

RIGOL

Quick Guide

DS6000 Series Digital Oscilloscope

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RIGOL Technologies, Inc.

Content

Content	I
Guaranty and Declaration	II
Safety Requirement	III
General Safety Summary	III
Safety Terms and Symbols	V
Measurement Category	VI
Ventilation Requirement	VII
Working Environment	VII
General Care and Cleaning	IX
Environmental Considerations.....	IX
Quick Start	1
General Inspection	1
Appearance and Dimensions.....	2
To Prepare for Operation	3
Front Panel Overview.....	8
Rear Panel Overview.....	9
Front Panel Function Overview.....	11
User Interface.....	17
To Use the Security Lock	21
To Use the Desk Mount Instrument Arm	21
To Use the Rack Mount Kit	22
To Use the Built-in Help System	27
Troubleshooting	28

Guaranty and Declaration

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Product Certification

RIGOL guarantees this product conforms to the national and industrial standards in China. International standard conformance certification is in progress.

Contact Us

If you have any problem or requirement when using our products, please contact **RIGOL** Technologies, Inc. or your local distributors, or visit: www.rigol.com.

Safety Requirement

General Safety Summary

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

Use Proper Power Cord.

Only use power cords designed for the instrument and authorized by local country.

Ground The Instrument.

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

Connect The Probe Properly.

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

Observe All Terminal Ratings.

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

Use Proper Overvoltage Protection.

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

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels removed.

Change The Power Fuse.

If the power fuse needs to be changed, please return the instrument back to our

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

Avoid Circuit or Wire Exposure.

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

Do Not Operate With Suspected Failures.

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

Keep Proper Ventilation.

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

Do Not Operate In Wet Conditions.

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

Do Not Operate in Flammable and Explosive Environment.

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

Keep Product Surfaces Clean and Dry.

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

Protect The Instrument from Static Electricity.

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

Use The Battery Properly.

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

Handling Safety

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

Safety Terms and Symbols

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



WARNING

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



CAUTION

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

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

DANGER indicates a hazard may immediately happen.

WARNING indicates potential hazard may happen.

CAUTION indicates damage to the instrument or other devices connected to the instrument may happen.

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



**High
Voltage**



**Refer to
Manual**



**Protective
Earth
Terminal**



**Chassis
Ground
Terminal**



**Test
Ground
Terminal**

Measurement Category

Measurement Category

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



WARNING

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

Measurement Category Definitions

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

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

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

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

Ventilation Requirement

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



WARNING

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

Working Environment

Temperature

Operating: 0°C to +50°C

Non-operating: -20°C to +70°C

Humidity

Under +35°C: ≤90% relative humidity

+35°C to +40°C: ≤60% relative humidity



WARNING

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

Altitude

Operating: less than 3 km

Non-operating: less than 15 km

Installation (overvoltage) Category

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



WARNING

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

Installation (overvoltage) Category Definitions

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

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

Pollution Degree

Degree 2

Pollution Degree Definitions

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

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

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

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

Safety Class

Class 1 – Grounded Product

General Care and Cleaning

General Care

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

Cleaning

Clean the instrument regularly according to its use condition. To clean the oscilloscope:

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



CAUTION

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



WARNING

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

Environmental Considerations

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



Instrument Recycle

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

Quick Start

General Inspection

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

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

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

2. **Inspect the instrument.**

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

3. **Check the Accessories**

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

Appearance and Dimensions

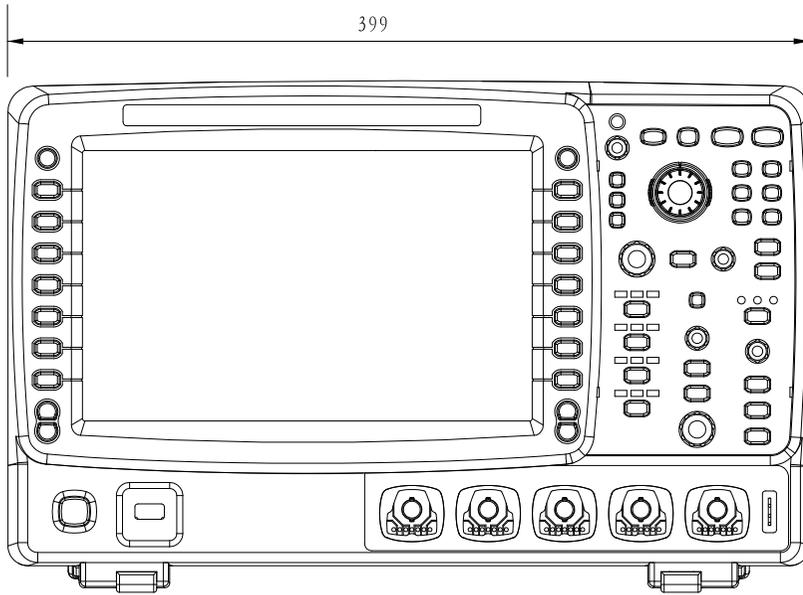


Figure 1 Front View

Unit: mm

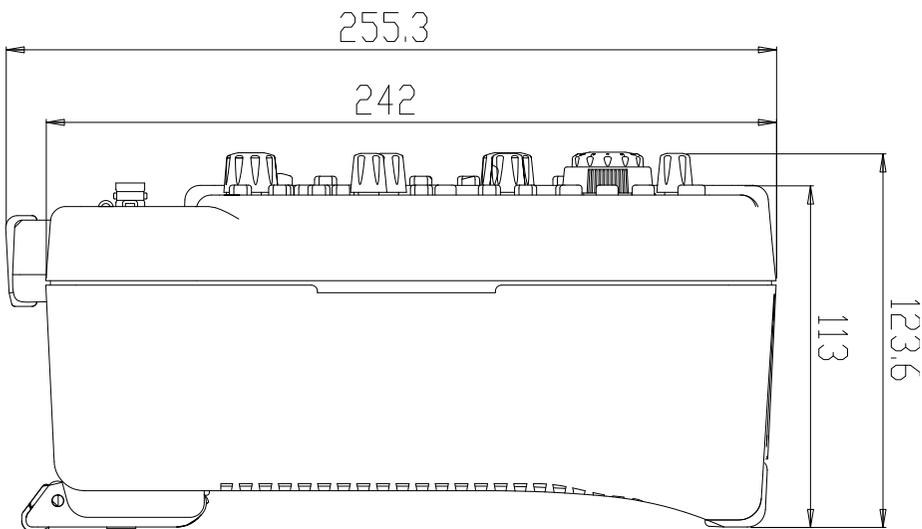


Figure 2 Side View

Unit: mm

To Prepare for Operation

To Remove the Cover

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

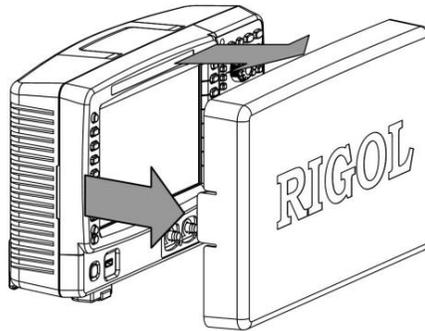


Figure 3 To Remove the Cover

To Adjust the Supporting Legs

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

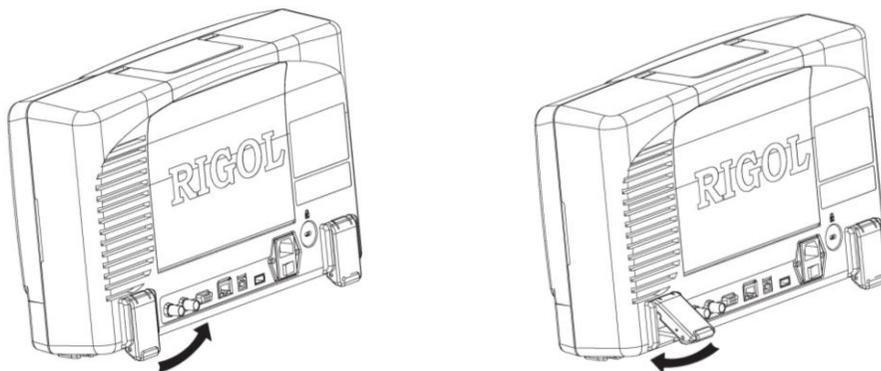


Figure 4 To Adjust the Supporting Legs

To Connect to AC Power Supply

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

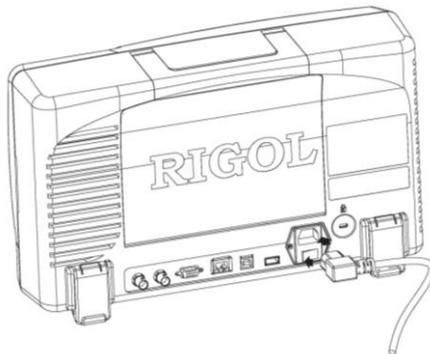


Figure 5 To Connect to AC Power Supply



CAUTION

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

To Use the Battery

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

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

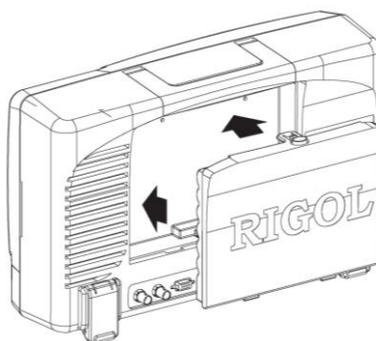


Figure 6 To Install the Battery

Power-on Inspection

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

To Connect the Probe

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

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

Connect the Probe:

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

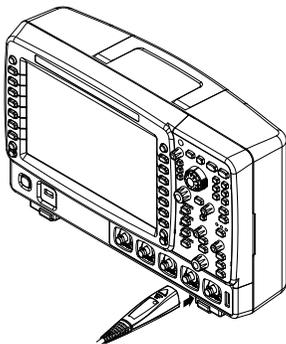


Figure 7 To Connect the Probe

Function Inspection

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

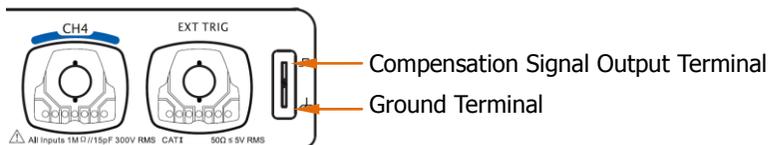


Figure 8 To Use the Compensation Signal

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

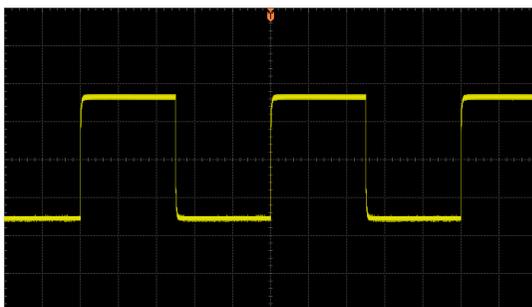


Figure 9 Square Waveform Signal

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

**WARNING**

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

Tip

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

Probe Compensation

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

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

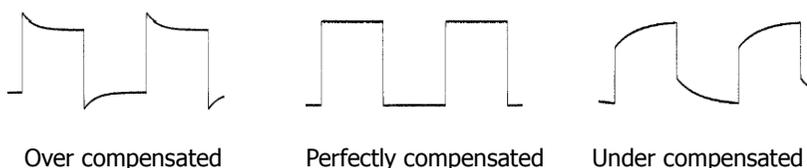


Figure 10 Probe Compensation

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

Front Panel Overview

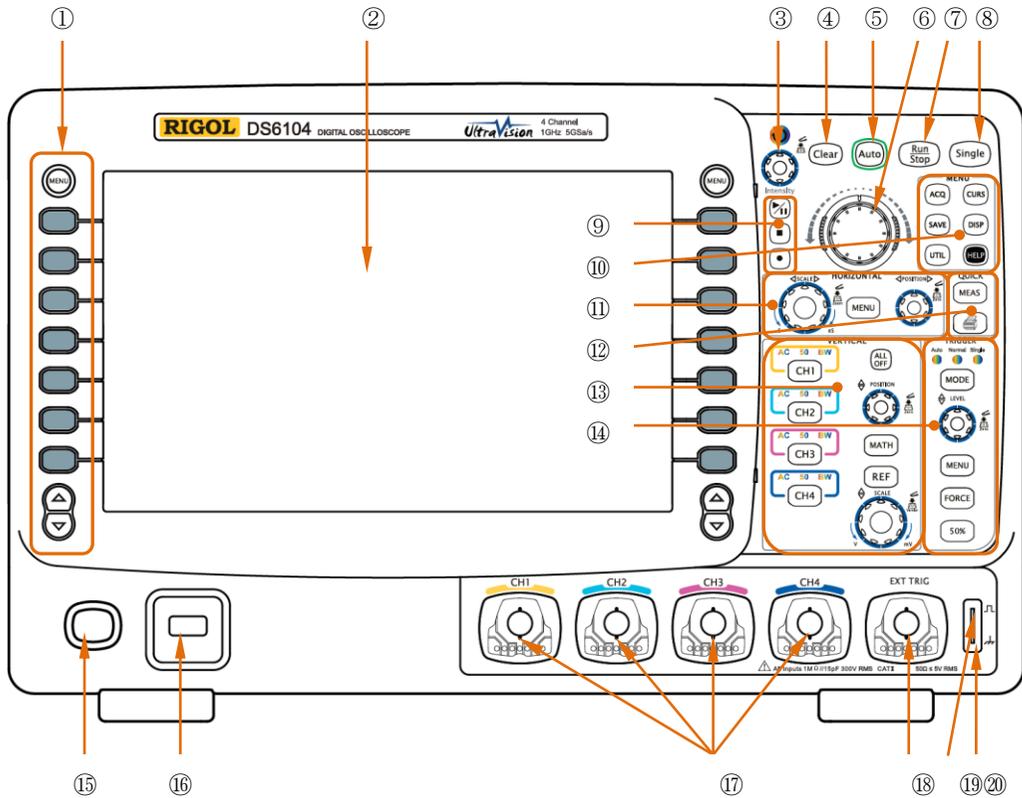


Figure 11 Front Panel Overview

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

Rear Panel Overview

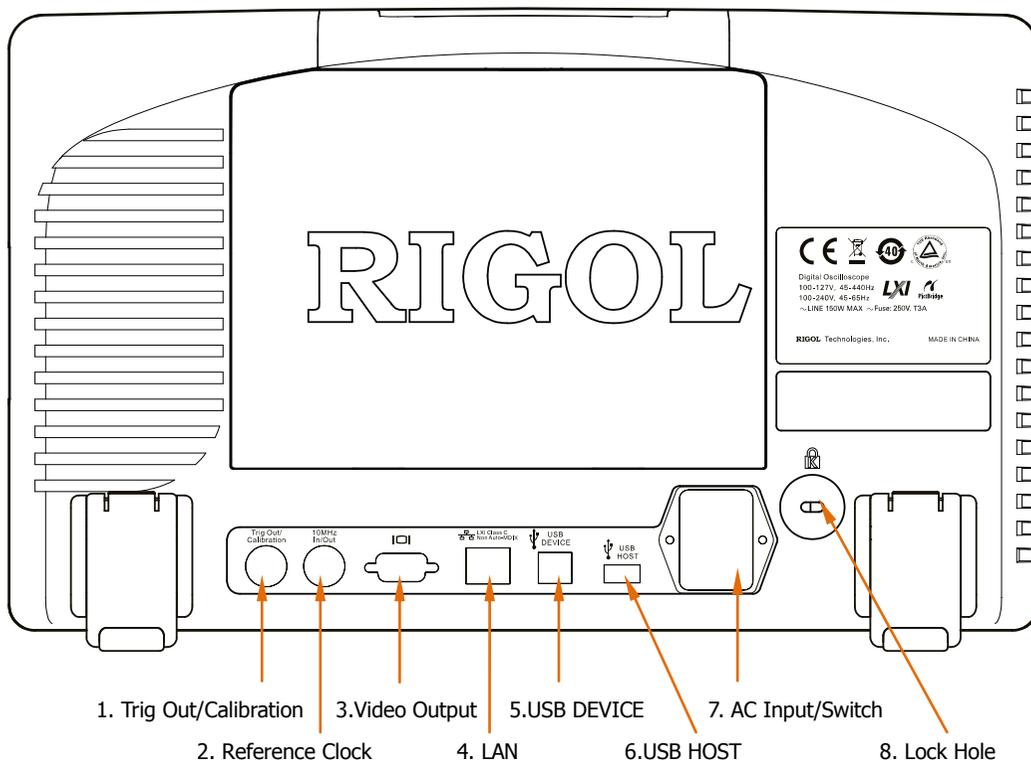


Figure 12 Rear Panel Overview

1. Trig Out/Calibration

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

- 1) **TrigOut:** After this type is selected, the oscilloscope outputs a signal that can reflect the current capture rate of the oscilloscope at each trigger.
- 2) **Quick Edge:** After this type is selected, the oscilloscope can output a quick edge signal which can be used in the self-calibration of the oscilloscope.
- 3) **GND:** After this type is selected, the oscilloscope can output a ground level.
- 4) **PassFail:** After this type is selected, the oscilloscope will output a pulse signal when failed waveforms are detected. Connect this signal to other control systems to conveniently view the test results.

2. Reference Clock

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

3. Video Output

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

4. LAN

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

5. USB DEVICE

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

6. USB HOST

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

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

Note that the front panel also provides this interface.

7. AC Input/Switch

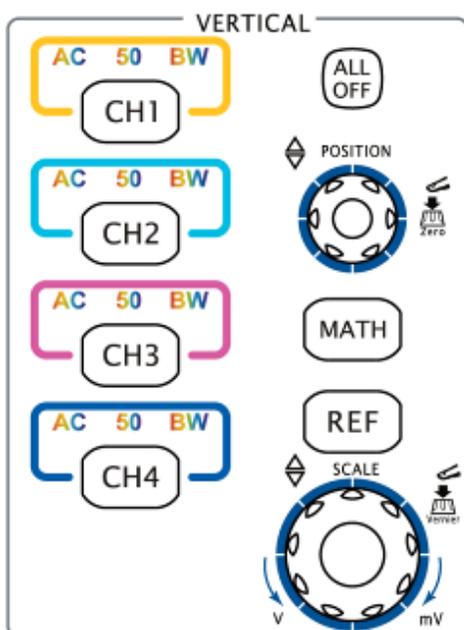
