R&S®RT-Zxx
High-Voltage and Current Probes
Specifications

ROHDE&SCHWARZ

Test & Measurement

Data Sheet | 14.00

CONTENTS

Definitions 3

Probe/oscilloscope chart 4

R&S®RT-ZH10/-ZH11 high-voltage probes 5

R&S®RT-ZD01 high-voltage differential probe 8

R&S®RT-ZC05B/-ZC10(B)/-ZC15B/-ZC20(B)/-ZC30 current probes 11

R&S®RT-ZA13 probe power supply 16

Ordering information 17

Definitions

General
Product data applies under the following conditions:

- Three hours storage at ambient temperature followed by 30 minutes warm-up operation
- Specified environmental conditions met
- Recommended calibration interval adhered to

Specifications with limits
Represent warranted product performance by means of a range of values for the specified parameter. These specifications are marked with limiting symbols such as <, ≤, >, ≥, ±, or descriptions such as maximum, limit of, minimum. Compliance is ensured by testing or is derived from the design. Test limits are narrowed by guard bands to take into account measurement uncertainties, drift and aging, if applicable.

Specifications without limits
Represent warranted product performance for the specified parameter. These specifications are not specially marked and represent values with no or negligible deviations from the given value (e.g. dimensions or resolution of a setting parameter). Compliance is ensured by design.

Typical data (typ.)
Characterizes product performance by means of representative information for the given parameter. When marked with <, > or as a range, it represents the performance met by approximately 80 % of the instruments at production time. Otherwise, it represents the mean value.

Measured values (meas.)
Characterize expected product performance by means of measurement results gained from individual samples.

Typical data as well as measured values are not warranted by Rohde & Schwarz.

Probe/oscilloscope chart

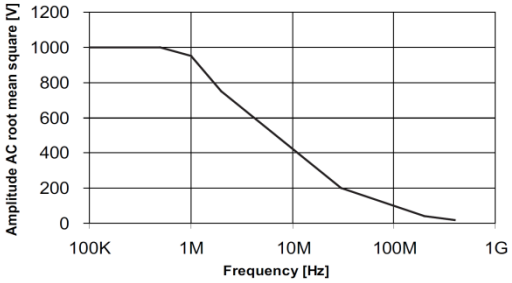
Base unit: R&S®	RTM				RTE/RTO							RT-ZA9	Page
Probe: R&S®	**200 MHz**	**350 MHz**	**500 MHz**	**1 GHz**	**200 MHz**	**350 MHz**	**500 MHz**	**600 MHz**	**1 GHz**	**2 GHz**	**4 GHz**		
Passive probes													
RT-ZH10	●	●	●	●	●	●	●	●	●	●	●		5
RT-ZH11	●	●	●	●	●	●	●	●	●	●	●		5
Differential probes													
RT-ZD01	●	●	●	●	●	●	●	●	●	●	●		8
Current probes													
RT-ZC10	○	○	○	○	○	○	○	○	○	○	○		11
RT-ZC20	○	○	○	○	○	○	○	○	○	○	○		11
RT-ZC30	●	●	●	●	●	●	●	●	●	●	●		11
RT-ZC05B	●	●	●	●	●	●	●	●	●	●	●		11
RT-ZC10B	●	●	●	●	●	●	●	●	●	●	●		11
RT-ZC15B	●	●	●	●	●	●	●	●	●	●	●		11
RT-ZC20B	●	●	●	●	●	●	●	●	●	●	●		11

● recommended extra
○ possible accessory, with limited functionality of probe or base unit

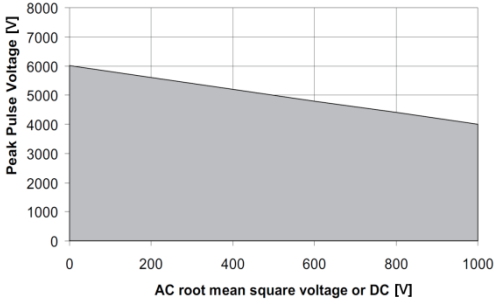
R&S®RT-ZH10/-ZH11 high-voltage probes

All parameters are valid when the probe is connected to an appropriate Rohde & Schwarz oscilloscope with an input impedance of 1 MΩ. See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

