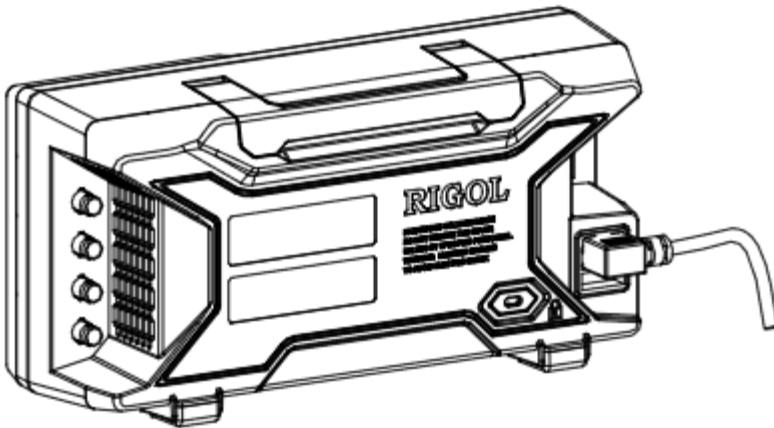


Figure 7 To Connect to Power



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.

To Replace the Fuse

To replace the fuse, please use the specified fuse and follow the steps below.

1. Turn off the instrument, cut off the power supply and remove the power cord.
2. Use a small straight screwdriver to prize out the fuse seat.
3. Take out the fuse seat.
4. Replace the specified fuse.
5. Install the fuse seat again.

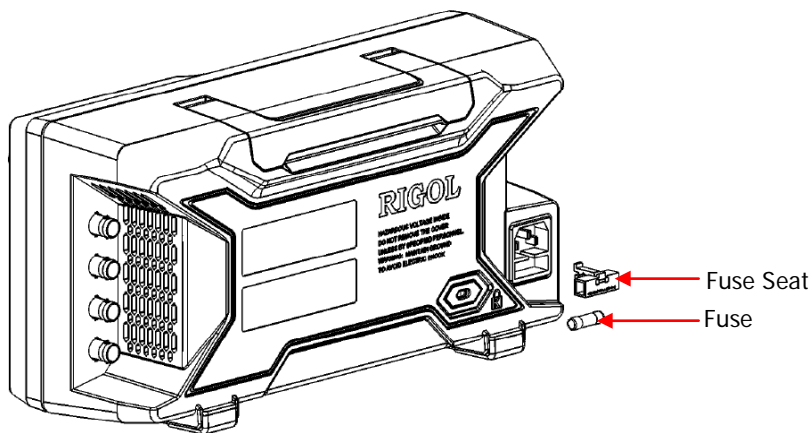


Figure 8 To Replace the Fuse



WARNING

To avoid electric shock, please make sure that the instrument has been turned off and the power supply has been cut off before replacing the fuse. Besides, please make sure that the fuse to be installed meets the requirement.

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.

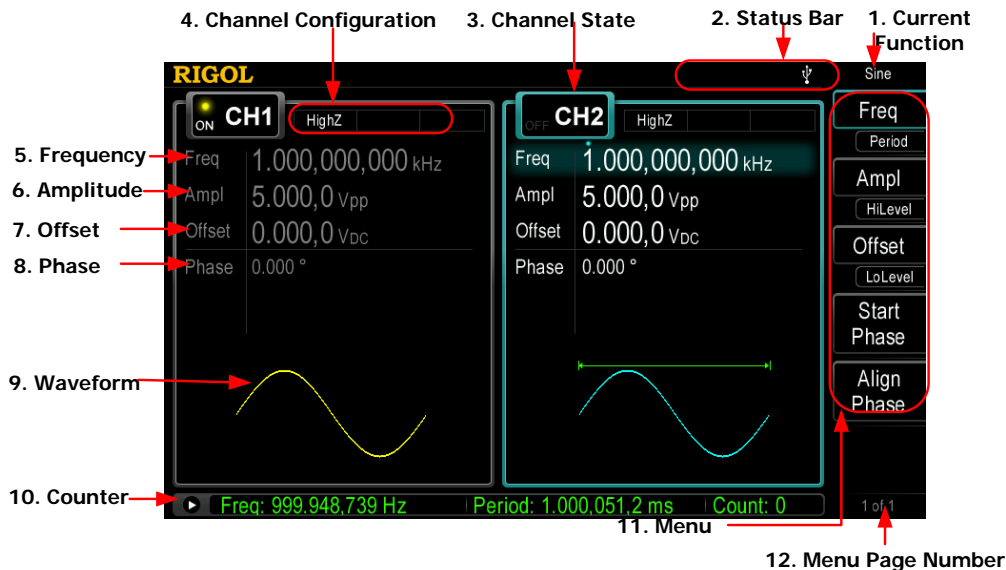





Figure 9 User Interface

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.

