

R&S® RT-Zxx Oscilloscope Probes Specifications



CONTENTS

Definitions.....	3
Probe/oscilloscope chart.....	4
R&S® RT-ZP10, R&S® RTM-ZP10 passive probes.....	5
R&S® RT-ZH10/-ZH11 high-voltage probes	8
R&S® RT-ZZ80 transmission line probe	11
R&S® RT-ZS10/-ZS10E/-ZS20/-ZS30 active probes	13
R&S® RT-ZS60 active probe	17
R&S® RT-ZD01 high-voltage differential probe.....	20
R&S® RT-ZD10/-ZD20/-ZD30 differential probes	23
R&S® RT-ZD40 differential probe	30
R&S® RT-ZC10/-ZC20 current probes	33
R&S® RT-ZA13 probe power supply	36
Ordering information	37

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 $<$, \leq , $>$, \geq , \pm , 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

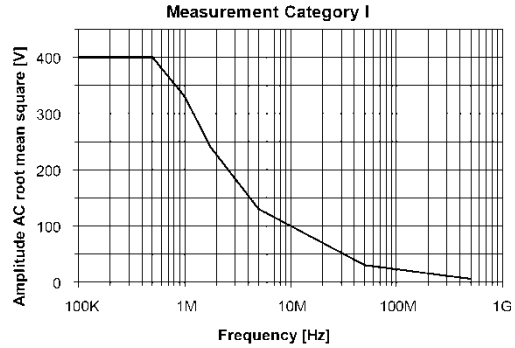
Probe: R&S®	Base unit: R&S®					RT-ZA9	Page
	RTM	RTO					
		600 MHz	1 GHz	2 GHz	4 GHz		
Passive probes							
RT-ZP10		●	●	●	●		5
RTM-ZP10	●						
RT-ZH10	●	●	●	●	●		8
RT-ZH11	●	●	●	●	●		
RT-ZZ80	○	●	●	●	●	○	11
Active probes							
RT-ZS10E	●	●	○	○	○	●	13
RT-ZS10	●	●	○	○	○	●	
RT-ZS20	○	○	●	○	○	●	
RT-ZS30	○	○	○	●	○	●	
RT-ZS60	○	○	○	○	●	●	
Differential probes							
RT-ZD01	●	●	●	●	●		20
RT-ZD10	●	●	○	○	○	●	23
RT-ZD20	○	○	●	○	○	●	
RT-ZD30	○	○	○	●	○	●	
RT-ZD40	○	○	○	○	●	●	30
Current probes							
RT-ZC10	●	●	●	●	●		33
RT-ZC20	●	●	●	●	●		

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

R&S[®]RT-ZP10, R&S[®]RTM-ZP10 passive probes

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

		R&S [®] RT-ZP10	R&S [®] RTM-ZP10
Step response			
Rise time	system, 10 % to 90 %	700 ps (meas.)	
Frequency response			
Bandwidth	system, -3 dB, starting at DC	> 500 MHz	
Input impedance			
DC input resistance	system	10 M Ω \pm 1 %	
Input capacitance	system	9.5 pF (meas.)	
DC characteristics			
Attenuation	system, automatically corrected on base unit display	10:1	
Attenuation error	probe only, with ideal 1 M Ω load impedance	\pm 2 %	
Attenuation voltage coefficient		\pm 0.0025 %/V (meas.)	
Maximum rated input voltage			
Continuous voltage	derated, see figure on page 6	400 V (RMS), CAT I 300 V (RMS), CAT II	
Transient overvoltage		\pm 1250 V	
Base unit			
Use with		R&S [®] RTO	R&S [®] RTM
Input capacitance	must be compensated by probe's LF compensation	5 pF to 20 pF	
Input coupling		1 M Ω AC/DC	



R&S®RT-ZP10, R&S®RTM-ZP10 maximum rated sine-wave root mean square voltage versus frequency.

