R&S®RT-ZISO
Optical Isolated Probing System
User Manual

1804530002
Version 01

ROHDE&SCHWARZ
Make ideas real

Contents

1 Safety and regulatory information

The product documentation helps you to use the product safely and efficiently.

Where do I find safety information?

Safety information is part of the product documentation. It warns you of potential dangers and gives instructions on how to prevent personal injury or damage caused by dangerous situations. Safety information is provided as follows:

- In Chapter 1.1, "Safety instructions", on page 5. The same information is provided in many languages as printed "Safety Instructions". The printed "Safety Instructions" are delivered with the product.
- Throughout the documentation, safety instructions are provided when you need to take care during setup or operation.

Intended use

The product is intended for the development, production and verification of electronic components and devices in industrial, administrative, and laboratory environments. Use the product only for its designated purpose. Observe the operating conditions and performance limits stated in the specifications document.

Target audience

The target audience of this document includes developers and technicians, administrators and maintenance personnel using oscilloscopes and probes. The required skills and experience of the users depend on the test setup and application of the product.

1.1 Safety instructions

Products from the Rohde & Schwarz group of companies are manufactured according to the highest technical standards. To use the products safely, follow the instructions provided here and in the product documentation. Keep the product documentation nearby and offer it to other users.

Use the product only for its intended use and within its performance limits. Intended use and limits are described in the product documentation such as the specifications document, manuals and the printed "Safety Instructions" document. If you are unsure about the appropriate use, contact Rohde & Schwarz customer support.

Using the product requires specialists or specially trained personnel. These users also need sound knowledge of at least one of the languages in which the user interfaces and the product documentation are available.

Reconfigure or adjust the product only as described in the product documentation or the specifications document. Any other modifications can affect safety and are not permitted.

Never open the casing of the product. Only service personnel authorized by Rohde & Schwarz are allowed to repair the product. If any part of the product is dam-

aged or broken, stop using the product. Contact Rohde & Schwarz customer support at https://www.rohde-schwarz.com/support.

In these safety instructions, the term "product" covers instruments (oscilloscopes), probes and their accessories.

Choosing the operating site

Only use the product indoors. The product casing is not waterproof. Water that enters can electrically connect the casing with live parts, which can lead to electric shock, serious personal injury or death if you touch the casing.

You can operate the product up to an altitude of 2000 m above sea level. If a higher altitude is permissible, the value is provided in the specifications document. The product is suitable for pollution degree 2 environments where nonconductive contamination can occur. For more information on environmental conditions such as ambient temperature and humidity, see the specifications document.

Connecting to power

The product is powered by the oscilloscope or by external power supply.

If you connect the product to an external power supply, use only the one delivered with the product or specified in the product documentation.

Performing measurements

Take the following measures for your safety:

- To ascertain a voltage-free state, use an appropriate voltage tester. Any measurement setup including an oscilloscope is not suitable for this purpose.
- The maximum input voltage on channel inputs and the external trigger input must not exceed the value specified in the specifications document.
- Observe all voltage and current ratings of the instrument, the probes, and the accessories. Exceeding the allowed voltages can lead to an electric shock.
  Limits and ratings are marked on the products and listed in the specifications documents.
  Consider that the rated voltage depends on the frequency. The voltage limitation curves or values are provided in the specifications document.
- Never cause any short circuits when measuring sources with high output currents.
- Use only probes and accessories that comply with the measurement category (CAT) of your measurement task. If the product is rated for any measurement category, the permitted category is indicated on the product and in the specifications document. If you use other than Rohde & Schwarz accessories, make sure that they are suitable for the instrument and the measurement task.
- Set the correct attenuation factor on the instrument according to the probe being used. Otherwise, the measurement results do not reflect the actual voltage level, and you might misjudge the actual risk.
- Prevent the probe from receiving mechanical shock. Avoid putting excessive strain on the probe cable or exposing it to sharp bends. Touching a broken cable during measurements can cause injuries.
- Set up all probe connections to the instrument before applying power.

Working with hazardous voltages

Voltages higher than 30 V RMS, or 42 V peak, or 60 V DC are regarded as hazardous contact voltages. Direct contact with them can cause serious injuries.

Make sure that only electrically skilled persons use the products for measurements on hazardous contact voltages. These working conditions require special education and experience to perceive risks and to avoid hazards which electricity can create.

When working with hazardous contact voltages, use protective measures to preclude direct contact with the measurement setup:

- Do not touch exposed connections and components when power is applied.
- Switch off the test circuit while connecting and disconnecting probe leads.
- Use only insulated voltage probes, test leads and adapters.
- Make sure that the input leads fulfill the safety requirements for your measurement. The delivered input leads might have a jacket wear indicator that indicates a worn jacket by different jacket color. In this case, do not use the input lead. Replace it with a new one.
- When connecting to the DUT, keep your fingers behind finger guard. Remove jewelry, watches, and other metallic objects. Only use 4 mm safety banana plugs.

Using optical isolated probe systems

Optical isolated probes are classified as class 1 laser product. Class 1 lasers are safe under all conditions of normal use. The product fully contains the beam of a higher-class laser. Take the following measures for your safety:

- To avoid exposure to the laser beam, never remove any covers from the probe head or probe receiver, and never disassemble the product.
- Check the product before using to ensure that it is undamaged. If you have dropped the product or exposed it to excessive mechanical stress, always check the product. Do not use the product if any component is damaged.
- Send the product to service regularly.

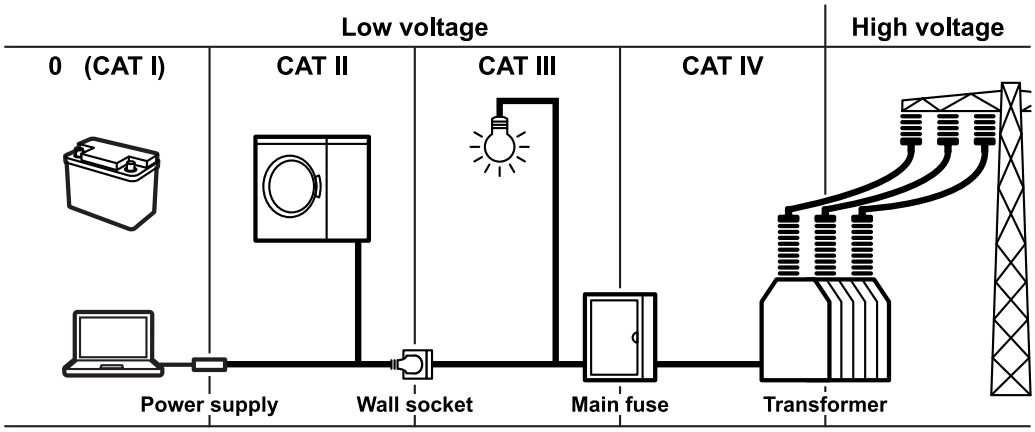
Optical isolated probes measure differential voltages. The test circuit can have a different potential. The common mode voltage between the potentials of the DUT and the oscilloscope can be much higher than the differential voltage and is not measured by the probe. To avoid the risk of electrical shock, use protective measures:

- Always de-energize the test circuit before installing or removing the tip module.
- Never exceed the differential voltage rating.
- When measuring on a test circuit with high common mode voltage, use a tripod to hold the probe head.
- Keep the probe head and the tip cable away from circuits with different potential to prevent arc flash caused by a different potential.

Measurement categories

IEC 61010-2-030 defines measurement categories that rate instruments on their ability to resist short transient overvoltages that occur in addition to the working voltage. Use the measurement setup only in electrical environments for which they are rated.

- 0 - Instruments without rated measurement category
  For measurements performed on circuits not directly connected to mains, for example, electronics, circuits powered by batteries, and specially protected secondary circuits. This measurement category is also known as CAT I.
- CAT II:
  For measurements performed on circuits directly connected to the low-voltage installation by a standard socket outlet, for example, household appliances and portable tools.
- CAT III:
  For measurements performed in the building installation, such as junction boxes, circuit breakers, distribution boards, and equipment with permanent connection to the fixed installation.
- CAT IV:
  For measurements performed at the source of the low-voltage installation, such as electricity meters and primary overcurrent protection devices.



1.2 Labels on the product

Labels on the casing inform about:

- Personal safety
- Product and environment safety
- Identification of the product

Meaning of safety labels

	Potential hazard Read the product documentation to avoid personal injury or product damage.

	Electrical hazard Indicates live parts. Risk of electric shock, fire, personal injury or even death.

	Warning: invisible laser radiation class 4 inside Exposure to direct or reflected laser beam can damage the eyes and cause burns. Never open or disassamble the product.

1.3 Warning messages in the documentation

A warning message points out a risk or danger that you need to be aware of. The signal word indicates the severity of the safety hazard and how likely it will occur if you do not follow the safety precautions.

WARNING

Potentially hazardous situation. Could result in death or serious injury if not avoided.

CAUTION

Potentially hazardous situation. Could result in minor or moderate injury if not avoided.

NOTICE

Potential risks of damage. Could result in damage to the supported product or to other property.

1.4 Where to find key documents on Rohde & Schwarz

Certificates issued to Rohde & Schwarz that are relevant for your country are provided at www.rohde-schwarz.com/key-documents, e.g. concerning:

- Quality management
- Environmental management
- Information security management
- Accreditations

1.5 Korea certification class A

이 기기는 업무용(A급) 전자파 적합기기로서 판매자 또는 사용자는 이 점을 주의하시기 바라며, 가정외의 지역에서 사용하는 것을 목적으로 합니다.

2 Product description

The R&S RT-ZISO isolated probing system is designed for measurement challenges in high voltage and fast switching environments. The power-over-fiber architecture galvanically isolates the device under test (DUT) from the measurement setup for the highest common mode rejection ratio (CMRR) up to 1 GHz. The complete system compensates thermal drifts and corrects gain errors for the highest signal fidelity without compromise.

The R&S RT-ZISO isolated probing system uses lasers to communicate between the probe head and the probe receiver to limit the possible electrical return path for common mode signals. The probe tip and the probe head are essentially floating and measurements are optically transmitted to the probe receiver. Even when the instrument and DUT can be connected on the same ground plane, the lack of an electrical path completely isolates the common mode loops.

2.1 Key characteristics and key features

2.1.1 Key characteristics

The following table shows the main parameters of the R&S RT-ZISO optical isolated probing system. For further characteristics, refer to the specifications document.

