# R&S®RT-ZD02
# Differential Probe
# User Manual


1333082102

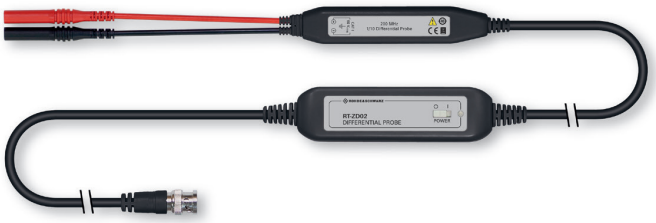
ROHDE&SCHWARZ

Test & Measurement

User Manual

Version 01

# Differential Probe 10 : 1
# RT-ZD02




200 MHz bandwidth

high input resistance of 1 MΩ

low input capacitance of 3.5 pF

high dynamic range of ±20 V differential and ±60 V common

universal power supply using battery or USB cable

typical applications:
– differential signals like CAN Bus or LVDS
– DC-DC converter

## General Information

The RT-ZD02 200 MHz Differential probe is best suited for measurements of high-speed differential signals. These signals are commonly used in digital and power applications and especially at serial buses like CAN. The RT-ZD02 can be powered by USB or battery and is compatible with all oscilloscopes with 50 Ω BNC inputs. Scopes without 50 Ω input need a 50 Ω feed through BNC adapter. The probe has a high input resistance of 1 MΩ combined with 7 pF input capacitance. This secures a low loading of the device under test. The attenuation of the RT-ZD02 is 10 : 1.

# SPECIFICATIONS

all data valid at 23 °C after 30 minutes warm up

## Electrical specifications

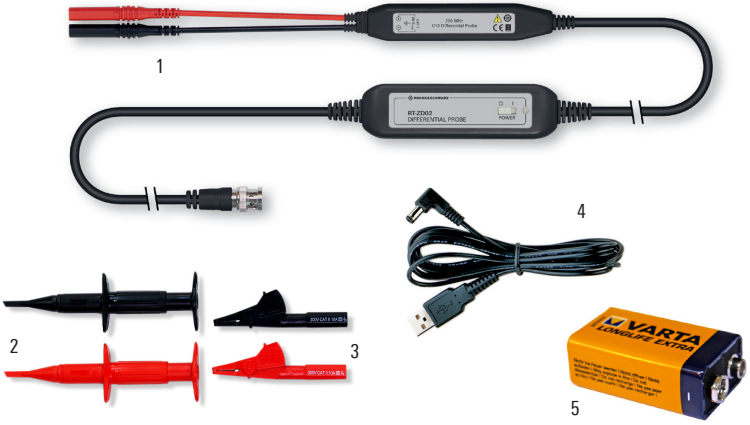
| | |
|---|---|
| Bandwidth (-3 dB): | 200 MHz, typ. |
| Attenuation Ratio: | 10 : 1 |
| Probe Risetime (10%-90%): | 1.75 ns |
| Gain Accuracy: | ±1%, typ. |
| Absolute Maximum Rated Input Voltage (each side to ground): | ±60 V |
| Maximum Differential Input Voltage (DC+AC Peak): | ±20 V |
| Maximum Common Mode Input Voltage | ±60 V |
| Input Resistance / Input capacity | |
| each side to ground: | 500 kΩ, 7 pF |
| between inputs: | 1 MΩ, 3.5 pF |
| Output Voltage Swing: | ±2 V (driving 50 Ω scope input) |
| Offset: | ±2 mV, typ. |
| CMRR: | -80 dB at 60 Hz, typ.<br>-50 dB at 10 MHz, typ. |
| Power Requirements: | one 9 V battery or USB power adapter (5 V to 9 V, 200 mA) |
| Approx. Battery Life: | 7.5 hours (alkaline battery) |
| Battery/Power Cord: | The supplied voltage must be less than 12 V and greater than 4.5 V or else the probe could be damaged |

## Mechanical specifications

| | |
|---|---|
| Approximate Weight: | 170 g (not including battery and accessories) |
| BNC Cable Length: | 120 cm |
| Length of Input Leads: | 15 cm |
| Dimensiones (LxWxH): | 111 x 22 x 14 mm |

## Environmental specifications

| | |
|---|---|
| Temperature range | |
| operating: | 5 °C to +40 °C |
| non-operating: | -20 °C to +70 °C |
| Altitude operating: | 3,000 m |
| non-operating: | 15,300 m |
| Humidity: | 25 - 85% (indoor use only) |




Set of RT-ZD02 probe consists of:

| | | |
|---|---|---|
| 1 | RT-ZD02 200 MHz differential probe | 1 piece |
| 2 | Hook Clip, red | 1 piece |
| | Hook Clip, black | 1 piece |
| 3 | Alligator Clip, red | 1 piece |
| | Alligator Clip, black | 1 piece |
| 4 | USB Power Cord (2 m) | 1 piece |
| 5 | 9 V Battery | 1 piece |
| | Manual | 1 piece |

# Important hints

After unpacking please check for mechanical damage and loose parts floating around inside the instrument. In case of damage please inform the transport company immediately. Do not operate the instrument and protect it against unauthorized operation.

