

RIGOL

Quick Guide

DS1000CA Series Oscilloscope

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RIGOL Technologies, Inc.

Guaranty and Declaration

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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 Notice

Review the following safety precautions carefully to avoid any personal injuries or damages to the instrument and any products connected to it. To avoid potential hazards, please use the instrument as specified by this manual only.

The instrument should be serviced by Authorized personnel only.

Avoid Fire or Personal Injury.

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 marks on the instrument and check your manual for detailed information about

ratings before connecting the instrument.

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels removed.

Use Proper Fuse.

Use the specified type of fuse with certain ratings..

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.

The disturbance tests of all the models conform to class A standard on the basis of EN 61326: 1997+A1+A2+A3, but do not conform to class B standard.

Measurement Category

The DS1000CA series Digital Oscilloscope can make measurements in Measurement Category I.

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.

WARNING

IEC Measurement Category. The HI and LO input terminals can be connected to circuit terminals with up to 300 VAC line voltage under IEC Category I installation conditions. To avoid the danger of electric shock, do not connect the input terminals to circuits with greater than 300Vrms line voltage.

Transient overvoltage is also present in circuits that are isolated from mains. The DS1000CA series Digital Oscilloscopes can safely withstand up to 500Vpk transient overvoltage. Do not use this

equipment to measure circuits where transient overvoltage could exceed this value.

Safety Terms and Symbols

Terms in This Guide. 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 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**



**Earth
Ground
Terminal**

Necessary 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 been 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 accessory list below.

If the accessories are incomplete or damaged, please contact your **RIGOL** sales representative.

I. Instrument Appearance

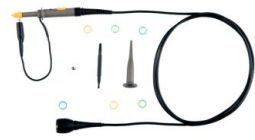


DS1000CA Series Appearance

II. Standard Accessories



A Power Cord



Two Passive Probes



A USB Cable



A CD-ROM*



A Quick Guide

NOTE*: The CD-ROM includes User's Guide and Application Software.

III. Options



BNC Cable



USB-GPIB Adapter



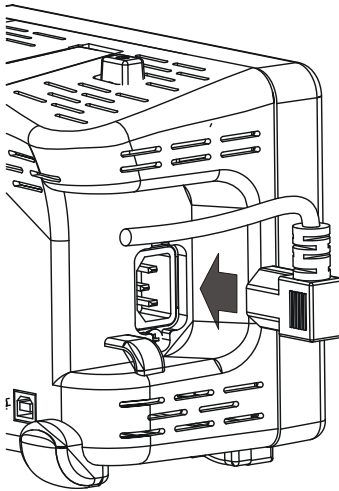
Instrument Carrying Bag



RS232 Cable

How to Connect Power Cord

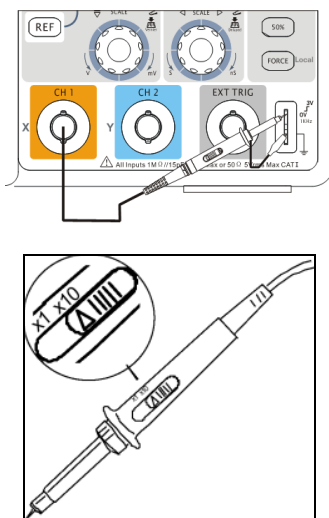
After inspecting the instrument and the accessories, connect the power cord as shown in the following figure and power on the instrument.



After power-on, press the power button on the top of the instrument to start the instrument. If the instrument does not start, please check if the power is correctly connected. After that, if the instrument still does not work correctly, please contact **RIGOL**.

How to Connect Probe or BNC

1. Connect the probe



Connect the signal to CH1 using the probe according to the method shown in the figure above:

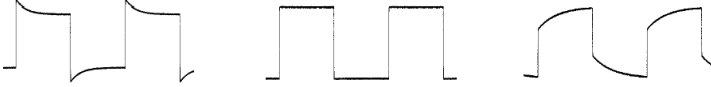
Set the attenuation switch on the probe to "10X". Align the slot of the probe connector with the socket of the BNC connector and insert, then rotate the probe clockwise.

When the probes are used for the first time, you should compensate the probes following the method below:

- (1) Set the attenuation switch on the probe to "10X" and connect the probe to CH1 on the oscilloscope. Connect the probe head to the probe compensation signal output terminal and connect

the ground alligator clip to the probe compensation ground terminal. Press **CH1**, and set the attenuation coefficient of the probe to 10X. Then press **AUTO**.

- (2) View the waveform displayed on the screen and compare it with the followings.



Over Compensated Correctly Compensated Under Compensated

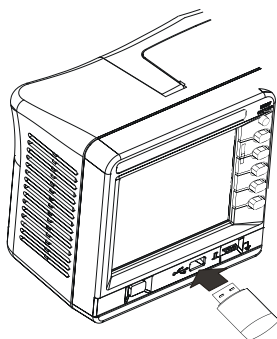
- (3) If necessary, use a non-metallic driver to adjust the variable capacitor of the probe until the displayed waveform is as the "**Correctly compensated**" in the figure above.
- (4) Repeat the above steps if necessary.

2. Connect the BNC

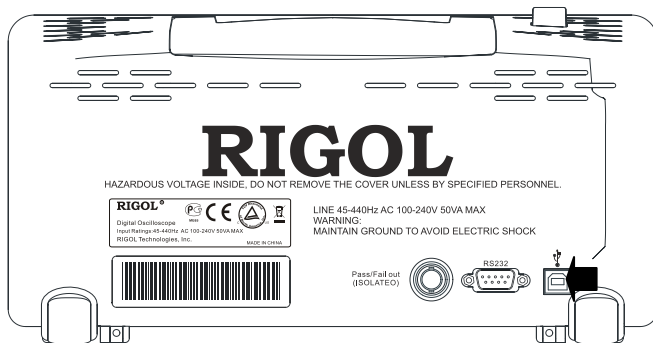
Insert the BNC cable to the BNC connector on the front panel of the oscilloscope, rotate it clockwise to lock the BNC.

How to Connect USB Devices

DS1000CA series oscilloscope supports USB flash devices and can be connected to PC or printer through USB interface. The instrument provides a USB Host and a USB Device interface.



USB Host (Front Panel)



USB Device(Rear Panel)

Troubleshooting

1. The screen remains 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) After the above inspection, restart the oscilloscope.
- (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 sensitivity and 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". Besides, pressing 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. Unable to connect to PC or the PictBridge printer by 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.