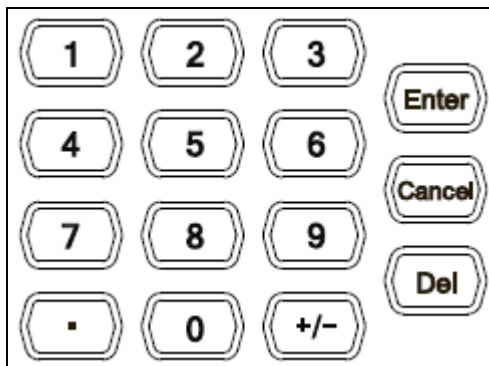
12. Menu Page Number

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** → **Built In**, **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.

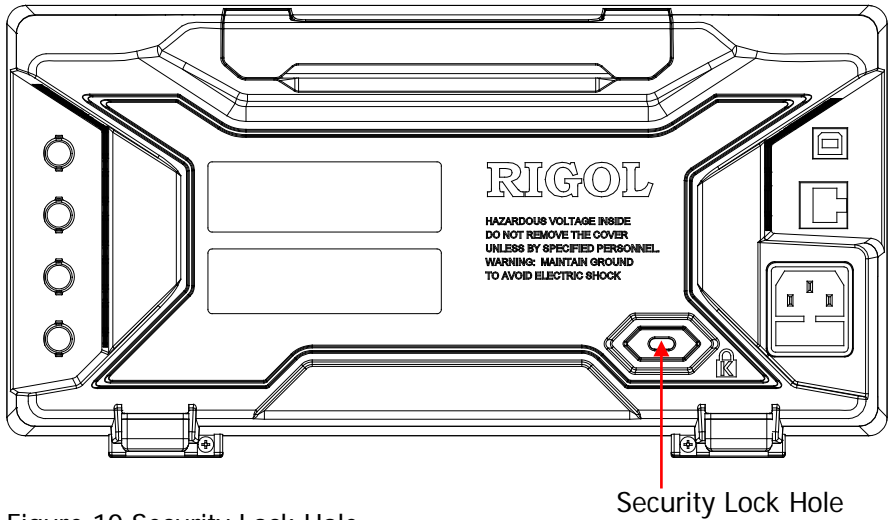


Figure 10 Security Lock Hole

Security Lock Hole

To Use the Rack Mount Kit

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

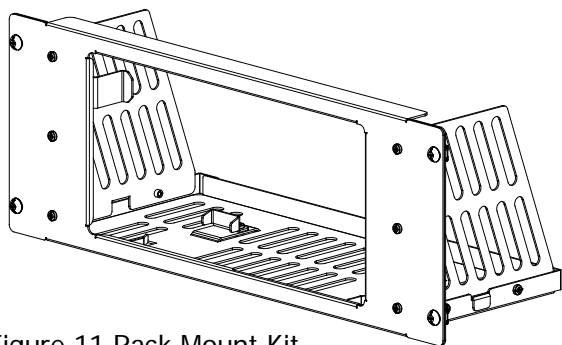


Figure 11 Rack Mount Kit

Kit Parts List

The part list of the rack mount kit (as shown in Figure 11) of DG4000 is as shown in the table below. Wherein, the "No." column corresponds to Figure 12 and Figure 13.