When using AC power supply, please insert the power cord plug into the socket vertically and use the switch under the socket to power the oscilloscope on or off.

8. Lock Hole

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

Front Panel Function Overview

VERTICAL



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

AC: illuminated when AC channel coupling mode is enabled.

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

BW: illuminated when the bandwidth limit is turned on.

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

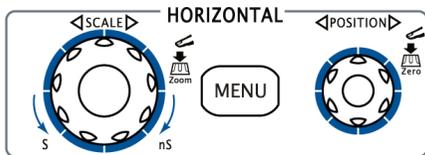
MATH: press this key to turn on the math operation and decoding function menus under which to perform (add, subtract, multiply, divide) operations, FFT operation, logic operation, advanced operation and (parallel, RS232, SPI, I2C) decoding.

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

VERTICAL  **POSITION**: modify the vertical position of the current channel waveform. Turn clockwise to increase the position and turn counterclockwise to decrease. During the modification, the waveform would move up and down and the position message (e.g. **POS: -138.0mV**) prompts at the lower-left corner of the screen would change accordingly. Press down this knob to restore the vertical position quickly.

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

HORIZONTAL



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

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

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

TRIGGER



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

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

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

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

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

Run/Stop



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

Single



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

Auto



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

Knob



Adjust waveform brightness:

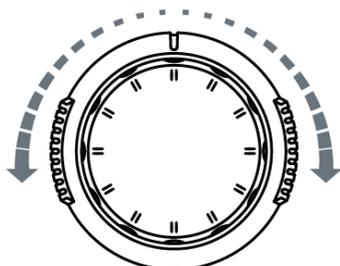
In non-menu-operation mode (menu is hidden), turn this knob to adjust the brightness of waveform display. The adjustable range of the brightness is from 0% to 100%. Turn clockwise to increase the brightness and counterclockwise to reduce. Press down this knob to reset the brightness to 50%.