## Symbol:

Please consult the manual

## Safety instructions

The instrument conform to the European standards EN 61010-1 and IEC 61010-1, respectively.

### Further Safety Informations

To avoid personal injury and to prevent fire or damage to this product or products connected to it, review and comply with the following safety precautions. Be aware that if you use this probe assembly in a manner not specified the protection this product provides may be impaired.

- Only qualified personnel should use this probe assembly.
- Use only grounded instruments.
- Connect and disconnect properly.
- Connect the probe output to the measurement instrument and connect the ground lead to earth ground before connecting the probe to the circuit under test. Disconnect the probe input and the probe ground lead from the circuit under test before disconnecting the probe from the measurement instrument. Observe probe ratings.
- Do not apply any electrical potential to the probe input which exceeds the maximum ratings of the probe.
- Keep away from live circuits.
- Avoid open circuitry. Do not touch connections or components when power is present.
- Do not operate with suspected failures.
- Repair only by qualified service personnel.
- Indoor use only.
- Do not operate in wet/damp environment. Keep product surfaces dry and clean.
- Do not operate the product in an explosive atmosphere.

## Operating conditions

The permissible operating temperature is +5 °C to +40 °C. During transport and storage the temperature may be –20 °C to +70 °C. In case of condensation after transport it is necessary to dry the probe for at least 2 hrs. prior to operation. Operate only in clean, dry rooms.

## Warranty and Repair

Our instruments are subject to strict quality controls. Prior to leaving the manufacturing site, each instrument undergoes a 10-hour burn-in test. This is followed by extensive functional quality testing to examine all operating modes and to guarantee compliance with the specified technical data. The testing is performed with test equipment that is calibrated to national standards. The statutory warranty provisions shall be governed by the laws of the country in which the product was purchased. In case of any complaints, please contact your supplier.

**The product may only be opened by authorized and qualified personnel. Prior to working on the product or before the product is opened, it must be disconnected from the AC supply network. Otherwise, personnel will be exposed to the risk of an electric shock.**

Any adjustments, replacements of parts, maintenance and repair may be carried out only by authorized technical personnel. Only original parts may be used for replacing parts relevant to safety (e.g. power switches, power transformers, fuses). A safety test must always be performed

after parts relevant to safety have been replaced (visual inspection, PE conductor test, insulation resistance measurement, leakage current measurement, functional test). This helps to ensure the continued safety of the product.

### Cleaning the Probe

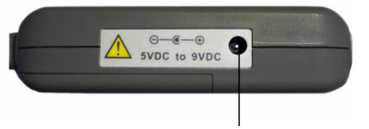
Disconnect the probe and clean it with a soft cloth. Make sure the probe is completely dry before reconnecting it to an instrument. Avoid using abrasive cleaners and chemicals containing benzene or similar solvents.

### Handling the Probe

Handle the probe with care and refer to the safety notices in this manual. Note that the probe cable is a sensitive part of the probe and, therefore, you should be careful not to damage it through excessive bending or pulling. You should also avoid any mechanical shocks to this product in order to guarantee accurate performance and protection.

## Using the probe and accessories

To use the probe, first slide open the battery compartment on the rear of the probe housing and insert the 9V battery. You can also use the USB power cord that ships with the probe to supply power instead of the battery. Simply connect the USB power cord to the probe and an USB port (on a computer or oscilloscope).




Input for USB power cord

### Battery Use

Insert one 9V battery in the back of the unit as indicated within the chassis (see picture for the battery location). When battery life has expired, remove the battery. Note the WEEE label on the battery and dispose it properly.

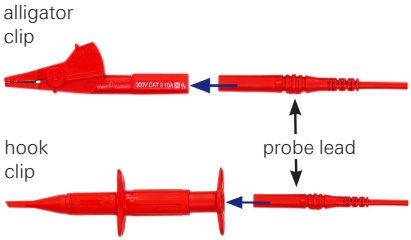

Then connect the BNC output connector to the channel input of the oscilloscope. The oscilloscope must have a 50Ω input with ground reference. In case the oscilloscope does not provide a 50Ω input please use a 50Ω feed through termination.

Using the appropriate probe accessories, connect the inputs to the circuit under test.

- To protect against electrical shock, use only the accessories supplied with this probe or in the accessory kit.
- This probe is made to carry out differential measurements between two points on the circuit under test. This probe is not made for electrically insulating the circuit under test and the measuring instrument.

### Hook and Alligator Clips

These accessories can be pushed onto the probe leads as shown below.




Use the hook clips to clamp onto smaller components and use the alligator clips to clamp onto bigger devices.

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