Table 2-1: Key characteristics

Parameter	R&S RT-ZISO with option				
	R&S ZISO-B901	**R&S ZISO-B902**	**R&S ZISO-B903**	**R&S ZISO-B905**	**R&S ZISO-B910**
Bandwidth	100 MHz	200 MHz	350 MHz	500 MHz	1 GHz
Rise time	4 ns	2 ns	1.14 ns	800 ps	450 ps
Dynamic range, without probe tip	max. ±30 V min. ±0.01 V				
Length of optical cable	3 m with option R&S ZISO-B403 10 m with option R&S ZISO-B410				
Input impedance, without probe tip	1 MΩ || 8 pF				
Offset range	±30 V (at ± 10 mV input range)				
Input coupling	DC, AC				
Permissible voltage against ground (common mode voltage)	handheld: 30 V (RMS), ±42 V (Vpp) not handheld: ±60 kV				

Bandwidth upgrades are available. Contact your Rohde & Schwarz service center if you need an upgrade. See also: Chapter 5.6, "Returning for servicing", on page 47.

2.1.2 Key features

R&S ProbeMeter

The R&S ProbeMeter measures the DC voltage of the input signal directly at the probe tip. It provides a continuous high-precision DC voltage measurement that is independent of the settings of the oscilloscope and runs in parallel to the time domain measurement. If activated on the base unit, the measured value is displayed on the screen of the Rohde & Schwarz oscilloscope.

Data memory

The probe has an integrated data memory, containing the individual probe correction parameters (e.g. gain, delay, offset). These parameters are read out and processed by the Rohde & Schwarz oscilloscope. As a result, the probe offers a high degree of accuracy, and additional calibration procedures are not required.

2.2 Unpacking and checking

1. Unpack the product carefully.
2. Retain the original packing material. Use it when transporting or shipping the product later.
3. Using the delivery notes, check the equipment for completeness.
4. Check the equipment for damage.

   If the delivery is incomplete or equipment is damaged, contact Rohde & Schwarz.

Delivery notes

The R&S RT-ZISO probe system, its default accessories and documentation are delivered in a carrying case. The following items are included in the delivery:

- Carrying case with foam inlays in two layers and patch pockets inside the lid. The foam inlays provide additional openings and space for optional accessories.
- R&S RT-ZISO probe receiver and probe head, connected by the optical cable. Cable length is 3 m or 10 m, depending on the ordered option.
- Scope connector cable
- Coaxial cable
- Power supply
- Mini tripod with clamp
- SMA/BNC adapter in cylindrical box
- User manual
- Specifications document
- Safety instructions (multilingual)

- Calibration certificate
- Documented calibration values (if ordered)
- Tip modules are packed separately, they are not in the carrying case:
  – R&S RT-ZISO-Z301 tip browser 300 V
  – Only with 1 GHz option: R&S RT-ZISO-Z201 tip module MMCX 300 V

2.3 User documentation

The following documents explain the product and its usage:

- User manual
  Contains the product description, measurement setup and information on maintenance. A printed English version is included in the delivery. The manual is also available for download at www.rohde-schwarz.com/manual/rt-ziso.
- Safety instructions
  Provide safety information in many languages. The printed document is delivered with the product.
- Specifications
  The specifications document, also known as the data sheet, contains the technical specifications of the R&S RT-ZISO. It also lists the options and their order numbers, and optional accessories. The printed document is delivered with the product. Specifications are also available for download at www.rohde-schwarz.com/brochure-datasheet/rt-ziso

- Calibration certificate
  The printed document is delivered with the product.
- Service manual
- Open source acknowledgment
  The open source acknowledgment document provides verbatim license texts of the used open source software.

2.4 Supported oscilloscopes

Supported Rohde & Schwarz oscilloscopes have Rohde & Schwarz probe interfaces, and the firmware supports the R&S RT-ZISO optical isolated probe system. The R&S RT-ZISO is recognized and controlled by the oscilloscope. Supported Rohde & Schwarz oscilloscopes are listed in the probe's specifications document.

Due to its universal interface, the R&S RT-ZISO can be used with any oscilloscope including non-Rohde & Schwarz instruments. These oscilloscopes cannot recognize and control the R&S RT-ZISO probe, and they are named *unsupported oscilloscopes* in this documentation. Unsupported oscilloscopes have no information about the connected R&S RT-ZISO probe because:

- They have BNC inputs, for example R&S RTB2000.
- They have Rohde & Schwarz probe interfaces, but the firmware does not support the R&S RT-ZISO, for example, R&S RTM3000.

If the R&S RT-ZISO is connected to an unsupported oscilloscope, it is set up at the probe receiver.

2.5 Description of the probe

The R&S RT-ZISO optical isolated probe system consists of the probe head with exchangeable tip module, probe receiver, and scope connector cable. The probe head is permanently connected to the probe receiver by an optical isolated cable with multi-fiber system. To connect the probe receiver to supported oscilloscopes, the scope connector cable is used. For connection to unsupported oscilloscopes, a coaxial cable and external power supply are delivered.

All components are designed to ensure safe operation at hazardous contact voltages within the specified working voltage and measurement category. In particular, all air gaps and creeping distances comply with all current safety standards to protect the user, the measurement object, and the probe against any harm or damage.

Figure 2-1: Probe receiver (center) with probe head and tip module (left) and connected scope connector cable (right)

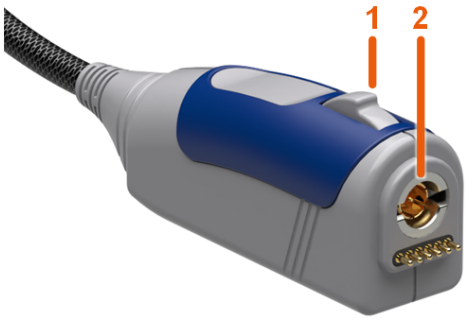
2.5.1 Scope connector cable

The scope connector cable consists of the probe box and a multicontact cable, and connects the probe receiver with supported oscilloscopes. The probe box is designed for connection to the Rohde & Schwarz probe interface. This interface provides the required supply voltage and transmits the measurement data and control signals simultaneously. The scope connector cable is 1 m long.

For connection to unsupported oscilloscopes, use the included coaxial cable and the external power supply.

See also: Chapter 2.4, "Supported oscilloscopes", on page 13.

Connect the probe only to an instrument with Rohde & Schwarz probe interface. Never connect it to a usual BNC jack, because this can damage the probe interface.



Probe box:

(1) Rohde & Schwarz probe interface with 7 mm (276 mil) coaxial connector and 6 pogo pins

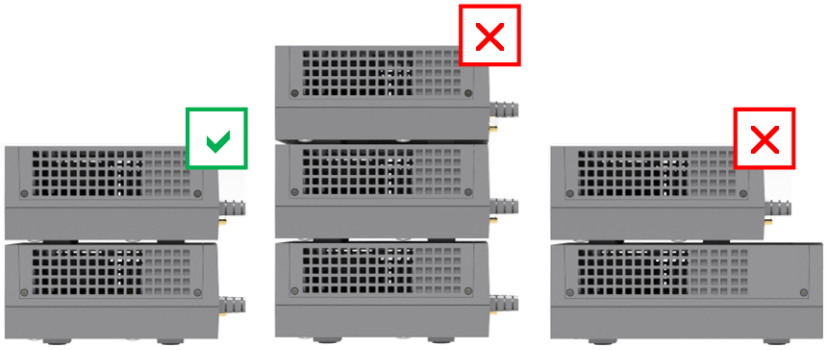
(2) Release knob

2.5.2 Probe receiver

The probe receiver converts the optical signal into the electrical signal that is analyzed in the oscilloscope. It is permanently connected to the probe head by the optical cable.

Stacking

You can stack one receiver on top of another one. A stack can fall over and cause injury.



Stack as follows:

- Never stack more than two receivers.
- Never stack the receiver on or below products with different dimensions (width and length).
- The feet of the upper receiver must fit in the notches on top of the lower receiver.

NOTICE

Overheating can damage the product

Prevent overheating as follows:

- Keep a minimum distance of 10 cm between the fan openings of the product and any object in the vicinity to provide sufficient airflow and ventilation.
- Do not place the product next to heat-generating equipment such as radiators or other products.

2.5.2.1 Front view

At the front of the probe receiver, you find the "Power" LED and the touch display.

Power LED

The light of the "Power" LED indicates the receiver state:

- (Unlighted): off
- Green: ready
- Red: error
  Possible error causes are:
  – The probe head does not work due to a defective laser.
  – No power: connect the 12 V cable of the scope connector, or the external power supply.

Touch display

The touch display provides basic information if the receiver is connected to a supported Rohde & Schwarz oscilloscope. You set up the probe at the oscilloscope.

If the probe is connected to an unsupported oscilloscope, you set up the probe at the receiver display.

The probe settings are described in Chapter 2.7, "Settings at the probe receiver display", on page 21.

2.5.2.2 Rear and side view

At the rear of the probe receiver, you connect the cables for connection to the oscilloscope: scope connector cable or coaxial cable. The external power connector is on the left side of the receiver.

1 = Optical cable, permanently connected
2 = SMA connector for the signal cable of scope connector cable, or the coaxial cable
3 = USB connector for the USB cable of scope connector cable: power supply for the receiver, and data transfer for probe control
4 = Power input of scope connector cable: power supply for the probe head, 12 V DC
5 = Power input of external power supply, 12 V DC

2.5.3 Probe head

The probe head receives the measured signal from the connected tip module and converts it in an optical signal. It is permanently connected to the probe receiver by the optical cable, which ensures the isolation of the probe head and tip module from ground.

The cable length is 3 m or 10 m, depending on the ordered option (see Table 2-1).

The tip connector ensures a stable and safe connection of the tip module.

2.5.4 Tip modules

All tip modules have a special connector for easy attachment to the probe head. A lever opens and closes the locking.

All available tip modules are described in Chapter 2.6, "Tip modules and accessories", on page 18.

2.5.5 Coaxial cable and external power supply

The SMA/BNC coaxial cable connects the probe receiver to unsupported oscilloscopes. To ensure precise measurements, use only the coaxial cable that is delivered with the probe or ordered at Rohde & Schwarz.

To power the probe receiver when using it with unsupported oscilloscopes, the external power supply is used. Connecting the power supply to the probe receiver during operation can lead to unforeseen behavior.

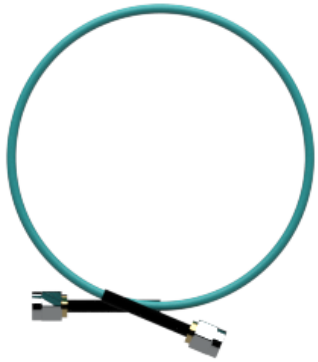
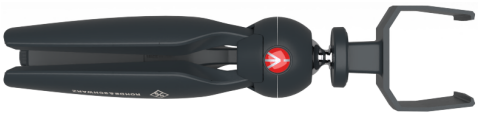
2.6 Tip modules and accessories

2.6.1 Supplied tip modules and accessories

Table 2-2 lists the tip modules and accessories that are supplied with the R&S RT-ZISO optical isolated probing system.

Observe the measurement category (CAT) of the accessories. The accessory with the minor CAT rating defines the CAT rating of the whole measurement setup.