You can also press **DISP** → **Brightness** and use the knob to adjust the waveform brightness.

Multifunctional Knob (the backlight goes on during operation):

In menu operation, press some menu softkey and turn the knob to select the submenus under this menu and then press down the knob to select the currently selected submenu. It can also be used to modify parameters and filename input.

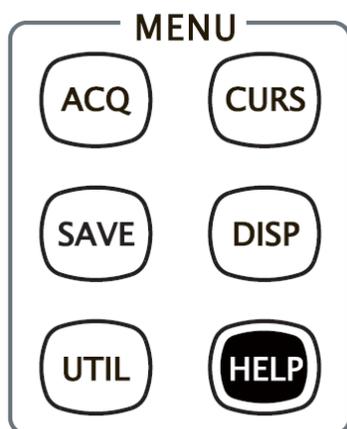
Navigation Knob



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

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

Menu



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

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

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

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

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

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

Record



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



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



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

MEAS



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

Clear



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

Print



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

User Interface

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

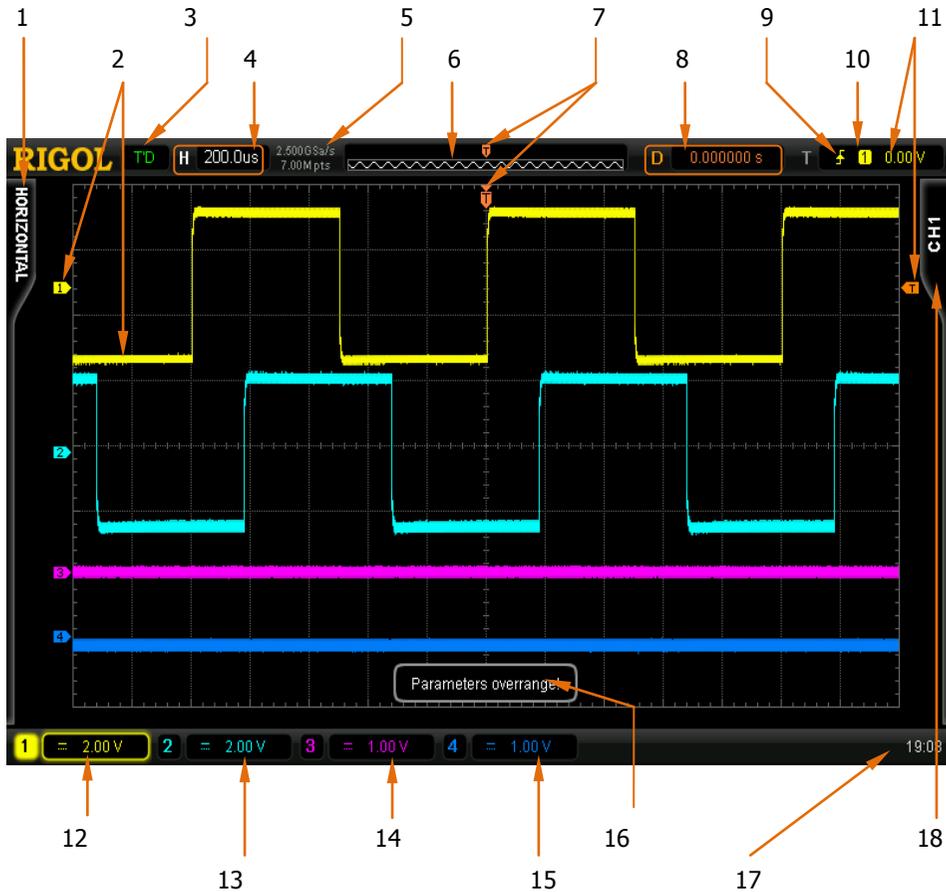


Figure 13 User Interface

1. Measurement Menu

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

2. Channel Label/Waveform

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

3. Status

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

4. Horizontal Time Base

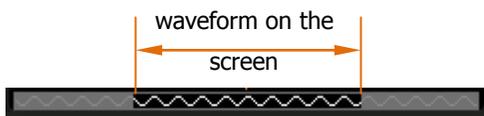
- Represent the time per grid on the horizontal axis on the screen.
- Use **HORIZONTAL**  **SCALE** to modify this parameter. The range available is from 500 ps to 50 s.

5. Sample Rate/Memory Depth

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

6. Waveform Memory

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



7. Trigger Position

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

8. Trigger Position

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

9. Trigger Type

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

10. Trigger Source

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

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

11. Trigger Level

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

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

12. CH1 Vertical Scale

- Display the voltage value per grid of CH1 waveform vertically.
- Use **VIRTUAL**  **SCALE** to modify this parameter.
- The following labels will be provided according to the current channel setting: channel coupling (e.g. ) , bandwidth limit (e.g. ) and input impedance (e.g. ). The situations of CH2, CH3 and CH4 are similar to this.

13. CH2 Vertical Scale

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

14. CH3 Vertical Scale

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

15. CH4 Vertical Scale

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

16. Message Box

Display prompt messages.

