RIGOL

User Guide

RP1000D Series High Voltage Differential Probe

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RIGOL TECHNOLOGIES. CO., LTD.

Guaranty and Declaration

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RIGOL guarantees that this product conforms to the national and industrial standards in China as well as the ISO9001:2015 standard and the ISO14001:2015 standard. Other international standard conformance certifications are 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

Website: www.rigol.com

General Safety Summary

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

Ground the Instrument.

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

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 the instrument.

Do Not Operate Without Covers.

Do not operate the instrument with covers or panels removed.

Avoid Circuit or Wire Exposure.

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

Do Not Operate with Suspected Failures.

If you suspect that any damage may occur to the instrument, have it inspected by **RIGOL** authorized personnel before further operations. Any maintenance, adjustment or replacement especially

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

Provide Adequate 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.

To avoid short circuit inside the instrument or electric shock, never operate the instrument in a humid environment.

Do Not Operate in an Explosive Atmosphere.

To avoid personal injuries or damage to the instrument, never operate the instrument in an explosive atmosphere.

Keep Product Surfaces Clean and Dry.

To avoid dust or moisture from affecting the performance of the instrument, keep the surfaces of the instrument clean and dry.

Prevent Electrostatic Impact.

Operate the instrument in an electrostatic discharge protective environment to avoid damage induced by static discharges. Always ground both the internal and external conductors of cables to release static before making connections.

Safety Terms and Symbols

Safety Notices in this Manual:



WARNING
Indicates a potentially hazardous situation or practice which, if not avoided, will result in serious injury or death.



CAUTION
Indicates a potentially hazardous situation or practice which, if not avoided, could result in damage to the product or loss of important data.

Safety Terms on the Product:

DANGER	It calls attention to an operation, if not correctly performed, could result in injury or hazard immediately.
WARNING	It calls attention to an operation, if not correctly performed, could result in potential injury or hazard.
CAUTION	It calls attention to an operation, if not correctly performed, could result in damage to the product or other devices connected to the product.

Safety Symbols on the Product:



Double Insulation



Hazardous Voltage



Safety Warning



Protective Earth Terminal



Chassis Ground



Test Ground

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RP1000D Overview

RP1000D series high voltage differential probe can convert high differential input voltage to low voltage and display the waveforms on the oscilloscope. Its working frequency is up to 25MHz (RP1025D), 50MHz (RP1050D) and 100MHz (RP1100D) and it is rather suitable for large electricity test and R&D.

RP1000D series high voltage differential probe is applicable to general purpose oscilloscope and the labeled attenuation ratios are those when the input impedance of the oscilloscope is 1MΩ. The attenuation ratios will double when the input impedance of the oscilloscope is 50Ω.



Figure 1 RP1025D High Voltage Differential Probe



Figure 2 RP1050D High Voltage Differential Probe



Figure 3 RP1100D High Voltage Differential Probe

Basic Operations

1. Connect the red safety IC clip with one end of the red dual-banana plug silicon cable and the black safety IC clip with one end of the black dual-banana plug silicon cable provided in the accessories. Then, connect the red dual-banana plug silicon cable with the red (+) input terminal of the high voltage probe and the black dual-banana plug silicon cable with the black (-) input terminal of the high voltage probe.

   Note:
   a) The safety IC clip can be replaced by the high voltage dedicated IC clip, safety alligator clip or safety contact probe prod;
   b) The dual-banana plug silicon cable can be replaced by high voltage dedicated dual-banana plug silicon cable.

2. Connect one end of the dual-BNC coaxial cable to the BNC interface of the high voltage differential probe and the other end to the input terminal of the oscilloscope.

3. Turn on the channel switch on the oscilloscope and adjust the attenuation of the high voltage probe to make it match that of the oscilloscope. If the attenuation ratio of the oscilloscope does not match that of the high voltage probe, the actual vertical scale equals the attenuation ratio of the high voltage probe divided by the attenuation ratio of the oscilloscope and then times the vertical scale of the oscilloscope.