Table 2-2: Supplied accessories

Item	Quantity	Description
	1	R&S ZISO-Z301 • Browser • Bandwidth: > 500 MHz • Attenuation: 10:1 • Offset range: ±300 V • Dynamic input range: ±300 V • Maximum rating, handheld usage: 300 V (RMS) CAT III
	(1)	R&S ZISO-Z201 is only delivered with 1 GHz probe system (option R&S ZISO-B910). See Table 2-3 for details.
	1	Scope connector cable
	1	Coaxial cable
	1	Tripod with clip
	1	SMA/BNC adapter

Item	Quantity	Description
	1	External power supply with country-specific power cable
	1	Accessory case with foam inlay

For a list of spare parts, see Chapter 5.7, "Spare parts", on page 48.

2.6.2 Optional tip modules

If the delivered accessories do not meet your requirements, Rohde & Schwarz offers different tip modules for sale. The order numbers are provided in the specifications document.

Table 2-3: Optional tip modules

Item	Description
	R&S ZISO-Z101 • MMCX input • Bandwidth: > 1 GHz • Attenuation: 1.5 :1 • Offset range: ±45 V • Dynamic input range: ±45 V • Maximum non-destructive input voltage: 8 V (RMS) • Maximum rating, handheld usage: 1000 V (RMS) CAT III
	R&S ZISO-Z201 • MMCX input • Bandwidth: > 1 GHz • Attenuation: 10:1 • Offset range: ±300 V • Dynamic input range: ±300 V • Maximum non-destructive input voltage: 500 V (Vpp) • Maximum rating, handheld usage: 1000 V (RMS) CAT III

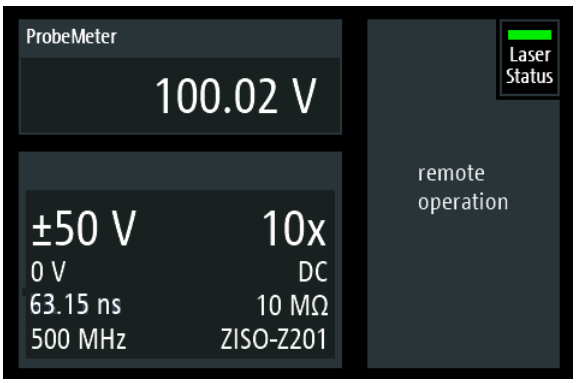
Item	Description
	R&S ZISO-Z202 • Square pin connector 2.54 mm (100 mil) • Bandwidth: > 1 GHz • Attenuation: 25:1 • Offset range: ±750 V • Dynamic input range: ±750 V • Maximum non-destructive input voltage: 1000 V (Vpp) • Maximum rating, handheld usage: 1000 V (RMS) CAT III • Accessories included in delivery, only for voltages < 25 V AC / 60 V DC: signal pin 1,85 mm, signal pin (angled), ground pin (spring loaded)
	R&S ZISO-Z203 • Wide square pin connector 5.08 mm (200 mil) • Bandwidth: > 1 GHz • Attenuation: 100:1 • Offset range: ±3000 V • Dynamic input range: ±3000 V • Maximum non-destructive input voltage: 2500 V (RMS) • Maximum rating, handheld usage: 1000 V (RMS) CAT III • Accessories included in delivery, only for voltages < 25 V AC / 60 V DC: signal pin 1,85 mm, signal pin (angled), ground pin (spring loaded)
	R&S ZISO-Z302 • Browser • Bandwidth: > 500 MHz • Attenuation: 100:1 • Offset range: ±3000 V • Dynamic input range: ±3000 V • Maximum rating, handheld usage: 1000 V (RMS) CAT III

2.7 Settings at the probe receiver display

The information on the probe receiver display depends on the connected oscilloscope. See Chapter 2.4, "Supported oscilloscopes", on page 13.

2.7.1 Supported Rohde & Schwarz oscilloscopes

The display shows the main settings, the measurement result of the R&S ProbeMeter, and indicates "remote operation" and the laser status. You set up the probe at the oscilloscope.



The signal information is desribed in "Signal label" on page 23.

Laser Status
The color indicates the current status of the laser:

- Green: the laser is working.
- Yellow: the laser needs service, but is still working.
- Red: defective laser, send it to your Rohde & Schwarz service center.

See also: Chapter 5.3, "Service interval", on page 46.

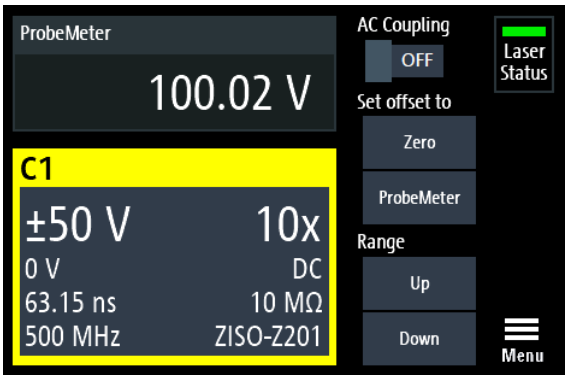
2.7.2 Unsupported oscilloscopes

You set up the probe at the probe receiver. The touchscreen provides direct access to the functionality.

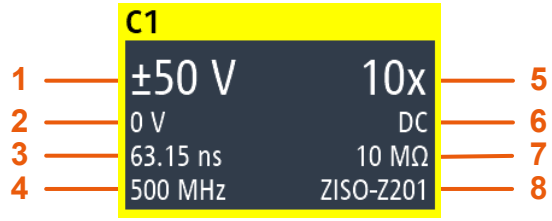
2.7.2.1 Main dialog

The main dialog offers the most commonly used functionality:

- Read the R&S ProbeMeter voltage.
- Change the input coupling.
- Set the offset to zero or to the R&S ProbeMeter value.
- Adjust the input voltage range with the "Up" and "Down" buttons.
- Check the laser status. See "Laser Status" on page 22.



Signal label
A label similar to the signal label at Rohde & Schwarz oscilloscopes displays the current settings.

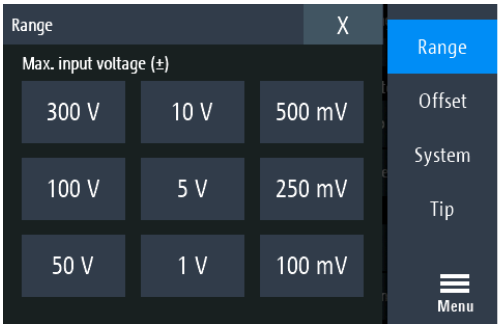


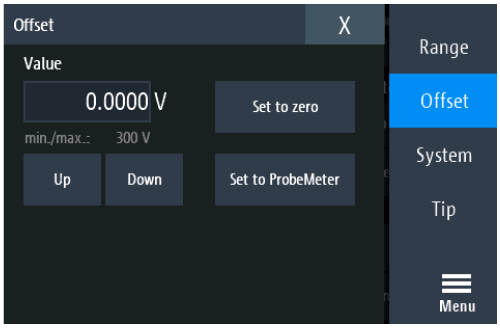
1 = Input range
2 = Offset
3 = Propagation delay
4 = Effective bandwidth
5 = Attenuation of the probe tip
6 = Coupling
7 = Input impedance
8 = Tip module

When you tap the signal label, you can change the channel name, and the channel color that is used on the display.

2.7.2.2 Range and offset settings

How to set up the vertical range and the offset of the input signal is described in Chapter 3.2.2.2, "Setting up the probe", on page 29.

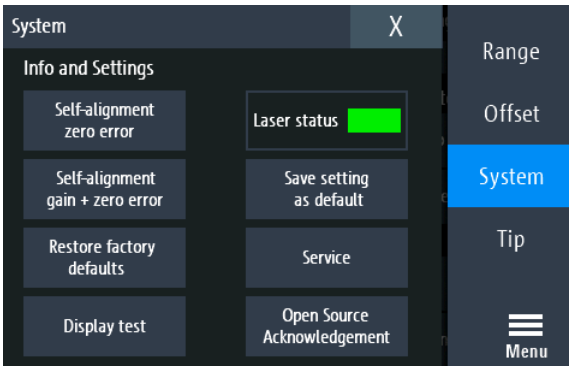




2.7.2.3 System settings

In the "System" dialog, you can:

- Run the self-alignment of the probe.
- Restore the factory settings.
- Run a display test.
- Check the state of the laser.
- Save the current settings (range, offset, coupling, channel name and channel color) as default. These settings are used at power-up of the R&S RT-ZISO when you use it with an unsupported oscilloscope.



"Service" is restricted for use by service personnel.

2.7.2.4 Tip module information

The "Tip" dialog shows the parameters of the connected tip module.

3 Connecting the probe

3.1 Handling the probe

The R&S RT-ZISO can withstand a moderate amount of physical and electrical stress. To avoid damage, treat the probe with care:

- Handle the probe by the probe receiver, probe head and probe box.
- Avoid strain on the probe cables and route them carefully.
- Keep the probe dry.
- Prevent the probe from receiving mechanical shock.
- Store the probe in its carrying case.

Preventing electrostatic discharge (ESD)

Electrostatic discharge is most likely to occur when you connect or disconnect a DUT.

► **NOTICE!** Electrostatic discharge can damage the electronic components of the product and the device under test (DUT).

Ground yourself to prevent electrostatic discharge damage:

a) Use a wrist strap and cord to connect yourself to ground.
b) Use a conductive floor mat and heel strap combination.

► Discharge cables and probe tips before you connect them.

ESD pulses can affect the operation of the R&S RT-ZISO:

- ESD pulses on the USB port can initiate a reboot of the probe receiver. After reboot is completed, the receiver works as intended.
- ESD pulses on the probe head can lead to a communication error message. After confirming this message, the receiver works as intended.

3.2 Connecting the probe receiver to the oscilloscope

3.2.1 Connecting the probe to a supported oscilloscope

The R&S RT-ZISO probe can be connected to supported oscilloscopes, which have inputs with Rohde & Schwarz probe interface. If your oscilloscope is not supported, refer to Chapter 3.2.2, "Connecting the probe to an unsupported oscilloscope", on page 28.

See also: Chapter 2.4, "Supported oscilloscopes", on page 13.

3.2.1.1 Connecting the probe box and the probe receiver

For connection, you need the scope connector cable.

1. Make sure that the oscilloscope is properly grounded.

   The probe receiver is grounded by the Rohde & Schwarz probe interface through the grounding of the oscilloscope.

2. Place the probe receiver on a stable, flat and level surface. Consider usage hints in Chapter 2.5.2, "Probe receiver", on page 15.

3. Connect the multicontact cable to the rear of the probe receiver.
   To connect the SMA cable (lowest connector), use a torque wrench with a torque of 0.6 Nm.