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

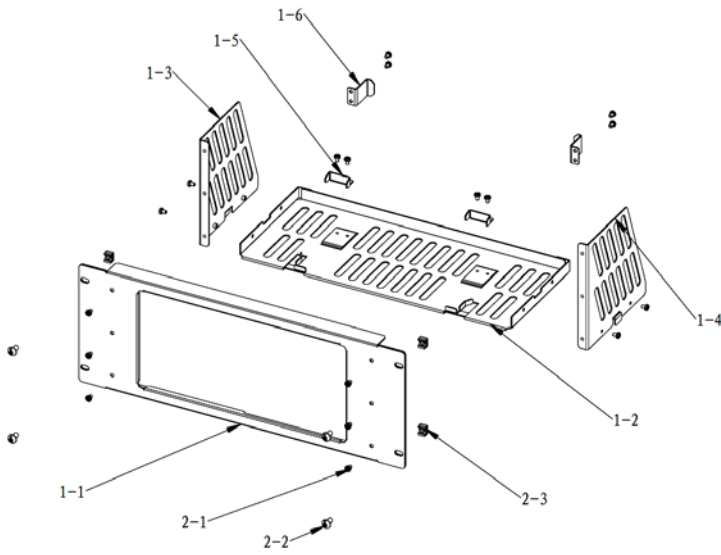


Figure 12 Parts of Rack Mount Kit

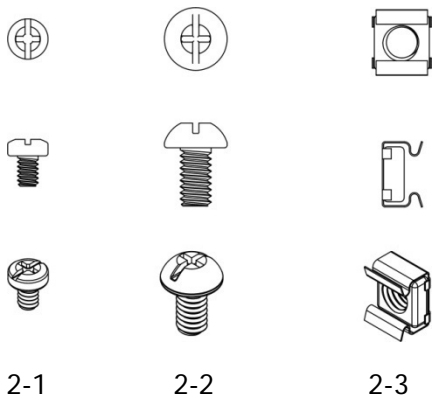


Figure 13 Screws and Nuts

Installation Tool

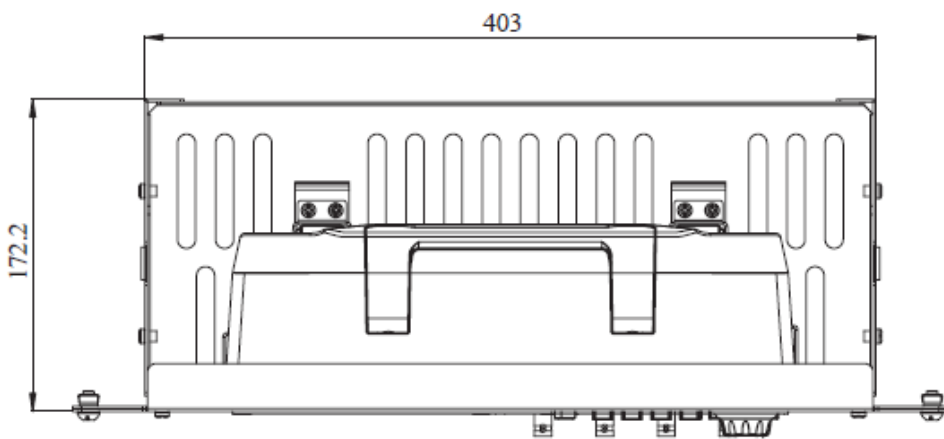
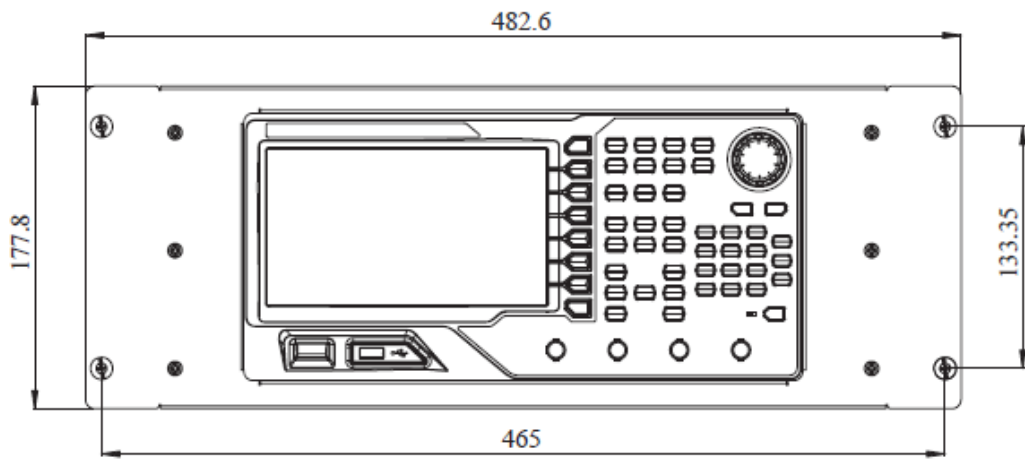
PH2 Phillips Screwdriver (recommended).