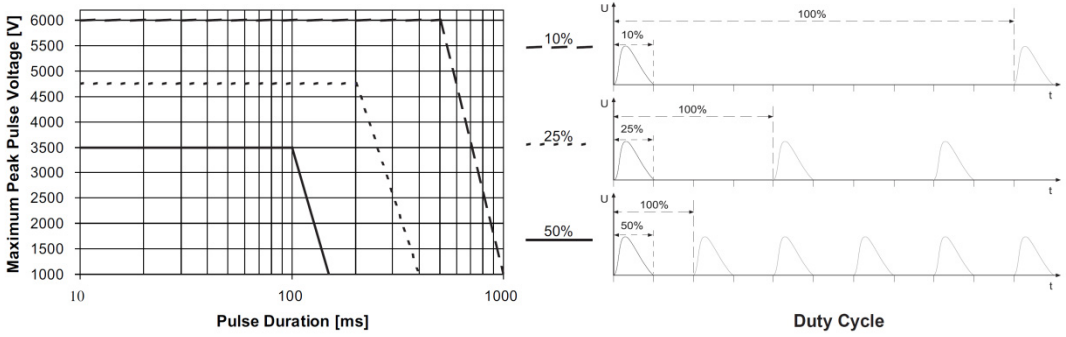
		R&S®RT-ZH10	R&S®RT-ZH11
Step response			
Rise time	system, 10 % to 90 %	900 ps (meas.)	
Frequency response			
Bandwidth	system, –3 dB, starting at DC	> 400 MHz	
Input impedance			
DC input resistance	system	50 MΩ ± 1 %	
Input capacitance	system	7.5 pF (meas.)	
DC characteristics			
Attenuation	system, automatically corrected on base unit display	100:1	1000:1
Attenuation error	probe only, with ideal 1 MΩ load impedance	±2 %	
Attenuation voltage coefficient		±0.0005 %/V (meas.)	
Maximum rated input voltage			
Continuous voltage	derated, see figures on page 6	1000 V (RMS), CAT II	
Transient overvoltage		±4000 V	
Base unit			
Input capacitance	must be compensated by probe's LF compensation	5 pF to 20 pF	
Input coupling		1 MΩ AC/DC	



R&S®RT-ZH10/-ZH11 maximum rated sine-wave root mean square voltage versus frequency, CAT I.



R&S®RT-ZH10/-ZH11 maximum root mean square voltage versus peak pulse voltage, CAT I.



R&S®RT-ZH10/-ZH11 maximum pulse derating, CAT I.

General data

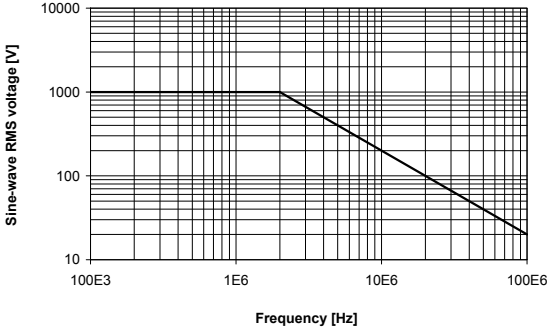
Temperature		
Temperature loading	operating temperature range	0 °C to +50 °C
	storage temperature range	−40 °C to +70 °C
Climatic loading		80 % relative humidity for temperatures up to +31 °C, decreasing linearly to 40 % at +50 °C
Altitude	operation	up to 2000 m
	transport	up to 15000 m
Safety		in line with Low Voltage Directive 2006/95/EC, IEC/EN 61010-31 (pollution degree 2)
Mechanical data		
Dimensions	diameter of probe tip	approx. 5 mm (0.2 in)
	cable length	approx. 2 m (79 in)
Weight	probe only	approx. 67 g (0.15 lb)

R&S®RT-ZD01 high-voltage differential probe

All parameters are valid when the probe is connected to an appropriate Rohde & Schwarz oscilloscope with an input impedance of 1 MΩ. See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

		R&S®RT-ZD01	
Attenuation setting		100:1	1000:1
Step response			
Rise time	10 % to 90 %	< 3.5 ns (meas.)	
Frequency response			
Bandwidth	starting at DC, calculated from 0.35/rise time	100 MHz	
Common mode rejection	DC to 100 Hz	80 dB (meas.)	
	100 Hz to 1 MHz	50 dB (meas.)	
Input impedance			
DC input resistance	differential (between signal sockets)	8 MΩ	
	single-ended (each signal socket to ground)	4 MΩ	
Input capacitance	differential (between signal sockets)	3.5 pF (meas.)	
	single-ended (each signal socket to ground)	7 pF (meas.)	
DC characteristics			
Attenuation error		±2 %	
Zero error		±0.5 V (meas.)	±5 V (meas.)
Dynamic range			
Differential input	between signal sockets	±140 V	±1400 V
Operating voltage window	each signal socket to ground	±1400 V	
Noise voltage	referenced to probe input	90 mV (RMS) (meas.)	0.9 V (RMS) (meas.)