4. **NOTICE!** Risk of damaging the probe. Connect the probe box only to an input with Rohde & Schwarz probe interface. Never connect it to a usual BNC input, because this can damage the probe interface.

   Connect the probe box (2) to the Rohde & Schwarz probe interface of the oscilloscope (1).

   The probe snaps in when connected properly to the port.

Figure 3-1: Connecting the probe to the Rohde & Schwarz oscilloscope

5. In general, the receiver is powered via the scope connector cable. Depending on the oscilloscope used and the number of connected R&S RT-ZISO probes, an external power supply can be required. For example, if you use an MXO 5 with more than four R&S RT-ZISO probes, an external power supply is needed. The power LED at the receiver and the power monitor at the oscilloscope indicate insufficient power supply.
   If needed, connect the power supply to the right side of the probe receiver, and to the power grid. Connecting the power supply to the probe receiver during operation can lead to unforeseen behavior.

3.2.1.2 Identification of the probe and setup at the oscilloscope

When the probe box is connected to the oscilloscope and to the probe receiver, the oscilloscope recognizes the probe and reads out the probe-specific parameters.

The oscilloscope settings for attenuation and offset are automatically adjusted. All probe settings are done in the probe settings dialog. After the probe is connected to the oscilloscope and the settings are adjusted, the waveform is shown for the channel to which the probe is connected.

To compensate for the delay caused by the cable length of the optical isolated probe system, you can add the propagation delay to the skew value at the oscilloscope. The propagation delay is shown at the probe receiver.

For more information, refer to the user manual of your oscilloscope.

3.2.1.3 Disconnecting the probe receiver and the probe box

Before you disconnect the probe receiver from the oscilloscope, always disconnect the probe from the DUT.

1. Disconnect the probe from the DUT as described in "To disconnect the probe from the DUT" on page 32.
2. Disconnect the probe box:
   a) Press and hold the release button (3 in Figure 3-1).
   b) Pull the probe box away from the oscilloscope.
3. Remove the multicontact cable from the rear of the probe receiver.

3.2.2 Connecting the probe to an unsupported oscilloscope

The R&S RT-ZISO probe can be connected to any oscilloscope, including non-Rohde & Schwarz instruments. These oscilloscopes are named *unsupported oscilloscopes*, and they are not listed as supported instruments. See also: Chapter 2.4, "Supported oscilloscopes", on page 13.

Use only oscilloscopes whose channel inputs are separated from contact-hazardous voltages by double or reinforced insulation.

3.2.2.1 Connecting the probe receiver

For connection, you need the coaxial cable and the external power supply.

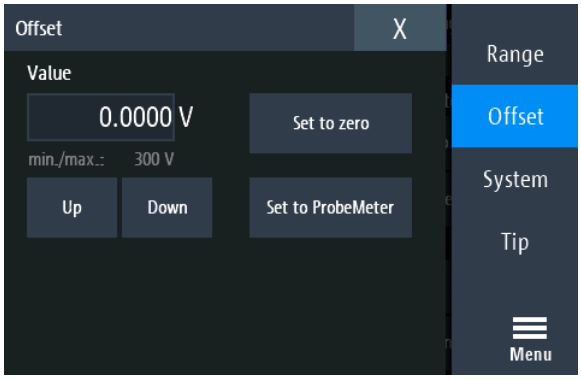
1. Make sure that the oscilloscope is properly grounded.
2. Place the probe receiver on a stable, flat and level surface. Consider the usage hints in Chapter 2.5.2, "Probe receiver", on page 15.
3. Using a torque wrench with a torque of 0.6 Nm, connect the coaxial cable to the SMA/BNC adapter, which is delivered with the isolated probe.
4. Connect the SMA/BNC adapter to the BNC input of the oscilloscope.
5. Using a torque wrench with a torque of 0.6 Nm, connect the coaxial cable to the rear of the probe receiver.
6. Connect the external power supply to the power grid.
7. Connect the external power supply to the power connector on the side panel of the probe receiver.
   Connecting the power supply to the probe receiver during operation can lead to unforeseen behavior. Use only the specified power supply, which is delivered with the instrument. You can order a spare power supply at Rohde & Schwarz, see the specifications document for order number.

3.2.2.2 Setting up the probe

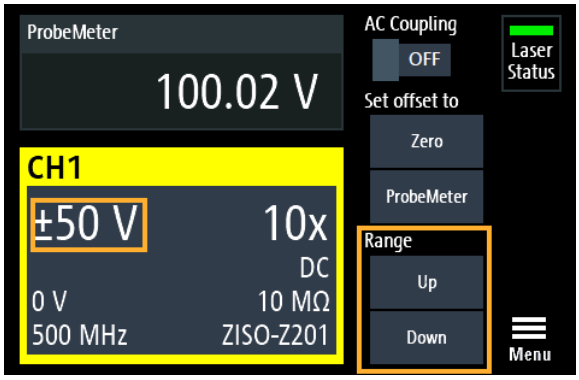
You adjust all probe settings at the probe receiver display. Because the probe settings are not transmitted to the oscilloscope, some adjustments at the oscilloscope are required.

To set up the probe receiver

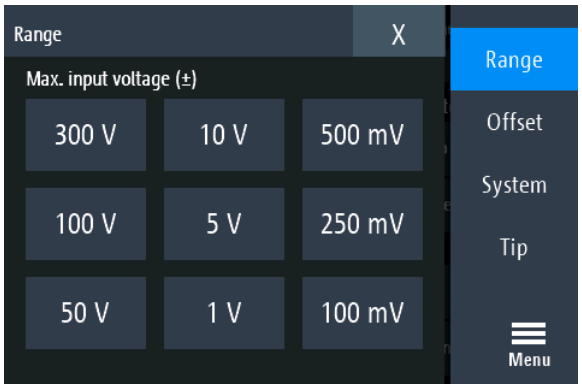
1. Set the coupling on the main dialog: "AC Coupling" = "On" or "Off" (DC coupling).
2. Set the offset:
   - To set the offset to zero, select "Zero" on the main dialog.
   - To set the offset to the measured R&S ProbeMeter value, select "ProbeMeter" on the main dialog.
   - To set the offset to another value, select "Menu" > "Offset". Enter the required value, or use the "Up" and "Down" buttons to adjust the value.



3. Set the range of the input signal:
   - To adjust the current value, use the "Up" and "Down" buttons on the main dialog.



- To set a value, select "Menu" > "Range". Select the input voltage.



To set up the oscilloscope

1. Set the probe attenuation to the value that is shown on the probe receiver. See "Signal label" on page 23.
2. To get correct signal display and measurement results, subtract the offset that is set on the probe receiver from the signal values. Therefore, you can use a math waveform, for example.

3.2.2.3 Disconnecting the probe receiver

Before you disconnect the probe receiver from the oscilloscope, always disconnect the probe from the DUT.

1. Disconnect the probe from the DUT as described in "To disconnect the probe from the DUT" on page 32.
2. Remove the external power supply from the power grid and the probe receiver.
3. Remove the coaxial cable from the rear of the probe receiver.
4. Remove the coaxial cable from the BNC input of the oscilloscope.

3.3 Connecting the probe to the DUT

To establish the connection to the DUT, you connect one of the tip modules to the probe head and to the DUT. The probe head, tip module and DUT can be the floating part of the measurement setup. The floating part is isolated from the grounded part (probe receiver, scope connector cable, oscilloscope) by the optical isolated cable. Thanks to this isolation, you can measure hazardous voltages, and optimal common mode rejection is achieved.

To ensure your personal safety, follow the procedure in the prescribed order. Never use the probe to measure effective working voltages higher than the specified voltage. Read and observe Chapter 1, "Safety and regulatory information", on page 5.

The probe can be used either handheld or with a tripod. Depending on the measured voltage and frequency, handheld use is not permitted and further safety measures must be applied. See Chapter 3.3.1, "Clearance requirements", on page 33.

To connect the probe to the DUT

1. **WARNING!** Read and observe safety instructions: "Using optical isolated probe systems" on page 7 and "Working with hazardous voltages" on page 7.

   Switch off the test circuit.

2. Connect the probe receiver to the oscilloscope as described in Chapter 3.2, "Connecting the probe receiver to the oscilloscope", on page 25.

3. Connect the tip module to the probe head.

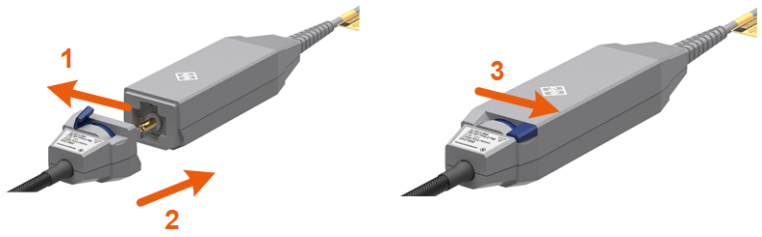


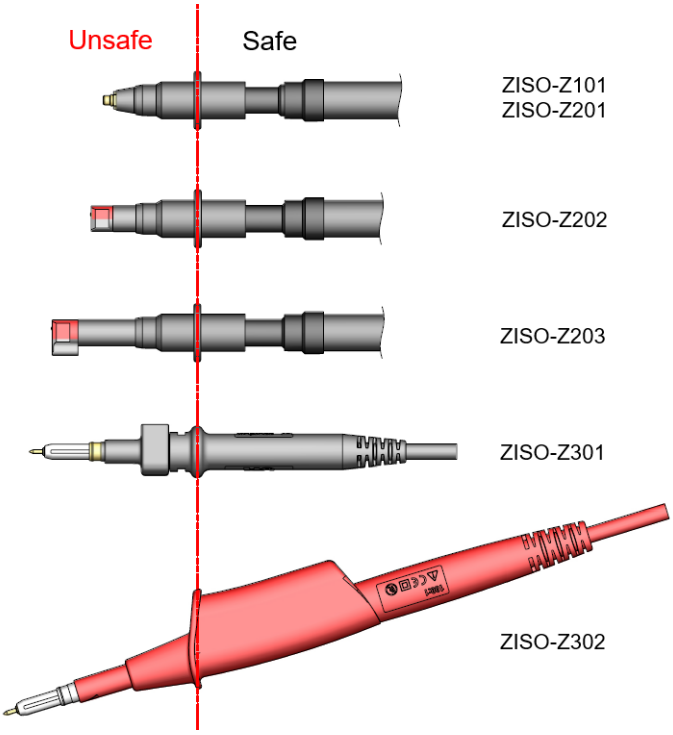
Figure 3-2: Attaching the tip module to the probe head

1 = open the lever
2 = attach the tip module
3 = close the lever

4. **WARNING!** Risk of electrical shock or RF burns. The probe can be used either handheld or with a tripod. Depending on the measured voltage and frequency, handheld use is not permitted and further safety measures must be applied. See Chapter 3.3.1, "Clearance requirements", on page 33.