17. Notification Area

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

- System Time: displayed in “hh:mm (hour:minute)” format. When printing and storing the waveform, the output file will contain this time message. Press **UTIL** → **System** → **System Time** to set through the following format:
mm-dd-yyyy hh-mm-ss
(month-date-year hour-minute-second)
- Sound Icon: when sound is turned on, this area displays . Press **UTIL** → **Sound** to turn the sound on or off.
- Battery Icon: when the battery is used for power supply, this area displays .
- USB flash device: when the oscilloscope detects a USB flash device, this area displays .

18. Operation MENU

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

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

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

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

To Use the Security Lock

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

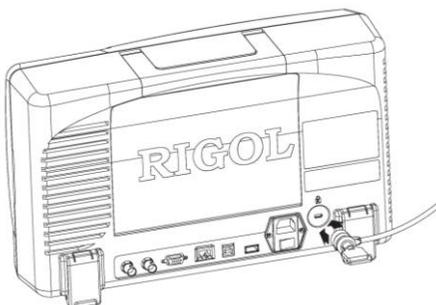


Figure 14 To Use the Security Lock

To Use the Desk Mount Instrument Arm

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



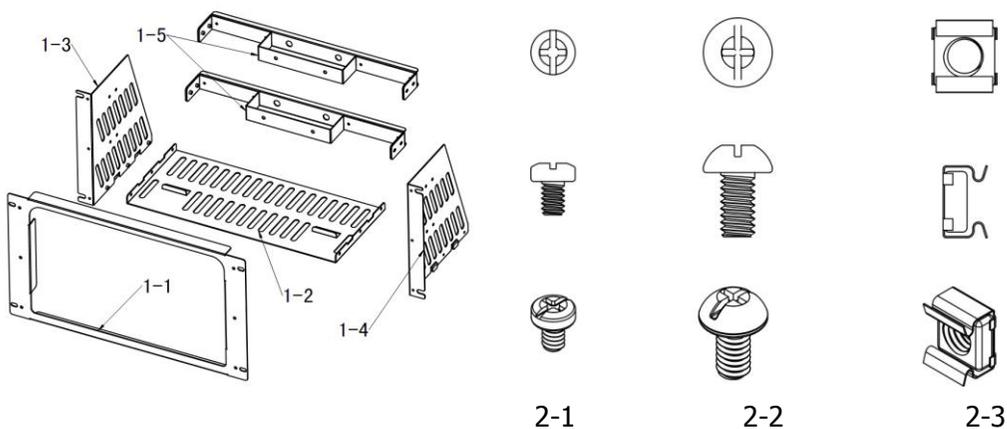
Figure 15 Working Sketch

To Use the Rack Mount Kit

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

Kit Parts List

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



Installation Tool

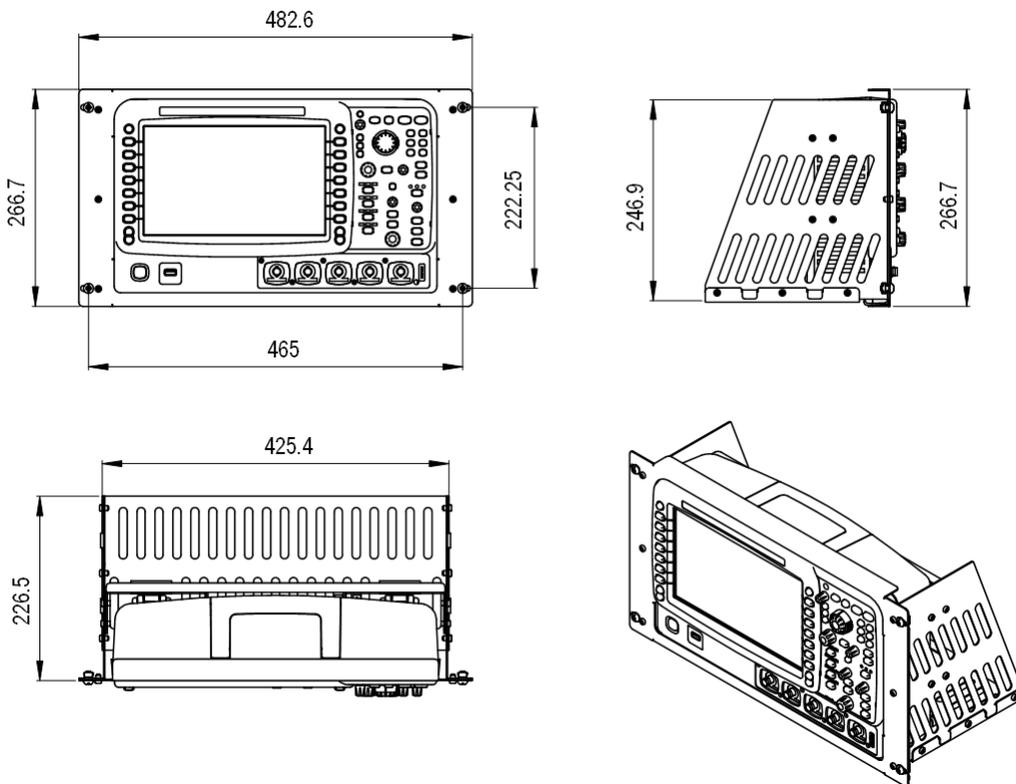
PH2 Phillips Screwdriver (recommended).