   For example, when the attenuation ratio of the oscilloscope is

set to 1X, the attenuation ratio of the high voltage probe is set to X200 and the vertical scale of the oscilloscope is 0.5V/div, the actual vertical scale is 200X0.5V/div=100V/div. When the input impedance of the oscilloscope is 50Ω, the actual vertical scale is 2X200X0.5V/div =200V/div.

Note: When the attenuation ratio of the oscilloscope matches the attenuation ratio of the high voltage probe, the vertical scale displayed on the oscilloscope is the actual scale.

Cleaning and General Care

Cleaning:

This product has no particular requirement for cleaning. To clean the probe, please wipe the probe surface using soft and clean cloth dampened with detergent.

General Care:

Please store this product in anti-humidity case if the product will not be used for more than 60 days.

Warranty

RIGOL TECHNOLOGIES CO., LTD. (hereinafter referred to as **RIGOL**) warrants that the product will be free from defects in materials and workmanship within the warranty period. If a product proves defective within the warranty period, **RIGOL** guarantees free replacement or repair for the defective product.

To get repair service, please contact with your nearest **RIGOL** sales or service office.

There is no other warranty, expressed or implied, except such as is expressly set forth herein or other applicable warranty card. There is no implied warranty of merchantability or fitness for a particular purpose. Under no circumstances shall **RIGOL** be liable for any consequential, indirect, ensuing, or special damages for any breach of warranty in any case.

Specifications

Technical Specifications

RP1025D:

Bandwidth	DC - 25MHz (-3dB)
Attenuation Ratio	X20, X50, X200
Accuracy	±2%
Input Voltage Range (DC + AC peak-peak value)	X20 attenuation ratio: ≤ 140Vpp, about 50Vrms or DC X50 attenuation ratio: ≤ 350Vpp, about 125Vrms or DC X200 attenuation ratio: ≤ 1400Vpp, about 500Vrms or DC
Maximum Input Voltage	Maximum differential voltage: 1400V (DC+AC peak-peak value) or 500Vrms Voltage to ground at the input terminal: 600Vrms
Input Impedance	Differential: 4MΩ/1.2pF Single-ended and to ground: 2MΩ/2.3pF
Output Voltage	≤ ±6.5V
Output Impedance	50Ω
Rise Time	14ns
Common-mode Rejection	60Hz: > 50dB 100Hz: > 50dB 1MHz: > 50dB
Power Supply	Specified external 9V DC power supply (must be specified products acknowledged by **RIGOL**)
Power Consumption	<300 mA

RP1050D:

Bandwidth	DC - 50MHz (-3dB)
Attenuation Ratio	X100, X200, X500, X1000
Accuracy	±2%
Input Voltage Range (DC + AC peak-peak value)	X100 attenuation ratio: ≤ 700Vpp, about 230Vrms or DC X200 attenuation ratio: ≤ 1400Vpp, about 460Vrms or DC X500 attenuation ratio: ≤ 3500Vpp, about 1140Vrms or DC X1000 attenuation ratio: ≤ 7000Vpp, 2300Vrms or DC
Maximum Input Voltage	Maximum differential voltage: 7000V (DC+AC peak-peak vale) or 2300Vrms Voltage to ground at the input terminal: 6500Vrms
Input Impedance	Differential: 16MΩ/1pF Single-ended and to ground: 8MΩ/2pF
Output Voltage	≤ ±7.0V
Output Impedance	50Ω
Rise Time	7ns
Common-mode Rejection	60Hz: > 50dB 100Hz: > 50dB 1MHz: > 50dB
Power Supply	Specified external 9V DC power supply (must be specified products acknowledged by **RIGOL**)
Power Consumption	<300 mA

RP1100D:

Bandwidth	DC - 100MHz (-3dB)
Attenuation Ratio	X100, X200, X500, X1000
Accuracy	±2%
Input Voltage Range (DC + AC peak-peak value)	X100 attenuation ratio: ≤ 700Vpp, about 230Vrms or DC X200 attenuation ratio: ≤ 1400Vpp, about 460Vrms or DC X500 attenuation ratio: ≤ 3500Vpp, about 1140Vrms or DC X1000 attenuation ratio: ≤ 7000Vpp, about 2300Vrms or DC
Maximum Input Voltage	Maximum differential voltage: 7000V (DC+AC peak-peak value) or 2300Vrms Voltage to ground at the input terminal: 6500Vrms
Input Impedance	Differential: 16MΩ/1.2pF Single-ended and to ground: 8MΩ/2.3pF
Output Voltage	≤ ±8.0V
Output Impedance	50Ω
Rise Time	3.5ns
Common-mode Rejection	60Hz: > 50dB 100Hz: > 50dB 1MHz: > 50dB
Power Supply	Specified external 9V DC power supply (must be specified products acknowledged by **RIGOL**)
Power Consumption	<300 mA

Operation Environment

	General	Operation	Storage
Temperature	+20℃ to +30℃	0℃ to +50℃	-30℃ to +70℃
Humidity	≤ 70%RH	10% to 85%RH	10% to 90%RH

General Specifications

Probe Dimensions	RP1025D: about 214mm x 60mm x 35mm
	RP1050D: about 240mm x 85mm x 36mm
	RP1100D: about 240mm x 85mm x 36mm
Weight	RP1025D: 280g
	RP1050D: 280g
	RP1100D: 280g
Safety	IEC 1010-1, CAT III, pollution degree 2
Electromagnetic Compatibility	Conform to EN50081-1 and 50082-1 standards
Maximum Voltage to Ground	RP1025D: 600Vrms
	RP1050D: 6500Vrms
	RP1100D: 6500Vrms
Using Environment	Indoor environment
Insulation Category	Double insulation

Accessories

RP1025D:

	Accessories	Explanation	Quantity
1.	User Guide	Chinese & English	1
2.	AC power adaptor conforming to the standard of the destination country	--	1
3.	Dual-BNC coaxial cable	50Ω impedance RG58C UL 100cm length	1
4.	Dual-banana plug silicon cable	UL 6KV 18AWG 60cm length	Red: 1; Black: 1
5.	Safety IC clip	UL 1000V CAT III	Red: 1; Black: 1
6.	Safety alligator clip	UL 1000V CAT II，10A	Red: 1; Black: 1

RP1050D:

	Accessories	Explanation	Quantity
1.	User Guide	Chinese & English	1
2.	AC power adaptor conforming to the standard of the destination country	--	1
3.	Dual-BNC coaxial cable	50Ω impedance RG58C UL 100cm length	1
4.	High voltage dedicated dual-banana plug silicon cable	UL 20KV 16AWG 60cm length	Red: 1; Black: 1
5.	High voltage dedicated IC clip	maximum 6500V (DC+AC p-p)	Red: 1; Black: 1
6.	Safety alligator clip	UL 1000V CAT II，10A	Red: 1; Black: 1

RP1100D:

	Accessories	Explanation	Quantity
1.	User Guide	Chinese & English	1
2.	AC power adaptor conforming to the standard of the destination country	--	1
3.	Dual-BNC coaxial cable	50Ω impedance RG58C UL 100cm length	1
4.	High voltage dedicated dual-banana plug silicon cable	UL 20KV 16AWG 60cm length	Red: 1; Black: 1
5.	High voltage dedicated IC clip	maximum 6500V (DC+AC p-p)	Red: 1; Black: 1
6.	Safety alligator clip	UL 1000V CAT II，10A	Red: 1; Black: 1
7.	Safety contact probe prod	UL 1000V，CAT III	Red: 1; Black: 1