   Attach the probe head to the tripod. Press the button at the tripod and rotate the probe head into the optimal position.
   We recommend using a tripod when measuring high frequency common mode signals. Touching the probe head or tip cable increases the capacitive coupling and can degrade the common mode loading on the DUT.

5. **WARNING!** When working on hazardous voltages, touch only the safe area of the tip module during a measurement. Do not touch exposed connections and components of the test circuit.



NOTICE! Connect the coaxial (common) shield of the tip module always to the low impedance section of the circuit. Connection to the high impedance section causes additional capacitance that can damage the probe and tip module.

- R&S ZISO-Z101 and R&S ZISO-Z201 (MMCX): the shield is the outer conductor.
- R&S ZISO-Z202 and R&S ZISO-Z203 (square pins): the shield connector is the black one.
- R&S ZISO-Z301 and R&S ZISO-Z302 (browser): the shield is the socket for reference lead connection.

Connect the tip module to the DUT. Ensure a stable connection between the DUT and the tip module.

6. Switch on the test circuit.

To disconnect the probe from the DUT

1. Switch off the test circuit.
2. Disconnect the tip module from the DUT. Observe the safety measures described in step 5 of the connecting procedure.
3. Remove the tip module from the probe head.

4. Disconnect the probe receiver from the oscilloscope. Disconnection from the measuring instrument is always the last step to ensure proper grounding of the receiver during the complete measurement process.

3.3.1 Clearance requirements

The floating section of the R&S RT-ZISO optical isolated probing system is safely isolated from the grounded section. When working on hazardous common voltage exceeding the CAT rating, you must use the tripod and keep a safe distance from the probe head, tip module and the energized DUT. The plastic covers of the probe head and the shielding of the tip cable do not provide safe isolation if the CAT rating is exceeded.

Refer to the derating curve in Figure 3-3 to identify safe operating areas.

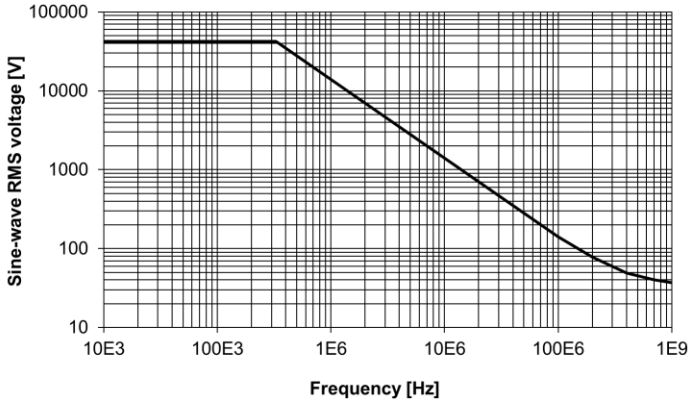


Figure 3-3: Maximum safe handling limits for common mode voltages between probe head and ground

In Figure 3-4, the RF burn area of 1 m (40 in) is indicated by a blue sphere around the probe head and probe tip. When measuring dangerous common mode signals exceeding the CAT rating, keep out of the RF burn hazard zone.

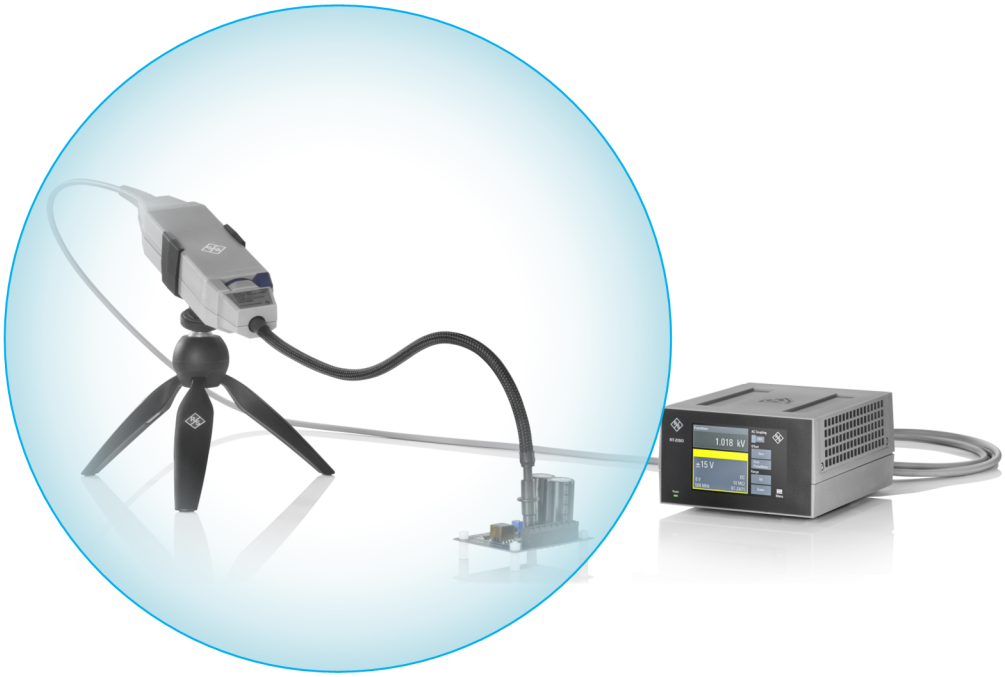


Figure 3-4: RF burn hazard zone around the probe head

3.4 Functional check

The functional check confirms the basic operation of the R&S RT-ZISO optical isolated probing system. The functional check is not suitable for verifying compliance with the probe specifications.

Functional check with supported oscilloscope

1. Connect the R&S RT-ZISO to the oscilloscope as described in Chapter 3.2.1, "Connecting the probe to a supported oscilloscope", on page 25.
2. Press the [Preset] key at the oscilloscope.
3. In the probe setup at the oscilloscope, start the gain and zero error alignment to align the R&S RT-ZISO.
4. Connect the delivered tip module R&S ZISO-Z301 to the probe head.
5. Set the vertical scale to 1 V/div.
6. Set the offset to 4 V.
7. Make sure that the probe tip has no contact.

   The oscilloscope shows a DC voltage of 0 V.

Functional check with unsupported oscilloscope

1. Connect the R&S RT-ZISO to the oscilloscope as described in Chapter 3.2.2, "Connecting the probe to an unsupported oscilloscope", on page 28.
2. Press the [Preset] key at the oscilloscope.
3. In the vertical setup at the oscilloscope, set the termination to 50 Ω.
4. At the probe receiver, select "Menu" > "System" > "Self-alignment gain + zero error" to align the R&S RT-ZISO.
5. Connect the delivered tip module R&S ZISO-Z301 to the probe head.
6. At the probe receiver, set the vertical range to 5 V: "Menu" > "Range" > "5 V".
7. In the probe setup at the oscilloscope, set the probe attenuation to the value that is shown on the probe receiver. See "Signal label" on page 23.
8. At the probe receiver, set the offset to 4 V: "Menu" > "Offset" > "Value" = "4 V"
9. Make sure that the probe tip has no contact.

   The oscilloscope shows a DC voltage of -4 V.

4 Features and characteristics of optical isolated probing systems

4.1 R&S ProbeMeter

The R&S ProbeMeter is an integrated voltmeter that measures DC voltages with higher precision compared to the oscilloscope's DC accuracy. The DC voltage is measured continuously and runs parallel to the time domain measurement of the oscilloscope.

High-precision measurements are achieved through immediate digitization of the measured DC voltage at the probe head.

The R&S ProbeMeter measures the differential mode DC voltage without reconnecting the probe.

When the R&S ProbeMeter is active, the measured values are displayed on the oscilloscope. The R&S ProbeMeter state is part of the probe settings of the channel to which the probe is connected. For details, refer to the user manual of the Rohde & Schwarz oscilloscope.

Advantages of the R&S ProbeMeter:

- Measures DC voltages of different levels, no need to adjust the measurement range of the oscilloscope.
- True DC measurement (integration time > 100 ms), not mathematical average of displayed waveform.
- High measurement accuracy and low temperature sensitivity.
- Simple means of setting the oscilloscope's trigger level and vertical scaling if a waveform is not visible.
- Independent of oscilloscope settings for position, vertical scale, horizontal scale, and trigger.
- Measurement range is ±3 V for ranges up to ±500 mV and ±30 V for larger ranges. The measurement range is multiplied with the tip attenuation. Maximum measurement accuracy is achieved when offset compensation is switched off.

4.2 Offset compensation

The offset compensation can compensate a DC component of the input signal between the positive and negative input in front of the active amplifier in the probe head. Offset compensation is particularly helpful if single-ended signals are measured with an isolated probe, for example, with the common shield connected to the ground. These signals often have a superimposed DC component, which can be compensated using the offset compensation on the probe.

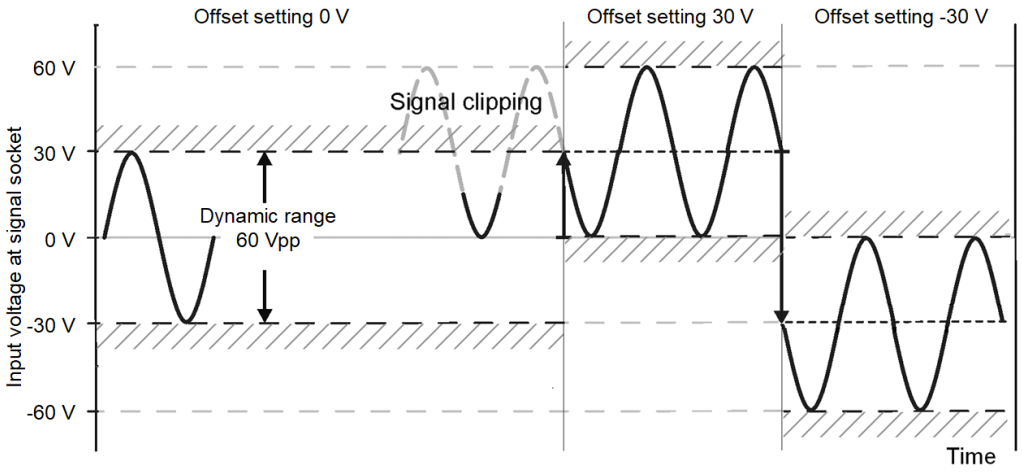


Figure 4-1: Offset compensation voltage for R&S RT-ZISO without tip module

There are several ways to set the offset compensation:

- If you use a supported oscilloscope:
  - Use the vertical knob at the oscilloscope if its function is set to offset.
  - Enter the offset value in the channel settings or probe settings on the Rohde & Schwarz oscilloscope. For more details, see the oscilloscope's user manual.
- If you use an unsupported oscilloscope, use the probe receiver display to set the offset to "ProbeMeter". For details, see Chapter 2.7.2.2, "Range and offset settings", on page 23.