Maximum rated input voltage		
Continuous voltage	derated, see figure, each signal socket to ground	1000 V (RMS), CAT III
Base unit		
Input coupling		1 MΩ AC/DC



Maximum rated sine-wave root mean square voltage versus frequency.

General data

Temperature		
Temperature loading	operating temperature range	0 °C to +40 °C
	storage temperature range	−30 °C to +70 °C
Climatic loading		85 % relative humidity
Altitude	operation	up to 2000 m
	transport	up to 4600 m
EMC		in line with EMC Directive 2004/108/EC, IEC/EN 61326-1, IEC/EN 61326-2-2
Calibration interval		2 years
Safety		in line with Low Voltage Directive 2006/95/EC, IEC/EN 61010-31 (pollution degree 2)
Mechanical data		
Dimensions	probe head (L × W × H)	approx. 207 mm × 83 mm × 38 mm (8.1 in × 3.2 in × 1.5 in)
	length of input leads	approx. 30 cm (12 in)
	length of probe cable	approx. 90 cm (35 in)
Weight	probe only	approx. 500 g (1.1 lb)

R&S®RT-ZC05B/-ZC10(B)/-ZC15B/-ZC20(B)/-ZC30 current probes

All parameters are valid when the probe is connected to an appropriate Rohde & Schwarz oscilloscope with an input impedance of 1 MΩ. See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

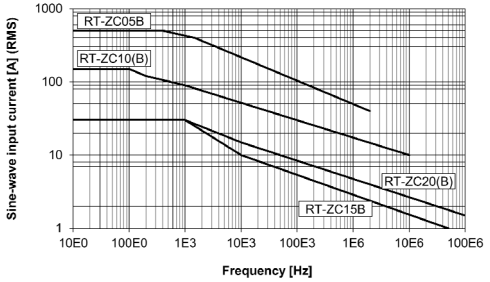
		R&S®RT-ZC05B	R&S®RT-ZC10(B)
Step response			
Rise time	10 % to 90 %	175 ns (meas.)	35 ns (meas.)
Frequency response			
Bandwidth	–3 dB, starting at DC	2 MHz (meas.)	10 MHz (meas.)
Input impedance		see figure on page 15	
DC characteristics			
Sensitivity		0.01 V/A	
Sensitivity error	+23 °C ±3 °C	±1 %	
Zero error	referenced to probe input after demagnetizing and zero adjustment	±500 mA (meas.)	±100 mA (meas.)
AC characteristics			
AC sensitivity error (sinusoidal, 45 Hz to 66 Hz)	+23 °C ±3 °C	±1 % ± 500 mA (RMS) (meas.)	±1 % ± 100 mA (RMS) (meas.)
	0 °C to +40 °C	±3 % ± 500 mA (RMS) (meas.)	±3 % ± 100 mA (RMS) (meas.)
Measurement due to external magnetic fields	400 A/m magnetic field, DC or 60 Hz, referenced to probe input	< 800 mA (RMS) (meas.)	< 150 mA (RMS) (meas.)
Maximum rated input			
Maximum continuous current	derated, see figures on page 15	500 A (RMS)	150 A (RMS)
Maximum transient current	peak	±700 A	±300 A
Other			
Noise	20 MHz measurement bandwidth, referenced to probe input	25 mA (RMS) (meas.)	

		R&S®RT-ZC15B	R&S®RT-ZC20(B)
Step response			
Rise time	10 % to 90 %	7 ns (meas.)	3.5 ns (meas.)
Frequency response			
Bandwidth	–3 dB, starting at DC	50 MHz (meas.)	100 MHz (meas.)
Input impedance		see figure on page 15	
DC characteristics			
Sensitivity		0.1 V/A	
Sensitivity error	+23 °C ±3 °C	±1 %	
Zero error	referenced to probe input after demagnetizing and zero adjustment	±10 mA (meas.)	
AC characteristics			
AC sensitivity error (sinusoidal, 45 Hz to 66 Hz)	+23 °C ±3 °C	±1 % ± 10 mA (RMS) (meas.)	
	0 °C to +40 °C	±3 % ± 10 mA (RMS) (meas.)	
Measurement due to external magnetic fields	400 A/m magnetic field, DC or 60 Hz, referenced to probe input	< 20 mA (RMS) (meas.)	< 5 mA (RMS) (meas.)
Maximum rated input			
Maximum continuous current	derated, see figures on page 15	30 A (RMS)	
Maximum transient current	peak	±50 A	
Other			
Noise	20 MHz measurement bandwidth, referenced to probe input	2.5 mA (RMS) (meas.)	