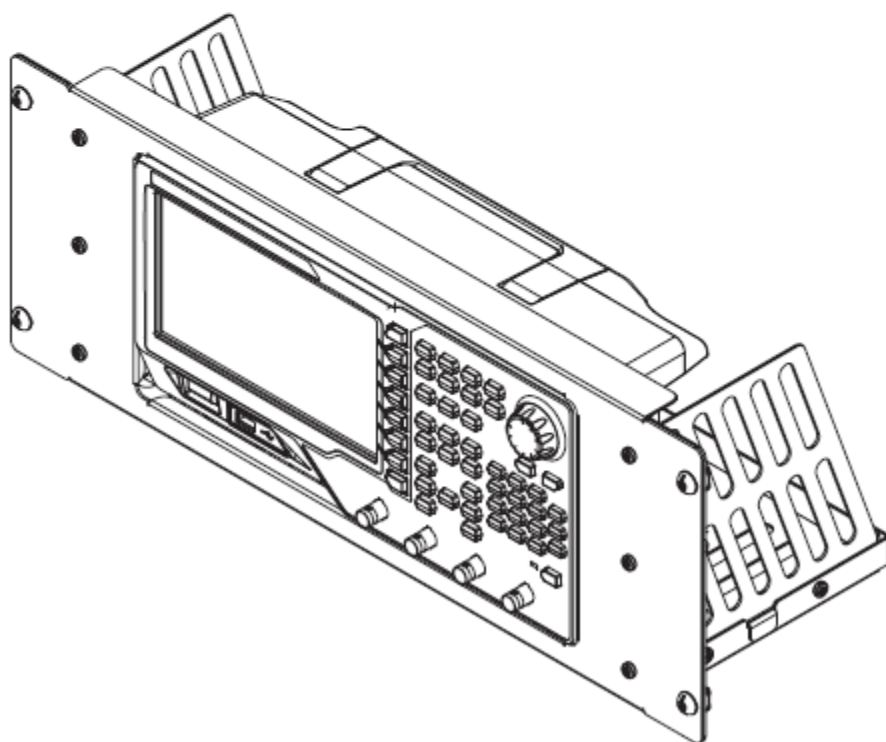
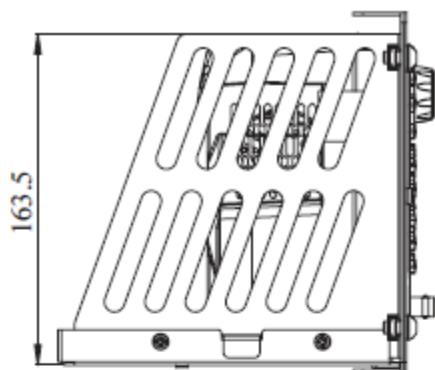
Installation Space

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.