Installation Space

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

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

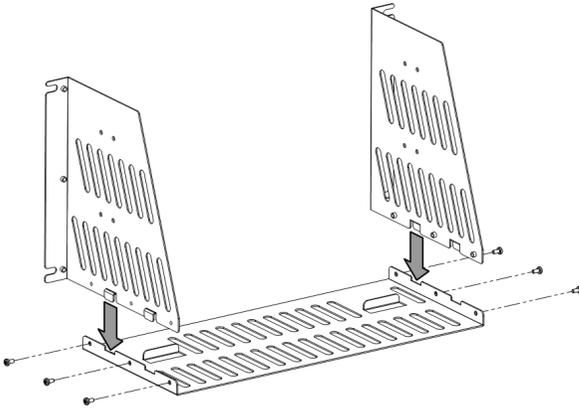
The dimension of the instrument after being installed is shown below.



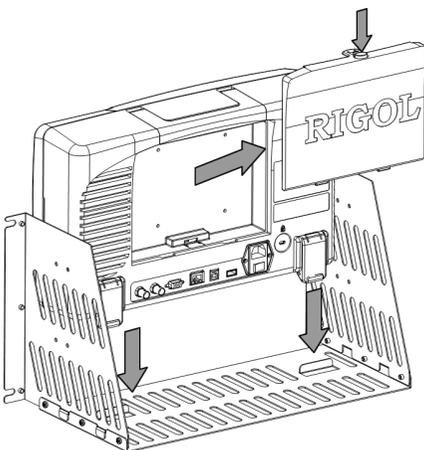
Installation Procedures

Only authorized operators can execute the installation operation. Improper installation might result in damage of the instrument or incorrect installation of the instrument on the rack.

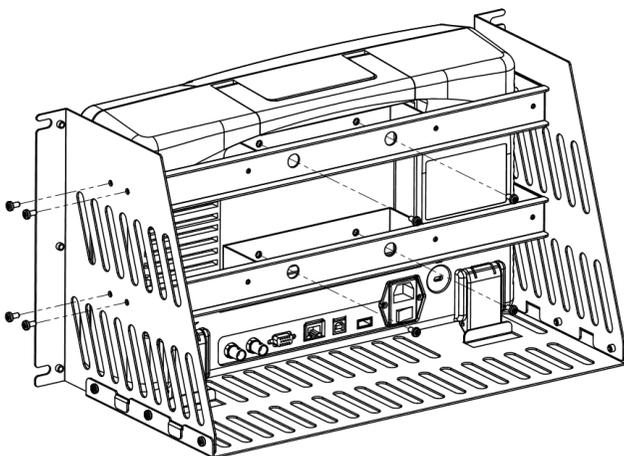
1. Install the right and left plates: align the detents of the right and left plates with the openings on the support board and insert them into the support board respectively, then fix them with six M4 screws.



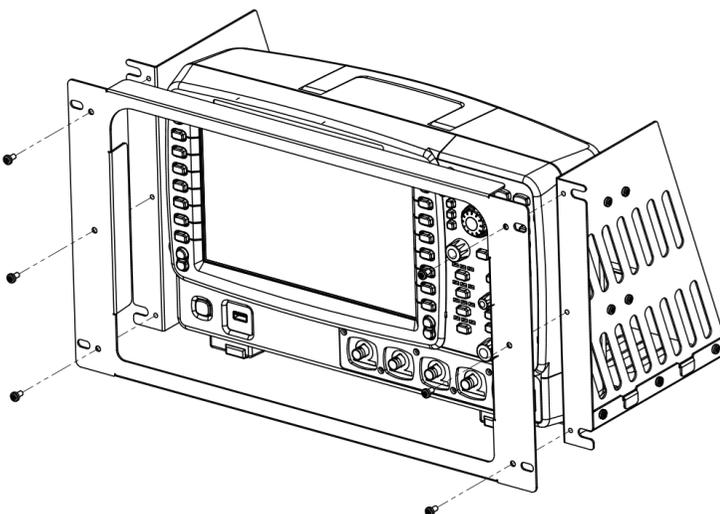
2. Place the Instrument: press the button above the battery on the instrument to remove the battery. Then align the instrument with the spacing on the support board and place it on the support board.



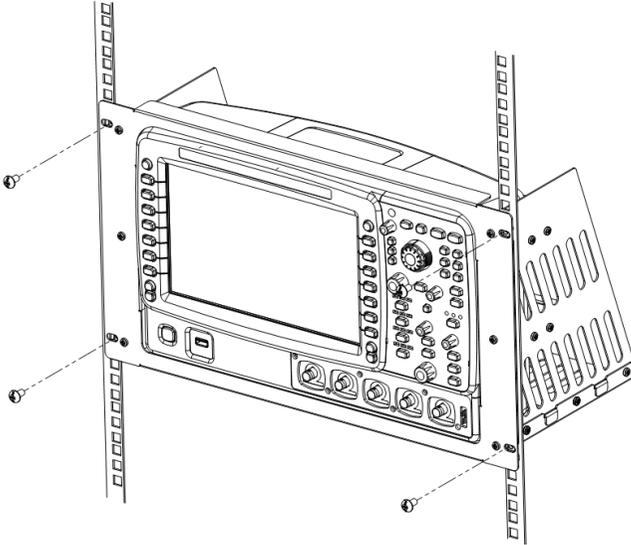
3. Fix the instrument: fix the instrument on the support board with two back battens and twelve M4 screws.