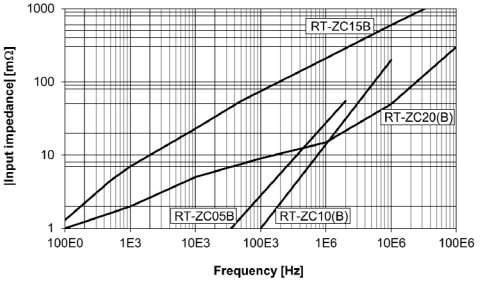
		R&S®RT-ZC30
Step response		
Rise time	10 % to 90 %	2.9 ns (meas.)
Frequency response		
Bandwidth	–3 dB, starting at DC	120 MHz (meas.)
Input impedance		see figure on page 15
DC characteristics		
Sensitivity		1 V/A
Sensitivity error	+23 °C ±3 °C	±3 %
Zero error	referenced to probe input after demagnetizing and zero adjustment	±1 mA (meas.)
AC characteristics		
AC sensitivity error	+23 °C ±3 °C	±3 % ± 1 mA (RMS) (meas.)
(sinusoidal, 45 Hz to 66 Hz)	0 °C to +40 °C	±5 % ± 1 mA (RMS) (meas.)
Measurement due to external magnetic fields	400 A/m magnetic field, DC or 60 Hz, referenced to probe input	< 5 mA (RMS) (meas.)
Maximum rated input		
Maximum continuous current	derated, see figures on page 15	5 A (RMS)
Maximum transient current	peak	±7.5 A
Other		
Noise	30 MHz measurement bandwidth, referenced to probe input	60 µA (RMS) (meas.)

General data

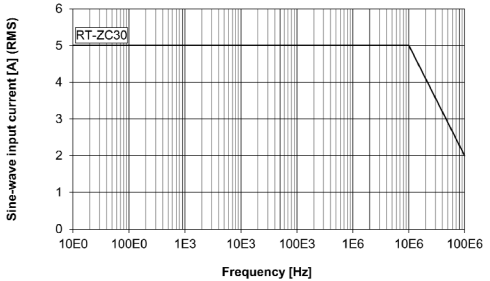
		R&S®RT-ZC05B/ R&S®RT-ZC10(B)	R&S®RT-ZC15B/ R&S®RT-ZC20(B)/ R&S®RT-ZC30
Temperature			
Temperature loading	operating temperature range	0 °C to +40 °C	
	storage temperature range	−10 °C to +50 °C	
Climatic loading		80 % relative humidity	
Altitude	operation	up to 2000 m	
Safety		in line with EN 61010-2-032 (type D sensor, insulated conductor only)	
EMC		in line with EN 61326-1, CISPR 11/EN 55011 (class B, table 2)	
Calibration interval		2 years	
Mechanical data			
Dimensions	max. conductor diameter	approx. 20 mm (0.79 in)	approx. 5 mm (0.2 in)
	cable length, probe	approx. 2 m (78.7 in)	approx. 1.5 m (59 in)
	cable length, power supply of R&S®RT-ZCxx	approx. 1 m (39.4 in)	approx. 1 m (39.4 in)
	probe head (W × H × L)	approx. 27 mm × 69 mm × 176 mm (1.06 in × 2.72 in × 6.93 in)	approx. 18 mm × 40 mm × 175 mm (0.71 in × 1.57 in × 6.89 in)
Weight	probe only	approx. 500 g (1.1 lb)	approx. 240 g (0.53 lb)
Interface	R&S®RT-ZCxx	BNC	
	R&S®RT-ZCxxB	Rohde & Schwarz probe interface	
Supply voltage	R&S®RT-ZCxx	external power supply necessary (e.g. R&S®RT-ZA13) ±12 V ± 0.5 V (5.5 W)	
	R&S®RT-ZCxxB	power supply by Rohde & Schwarz probe interface	



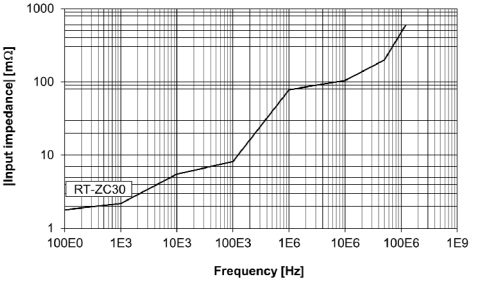
Maximum rated sine-wave root mean square input current versus frequency.