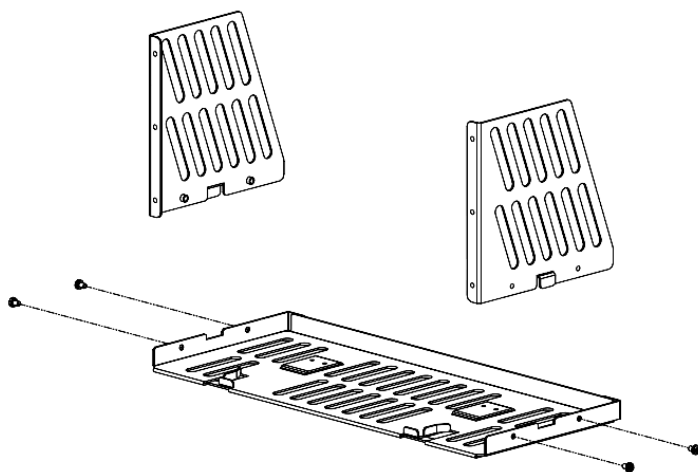




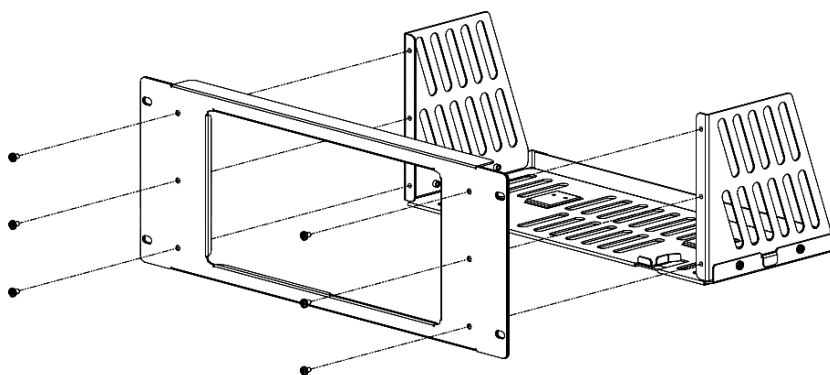
Installation Procedure

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.

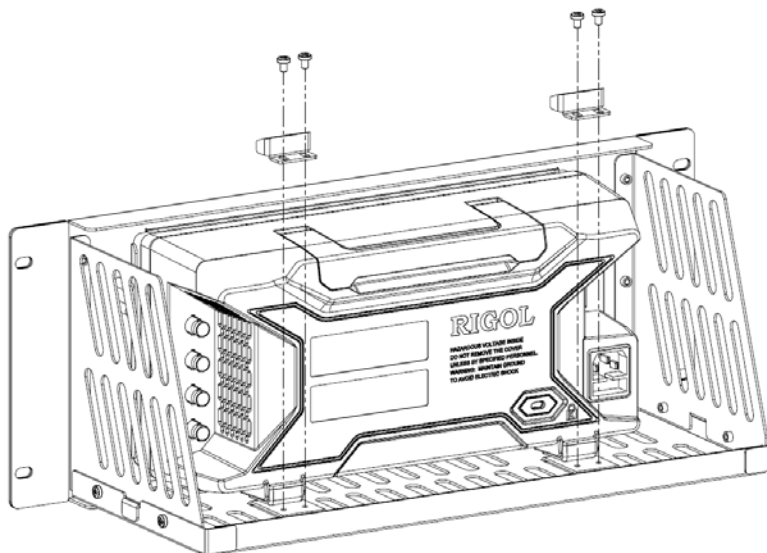
1. Install the right and left plates: align the detents of the right and left plates with the openings on the support board and insert them into the support board respectively, then fix them with four M4 screws.



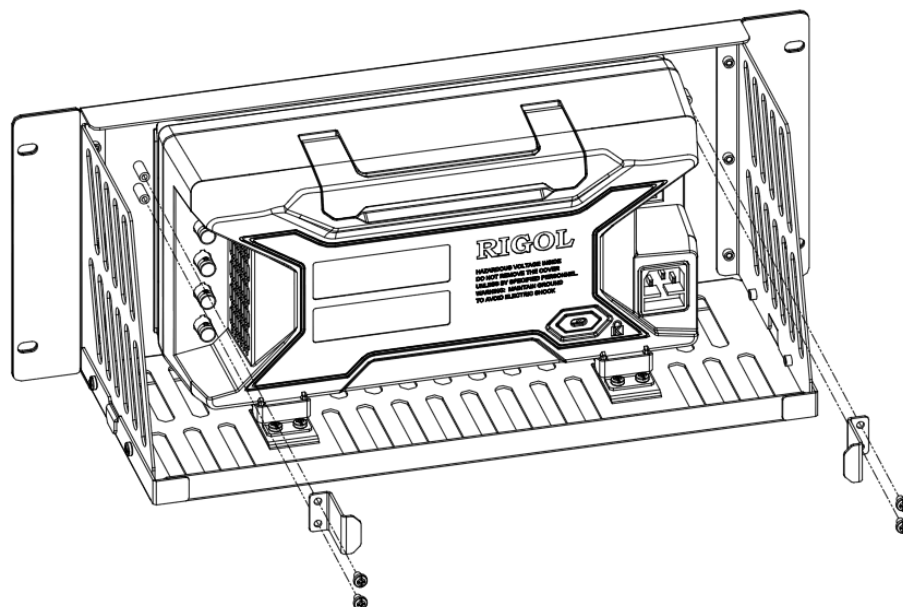
2. Install the front panel of the rack mount kit: fix the front panel onto the frame installed in the previous step using six M4 screws.