4.3 Characteristics of isolated probes

The R&S RT-ZISO isolated probe has two sockets: the signal socket and the common shield socket.

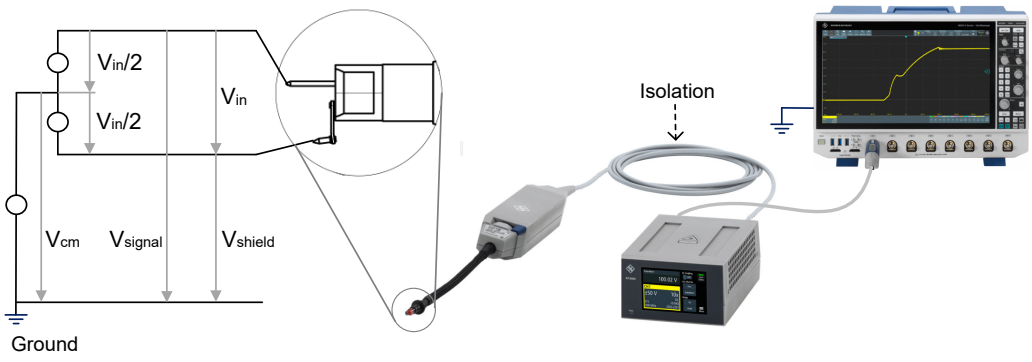


Figure 4-2: Voltages on an isolated probe

Two voltages can be defined for an isolated probe:

- Differential mode input voltage (V_{in})

Voltage between the signal socket and the common shield socket

- Common mode input voltage (V_{cm})
  Mean voltage of the signal socket and the common shield socket referred to the ground

The output voltage V_{out}, which is displayed on the oscilloscope, is obtained by superimposing the voltages generated from the differential mode input voltage and from the common mode input voltage:

$$V_{out} = A_{vdm}V_{in} + A_{vcm}V_{cm}$$

In this equation, A_{vdm} is the amplification of the differential mode input voltage and A_{vcm} is the amplification of the common mode input voltage.

An ideal isolated probe is expressed as $A_{vdm} = 1$ and $A_{vcm} = 0$. In this case, the displayed voltage exactly equals to the differential input voltage V_{in} between the two input sockets, and the common mode input voltage is suppressed.

4.3.1 Common mode rejection ratio (CMRR)

An ideal isolated probe outputs a voltage that depends only on the differential input voltage V_{in} between signal socket and common shield, and suppresses the common mode voltages. This is equivalent to an infinite common mode rejection ratio (CMRR).

In contrast, real probes have a finite CMRR, resulting in a small part of the common mode voltage visible in the output signal. The CMRR is defined as the ratio of the amplifications of differential and common mode input signals:

$$CMRR = \frac{A_{vdm}}{A_{vcm}}$$

Example:

If a differential input voltage of 1 V yields an output voltage of 10 mV (A_{vdm} = 0.01) and a common mode input voltage of 1 V an output voltage of 0.1 mV (A_{vcm} = 0.0001), the CMRR is 100 (40 dB).

A high CMRR is important if significant common mode signals are encountered at the probe input, for example:

- DC voltages for setting the operating points of active DUTs
- An interference that couples equally to both conductors of a differential transmission line
- Probing on ground-referenced signals. In this case, the common mode component is always equal to half of the input voltage.

4.3.2 Dynamic range and operating voltage window

Two separate specifications are necessary to characterize the permissible input voltage range of an isolated probe:

- The dynamic range designates the maximum differential voltage V_{in} that can occur between the signal socket and common shield socket.
- At the same time, the two voltage values at each of the two input sockets V_{signal} and V_{shield} referenced to the common ground must not exceed a specific limit value. This limitation is referred to as the operating voltage window (some manufacturers also use the less precise term "common mode range" for the same parameter).

Always adhere to the operating voltage window limitations. In handheld use, observe the CAT rating of the used tip module. If the dynamic range is exceeded, an unwanted signal clipping can occur.

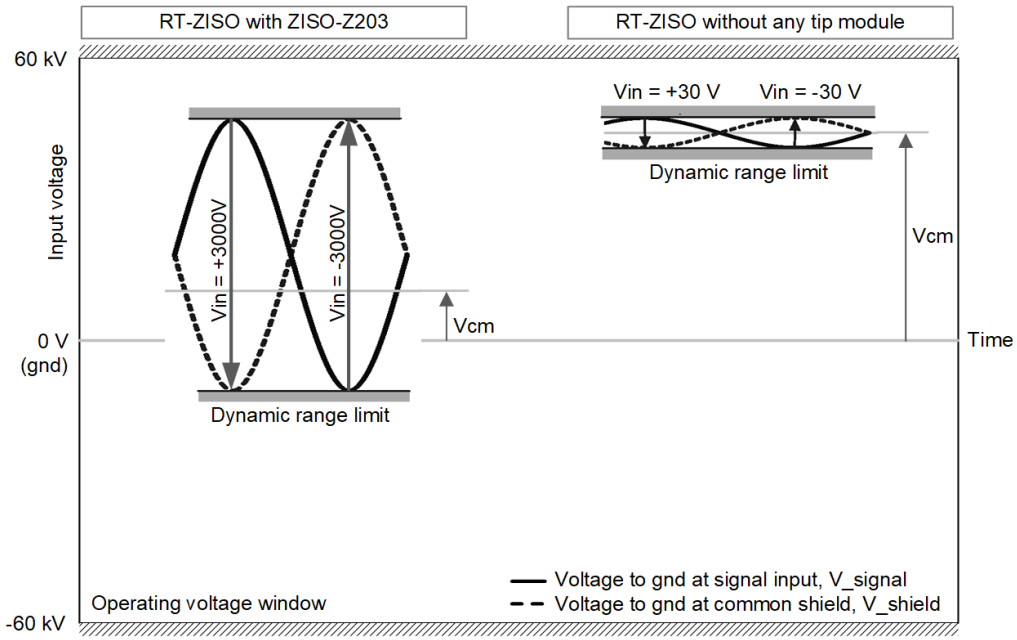


Figure 4-3: Dynamic range and operating voltage window for R&S RT-ZISO without any tip module and with R&S ZISO-Z203

The dependencies of dynamic range, operating voltage window and attenuation ratio are shown in Figure 4-3. The dynamic range between the signal socket and common shield socket depends on the selected attenuation and the selected tip module. The operating voltage window between each of the sockets and common ground is not affected by the attenuation.

The figure below shows several examples for permissible and impermissible inputs.

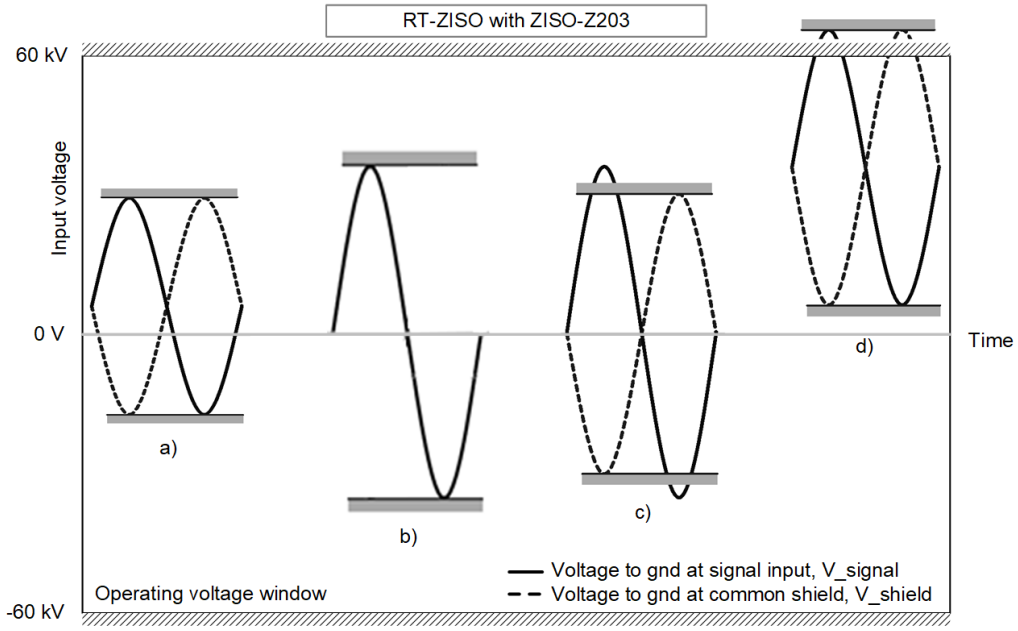


Figure 4-4: Signal curves R&S RT-ZISO with R&S ZISO-Z203

a) = Two signals of ±1500 V and opposing phase are applied to signal and common shield inputs. At the peaks, the probe is driven with an input voltage of ±3000 V between the signal and common shield socket. The dynamic range limit is reached.
b) = The common shield socket is connected to ground, the signal socket is driven with an input voltage of ±3000 V. The dynamic range limit is reached. The oscilloscope displays the same waveform as with example a).
c) = Dynamic range limit is exceeded. The oscilloscope displays a clipped signal.
d) = Operating voltage window is exceeded. In handheld use, observe the CAT rating of the used tip module.

Only differential input signals are detected by the probe and displayed by the base unit. Common mode signals are suppressed by the probe. Therefore, the user does not initially recognize that the operating voltage window is exceeded owing to inadmissible common mode voltages.

4.4 Typical characteristics of the R&S RT-ZISO

The R&S RT-ZISO isolated probe provides an electrical isolated connection between the DUT and the oscilloscope. The probe transfers the voltage of the electrical signal tapped off the DUT to the oscilloscope, where it is displayed graphically. Although a probe has a wide variety of specifications, these specifications can be grouped into two classes of basic requirements:

- High signal integrity of the transferred signal:
  With an ideal probe, the output signal that is transferred to the base unit is identical to the input signal between the probe tips, and signal integrity is extremely high. Every real probe, however, transfers the input signal in altered form. A good probe causes only minimum alterations. How the probe can fulfill this requirement is mainly determined by its bandwidth and CMRR.

- Low loading of the input signal:
  Every probe is a load for the signal to be measured. This means that the signal to be measured changes when the probe is connected. A good probe causes only a minimum change to the signal, so that the function of the DUT is not adversely affected. How the probe can fulfill this requirement is mainly determined by its input impedance.

The parameters of the R&S RT-ZISO probe are specified for the available tip modules and the probe without cables at the input.

4.4.1 Bandwidth

The bandwidth (BW) of a probe is one of its specific parameters. The bandwidth of the probe and the bandwidth of the base unit together form the system bandwidth. The following explanations refer to the probe itself, but can also be applied to the entire system.