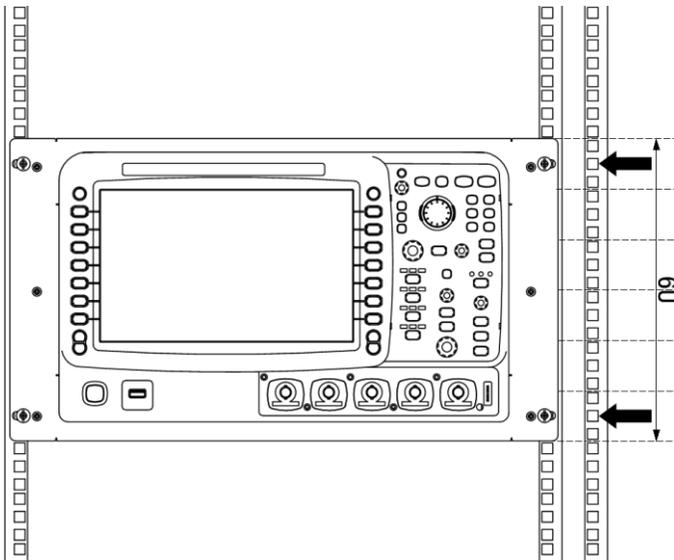
4. Install the front panel: align the screw holes on the right and left plates with the screw holes on the front panel of the rack and let the front panel of the oscilloscope protrude from the opening. Then fix them with six M4 screws.



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



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



To Use the Built-in Help System

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

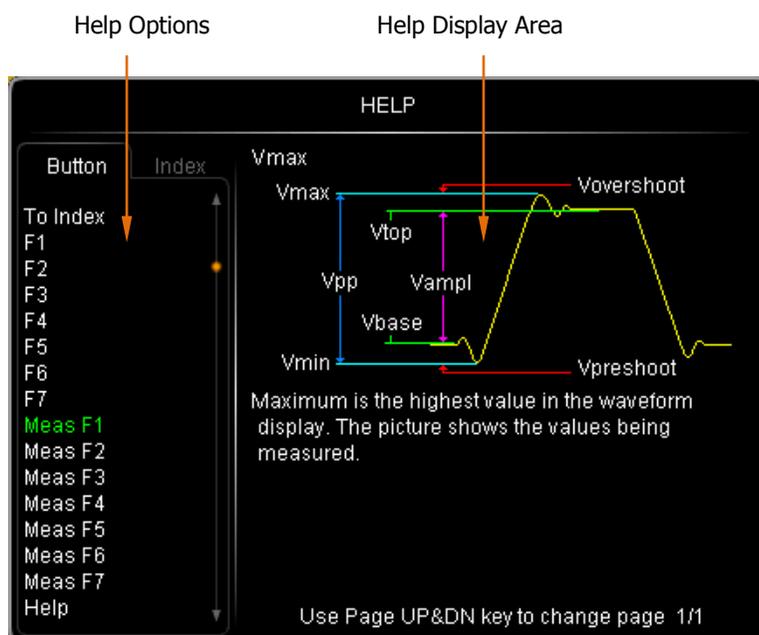


Figure 16 Help Information

Button:

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

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

Index:

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

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

Troubleshooting

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

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

- (1) Check if the power is correctly connected or if the battery is correctly installed.
- (2) Check if the power switch is really on.
- (3) Check if the fuse is burned out. If the fuse needs to be changed, please return the instrument to the factory and the RIGOL authorized personnel will change the fuse for you.
- (4) Restart the instrument after finishing the above inspections.
- (5) If it still does not work correctly, please contact **RIGOL**.

2. The signal is sampled but no waveform of the signal is displayed:

- (1) Check if the probe is correctly connected to the signal connecting wire.
- (2) Check if the signal connecting wire is correctly connected to the BNC (namely channel connector).
- (3) Check if the probe is correctly connected to the item under test.
- (4) Check if there are signals generated from the item under test (you can connect the probe compensation signal to the problematic channel to determine which has problems, the channel or the item under test).
- (5) Resample the signal.

3. The voltage tested amplitude is ten times higher or lower than the actual value:

Check whether the attenuation coefficient of the channel complies with the attenuation ratio of the probe.

4. There is waveform display but not stable:

- (1) Check the trigger signal source: check whether the **Source** item at the front panel complies with the signal channel actually used.
- (2) Check the trigger type: general signals should use "Edge" trigger and video

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

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

5. No display after pressing **Run/Stop**:

Check if the **MODE** at the trigger panel (TRIGGER) is on "Normal" or "Single" and if the trigger level exceeds the waveform range. If yes, set the trigger level to the middle or set the **MODE** to "Auto".

Note that using the **Auto** button could automatically finish the above setting.

6. The display of waveform is ladder-like:

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

7. Fail to connect PC or PictBridge through USB:

Check the **IO Setting** menu in **UTIL** to make sure whether the setting in **USB Device** matches the currently connected device. If needed, restart the oscilloscope.

8. The USB flash device can not be recognized:

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