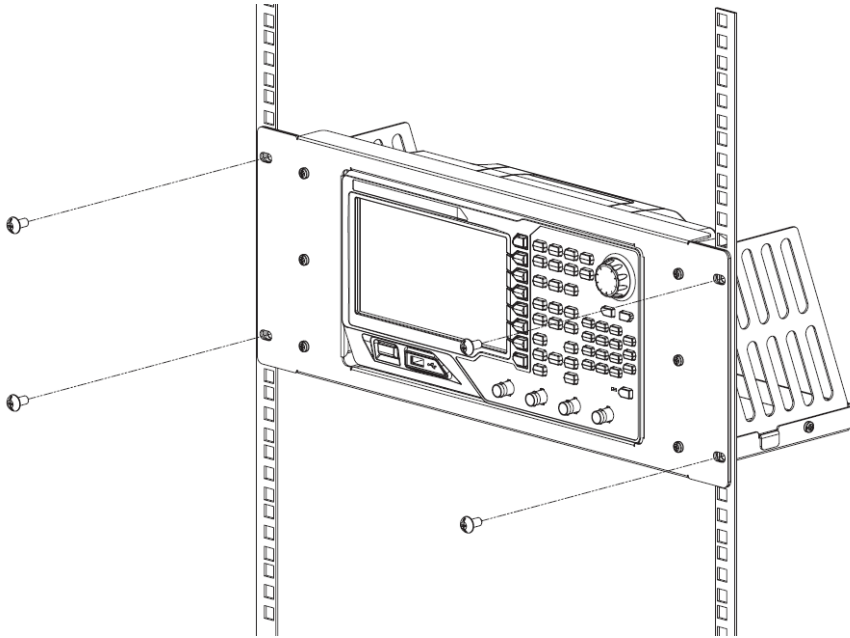
3. Fix the bottom of the instrument: fix the instrument onto the support board using two pressure feet and four M4 screws.



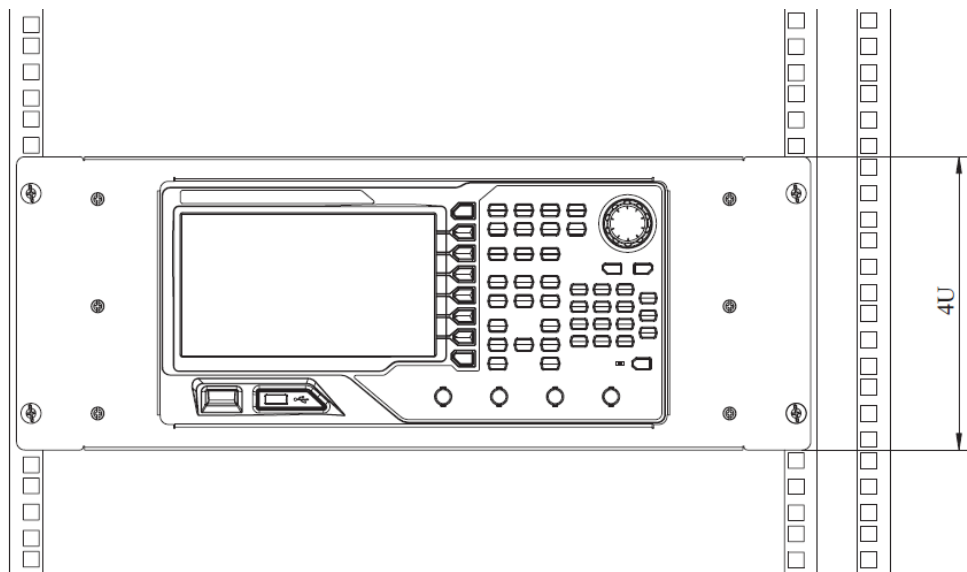
4. Fix the top of the instrument: fix the top of the instrument using two built-in fittings and four M4 screws.



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**.