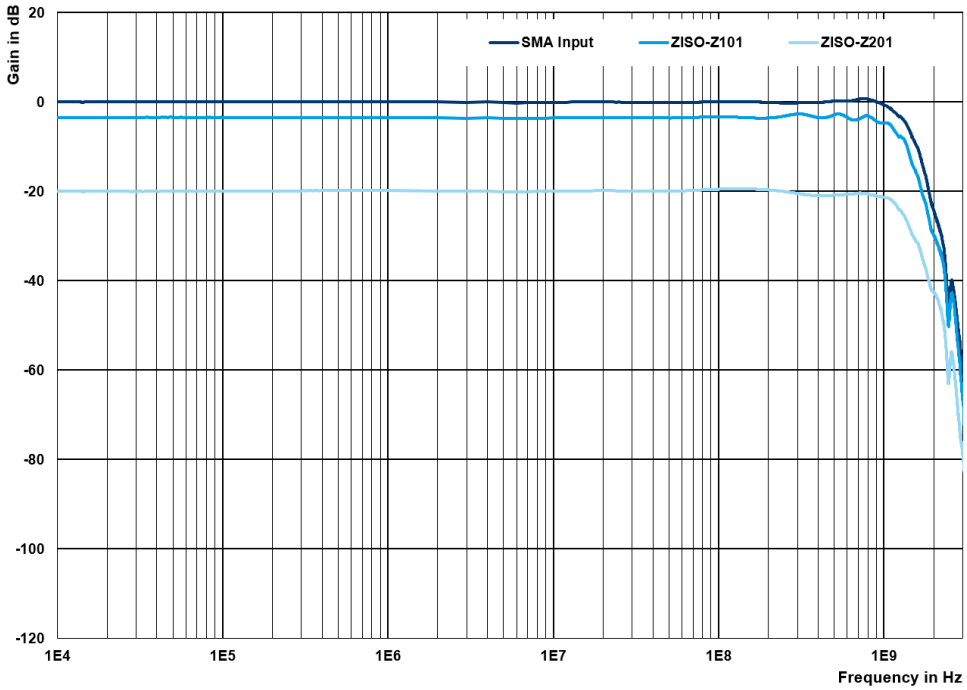


Figure 4-5: Probe gain of the R&S RT-ZISO with SMA input, R&S ZISO-Z101 and R&S ZISO-Z201

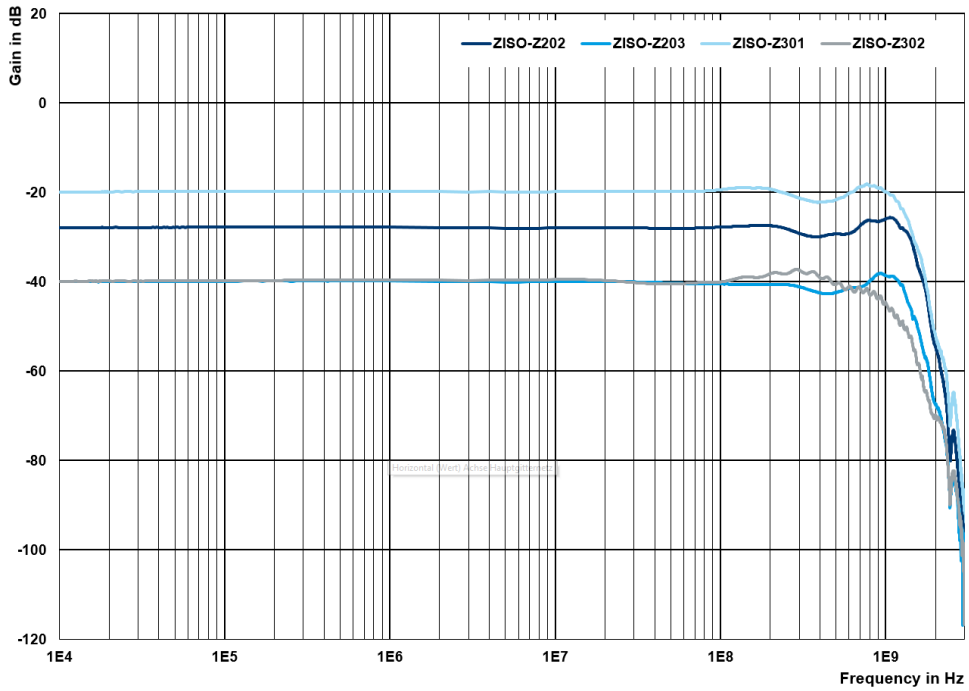


Figure 4-6: Probe gain of the R&S RT-ZISO with R&S ZISO-Z202, R&S ZISO-Z203, R&S ZISO-Z301 and R&S ZISO-Z302

The bandwidth:

- Specifies the maximum frequency at which a purely sinusoidal signal is still transferred at 70 % (–3 dB) of its amplitude.
- Specifies the transferable spectrum for other waveforms. E.g., with square-wave signals, the fifth harmonic should still be within the bandwidth for a high signal integrity.
- Determines the minimum measurable signal rise time. The rise time t_{rise} of the probe is inversely proportional to its bandwidth. The following approximation applies:
  $t_{rise} \approx 0.45 / BW$

4.4.2 Step response

In addition to bandwidth, a constant amplitude/frequency response of the probe is decisive for high signal integrity. All frequency components are transferred with the same gain so that the input signal is displayed without distortion.

A typical step response of R&S RT-ZISO with all R&S RT-ZISO-Zxxx up to 10 ns is shown in Figure 4-7. The propagation delay is normalized to the beginning of the step. The amplitude is normalized to the steady state value.

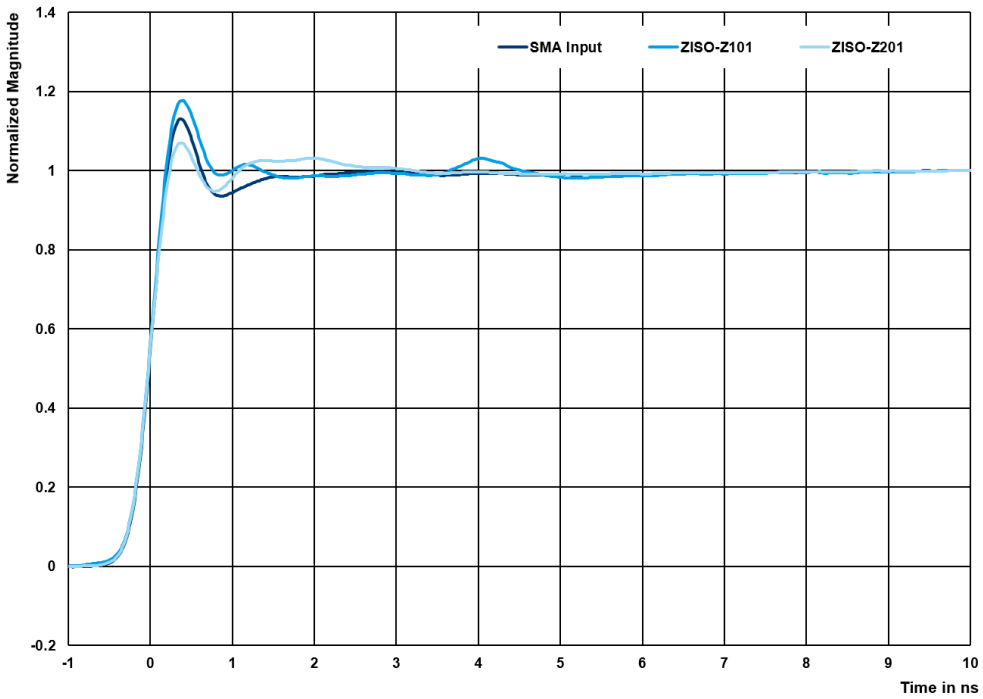


Figure 4-7: Step response of the R&S RT-ZISO with SMA input, R&S ZISO-Z101 and R&S ZISO-Z201

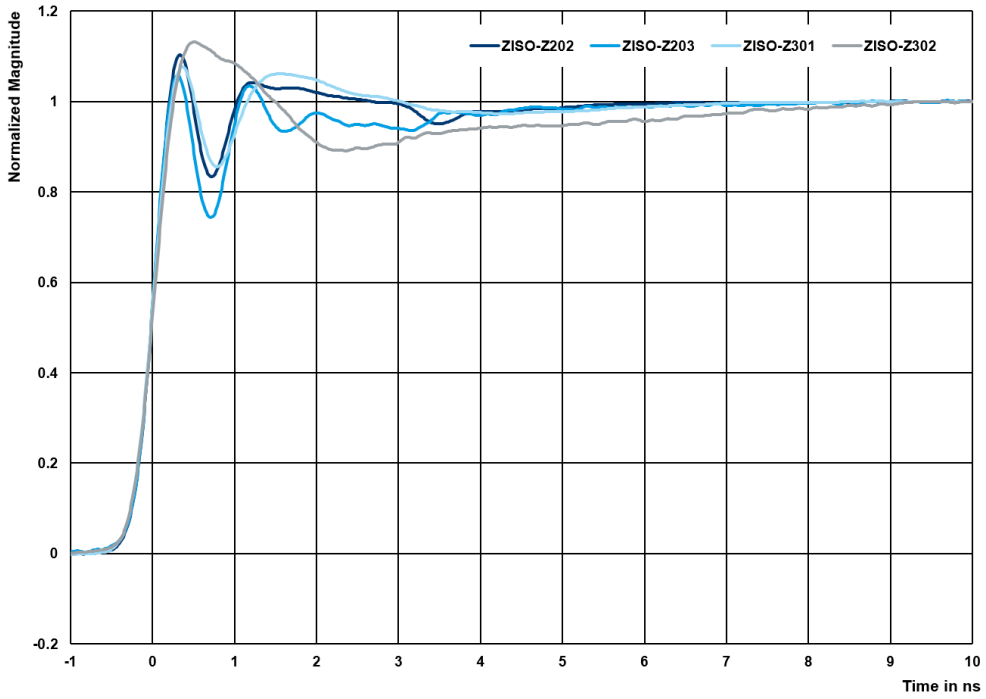


Figure 4-8: Step response of the R&S RT-ZISO with R&S ZISO-Z202, R&S ZISO-Z203, R&S ZISO-Z301 and R&S ZISO-Z302

The behavior of all R&S RT-ZISO-Zxxx is similar for more than 10 ns after a step.

4.4.3 CMRR

The CMRR is good for low-frequency signals, but it continuously decreases for higher frequencies. Therefore, the CMRR is usually specified as a function of frequency.

The figure below shows a typical CMRR for an optical isolated probing system with different tip modules.