Input impedance (meas.).



Maximum rated sine-wave root mean square input current versus frequency.



Input impedance (meas.).

R&S®RT-ZA13 probe power supply

Electrical data		
Number of channels		4
Output voltage		±12 V ± 0.5 V
Maximum output current	sum total of all channels	2.5 A
Power requirements		100 V to 240 V, 50/60 Hz
Maximum rated input power		170 W

General data

Safety		in line with EN 61010-1
EMC		in line with EN 61326-1 (class B equipment), EN 61000-3-2, EN 61000-3-3
Mechanical data		
Dimensions	W × H × L	approx. 80 mm × 119 mm × 200 mm (3.1 in × 4.7 in × 7.9 in)
Weight		approx. 1.1 kg (2.4 lb)
Connector		LEMO FFA.OS.304.CLAC44Z

Ordering information

Designation	Type	Order No.
High-voltage passive probes		
400 MHz High-Voltage Probe, passive, 100:1, 50 MΩ, 7.5 pF, 1 kV (RMS) Incl. adjustment tool; BNC adapter 5.0-L; coding rings (set) 3 × 4 colors; flexible adapter 5.0-L; ground lead 22 cm (2); ground lead 22 cm to 4 mm banana plug; insulating cap 5.0-L; operating manual; protection cap 5.0-L; safety alligator clip (2); solid tip 0.8 mm (5); spring tip 0.8 mm (5); sprung hook 5.0-L (2)	R&S®RT-ZH10	1409.7720.02
400 MHz High-Voltage Probe, passive, 1000:1, 50 MΩ, 7.5 pF, 1 kV (RMS) See R&S®RT-ZH10 for equipment included	R&S®RT-ZH11	1409.7737.02
Differential probes		
100 MHz, 1.4 kV High-Voltage Probe, differential, 1 kV RMS (CAT III) Incl. sprung hook 4 mm (2); USB power cord; carrying case; operating manual	R&S®RT-ZD01	1422.0703.02
Current probes		
10 MHz, AC/DC, 0.01 V/A, 150 A (RMS) Incl. carrying case; operating manual	R&S®RT-ZC10	1409.7750K02
100 MHz, AC/DC, 0.1 V/A, 30 A (RMS) Incl. carrying case; operating manual	R&S®RT-ZC20	1409.7766K02
120 MHz, AC/DC, 1 V/A, 5 A (RMS) Incl. carrying case; operating manual	R&S®RT-ZC30	1409.7772K02
2 MHz, AC/DC, 0.01 V/A, 500 A (RMS), Rohde & Schwarz probe interface Incl. carrying case; operating manual	R&S®RT-ZC05B	1409.8204.02
10 MHz, AC/DC, 0.01 V/A, 150 A (RMS), Rohde & Schwarz probe interface Incl. carrying case; operating manual	R&S®RT-ZC10B	1409.8210.02
50 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde & Schwarz probe interface Incl. carrying case; operating manual	R&S®RT-ZC15B	1409.8227.02
100 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde & Schwarz probe interface Incl. carrying case; operating manual	R&S®RT-ZC20B	1409.8233.02

Designation	Type	Order No.
Accessories and sets		
Mini Clips, contains: mini clip (10)	R&S®RT-ZA4	1416.0428.02
Micro Clips, contains: micro clip (4)	R&S®RT-ZA5	1416.0434.02
Lead Set, contains: lead 6 cm (2.4 in) (5); lead 15 cm (5.9 in) (5)	R&S®RT-ZA6	1416.0440.02
Probe Box to N/USB Adapter	R&S®RT-ZA9	1417.0909.02
SMA(f) to BNC(m) Adapter	R&S®RT-ZA10	1416.0457.02
Probe Power Supply	R&S®RT-ZA13	1409.7789.02

Service that adds value

- Worldwide
- Local and personalized
- Customized and flexible
- Uncompromising quality
- Long-term dependability

Sustainable product design

- Environmental compatibility and eco-footprint
- Energy efficiency and low emissions
- Longevity and optimized total cost of ownership

Certified Quality Management
ISO 9001

Certified Environmental Management
ISO 14001

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