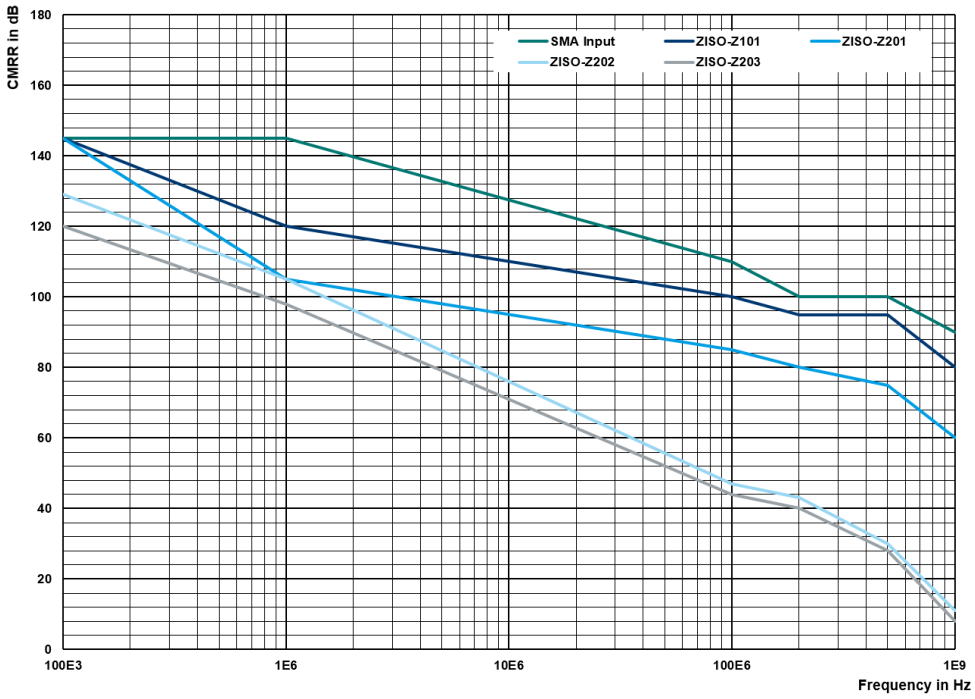


Figure 4-9: CMRR as a function of frequency

4.4.4 Signal loading of the input signal

The previous section explained the transfer function and step response of the probe. This section describes how the probe influences the input signal. The input signal loading caused by the probe is determined by its input impedance. In general, the probe causes only low signal loading because its input impedance is usually much greater than the source impedance of the test circuit.

The resulting input impedance versus frequency is indicated in Figure 4-10.

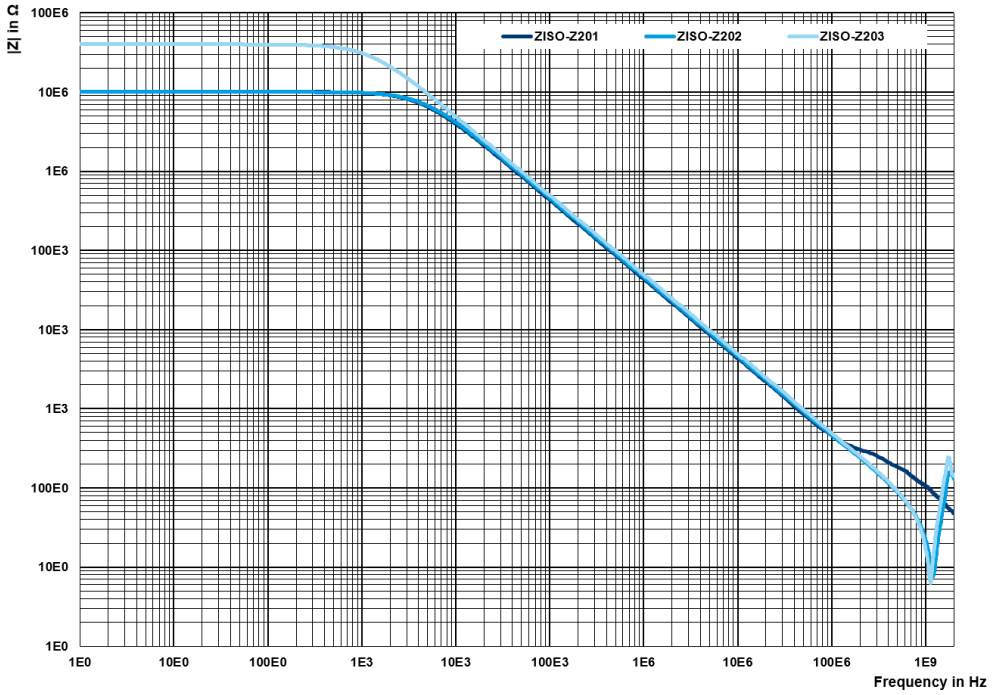


Figure 4-10: Magnitude of the input impedance as a function of frequency

5 Maintenance and service

Like all Rohde & Schwarz products, Rohde & Schwarz probes and adapters are of high quality and require only minimum service and repair. However, if service or calibration is needed, contact your Rohde & Schwarz service center. Return a defective product to the Rohde & Schwarz service center for diagnosis and exchange.

5.1 Cleaning

1. Clean the outside of the product using a soft cloth moistened with either distilled water or isopropyl alcohol. Keep in mind that the casing is not waterproof.

   Note: Do not use cleaning agents. Solvents (thinners, acetone), acids and bases can damage the labeling or plastic parts.

2. Dry the product completely before using it.

5.2 Storage and transport

Protect the product against dust. Ensure that the environmental conditions, e.g. temperature range and climatic load, meet the values specified in the specifications document.

Store the product in a shock-resistant case, e.g. in the shipping case.

Unless otherwise specified in the specifications document, the maximum transport altitude without pressure compensation is 4500 m above sea level.

5.3 Service interval

Under normal working conditions, the service interval of the laser is 10 000 hours. Depending on the usage conditions, for example high ambient temperature or long-term operation, the interval can be shorter and service is required at an earlier time. The "Laser Status" LED on the probe receiver display indicates when service is required.

See also:

- "Laser Status" on page 22
- Chapter 5.6, "Returning for servicing", on page 47

5.4 Calibration interval

The recommended calibration interval for R&S RT-ZISO optical isolated probing system is two years. For servicing, send the probe to your nearest Rohde & Schwarz service center (see Chapter 5.6, "Returning for servicing", on page 47).

5.5 Contacting customer support

Technical support – where and when you need it

For quick, expert help with any Rohde & Schwarz product, contact our customer support center. A team of highly qualified engineers provides support and works with you to find a solution to your query on any aspect of the operation, programming or applications of Rohde & Schwarz products.

Contact information

Contact our customer support center at www.rohde-schwarz.com/support, or follow this QR code:

Figure 5-1: QR code to the Rohde & Schwarz support page

5.6 Returning for servicing

Use the original packaging to return your R&S RT-ZISO to your Rohde & Schwarz service center. A list of all service centers is available on:

www.services.rohde-schwarz.com

If you cannot use the original packaging, consider the following:

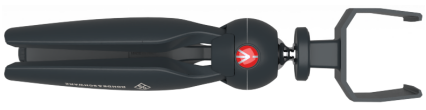
1. Use a sufficiently sized box.
2. Protect the product from damage and moisture (e.g. with bubble wrap).
3. Use some kind of protective material (e.g. crumpled newspaper) to stabilize the product inside the box.
4. Seal the box with tape.

5. Address the package to your nearest Rohde & Schwarz service center.

5.7 Spare parts

You can order the following items and accessories using the "Spare Part Request" form at the Rohde & Schwarz Service and Support Request portal. Alternatively, order the spare parts via e-mail: sparepart-ordercenter.munich@rohde-schwarz.com. Use the order numbers provided in the following table.

Table 5-1: Spare parts for R&S RT-ZISO

Pos.	Item	Description	Order number
1		Accessory case	1804.5275.00
2		Inlay set for accessory case	1804.5281.00
3		Mini tripod	1804.4940.00
4		PH stand clip	1803.4098.00

Pos.	Item	Description	Order number
5		Coax cable SMA_M-SMA_M 1m	1804.4927.00
6		Scope connector cable	1803.3491.02
7		GST40A12-P1J Power supply 40W 12V	3644.1042.00
8		Adapter SMA jack BNC plug	1316.0762.00
9		ZISO-Z101 Tip MMCX 1.5X 45V 50OHM	1803.4100.02

Pos.	Item	Description	Order number
10		ZISO-Z201 Tip MMCX 10X 300V 10MΩ	1803.4200.02
11		ZISO-Z202 Tip SQPIN 25X 750V 10MΩ	1803.4300.02
12		ZISO-Z203 Tip WSQPIN 100X 3KV 10MΩ	1803.4400.02
13		ZISO-Z301 Tip browser 10X 300V 10MΩ	1803.4500.02
14		ZISO-Z302 Tip browser 100X 3KV 100MΩ	1803.4600.02
15		Adapter SMA Plug MMCX Jack Accessory for: • ZISO-Z101 Tip MMCX 1.5X 45V 50OHM • ZISO-Z201 Tip MMCX 10X 300V 10MΩ	1804.5269.00
16		Signal pin 1.85mm, F/M Accessory for: • ZISO-Z202 Tip SQPIN 25X 750V 10MΩ • ZISO-Z203 Tip WSQPIN 100X 3KV 10MΩ	3723.6669.00

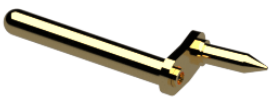
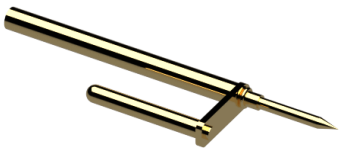
Pos.	Item	Description	Order number
17		Signal pin fix, angular Accessory for: • ZISO-Z202 Tip SQPIN 25X 750V 10MΩ • ZISO-Z203 Tip WSQPIN 100X 3KV 10MΩ	1804.5375.00
18		Ground pin, spring loaded Accessory for: • ZISO-Z202 Tip SQPIN 25X 750V 10MΩ • ZISO-Z203 Tip WSQPIN 100X 3KV 10MΩ	1804.5398.00

Table 5-2: Parts for ESD prevention

Pos.	Item	Material number
1	ESD wrist strap	0008.9959.00
2	ESD grounding cable	1043.4962.00

5.8 Disposal

Rohde & Schwarz is committed to making careful, ecologically sound use of natural resources and minimizing the environmental footprint of our products. Help us by disposing of waste in a way that causes minimum environmental impact.

Disposing of electrical and electronic equipment

A product that is labeled as follows cannot be disposed of in normal household waste after it has come to the end of its life. Even disposal via the municipal collection points for waste electrical and electronic equipment is not permitted.

Figure 5-2: Labeling in line with EU directive WEEE

Rohde & Schwarz has developed a disposal concept for the eco-friendly disposal or recycling of waste material. As a manufacturer, Rohde & Schwarz completely fulfills its obligation to take back and dispose of electrical and electronic waste. Contact your local service representative to dispose of the product.