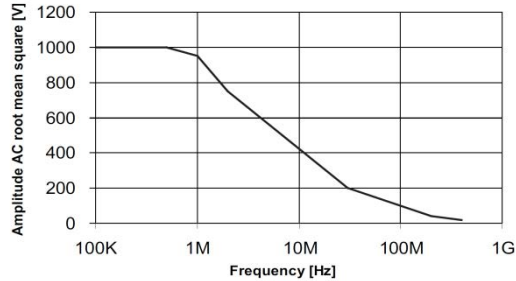
General data

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	2.5 mm (0.1 in)
	cable length	approx. 1.3 m (51 in)
Weight	probe only	approx. 48 g (0.1 lb)

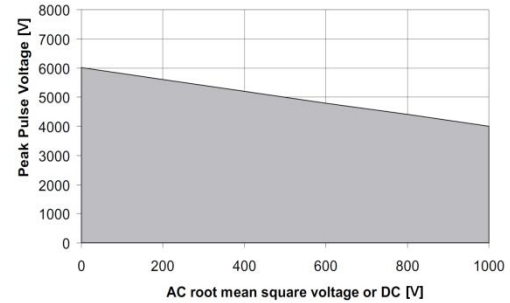
R&S[®] RT-ZH10/-ZH11 high-voltage probes

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

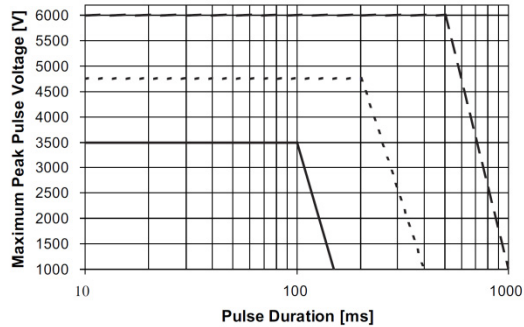
		R&S [®] RT-ZH10	R&S [®] RT-ZH11
Step response			
Rise time	system, 10 % to 90 %	900 ps (meas.)	
Frequency response			
Bandwidth	system, -3 dB, starting at DC	> 400 MHz	
Input impedance			
DC input resistance	system	50 M Ω \pm 1 %	
Input capacitance	system	7.5 pF (meas.)	
DC characteristics			
Attenuation	system, automatically corrected on base unit display	100:1	1000:1
Attenuation error	probe only, with ideal 1 M Ω load impedance	\pm 2 %	
Attenuation voltage coefficient		\pm 0.0005 %/V (meas.)	
Maximum rated input voltage			
Continuous voltage	derated, see figures on page 9	1000 V (RMS), CAT II	
Transient overvoltage		\pm 4000 V	
Base unit			
Input capacitance	must be compensated by probe's LF compensation	5 pF to 20 pF	
Input coupling		1 M Ω AC/DC	



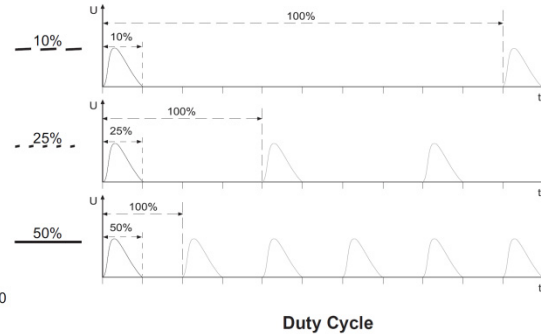
R&S®RT-ZH10/-ZH11 maximum rated sine-wave root mean square voltage versus frequency, CAT I.



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	5 mm (0.2 in)
	cable length	approx. 2 m (79 in)
Weight	probe only	approx. 67 g (0.15 lb)

R&S[®] RT-ZZ80 transmission line probe

All parameters are valid for the probe only when connected to a host instrument with an input impedance of 50 Ω . See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

		R&S [®] RT-ZZ80
Step response		
Rise time	10 % to 90 %	< 60 ps
Frequency response		
Bandwidth	starting at DC	8.0 GHz (meas.)
Input impedance		
DC input resistance	system	500 $\Omega \pm 1 \%$
Input capacitance		0.3 pF (meas.)
DC characteristics		
Attenuation	system	10:1
Attenuation error	probe only, with ideal 50 Ω load impedance	$\pm 1 \%$
Maximum nondestructive input voltage		
Continuous voltage		20 V (RMS)
ESD tolerance	human body model	2 kV (meas.)

General data

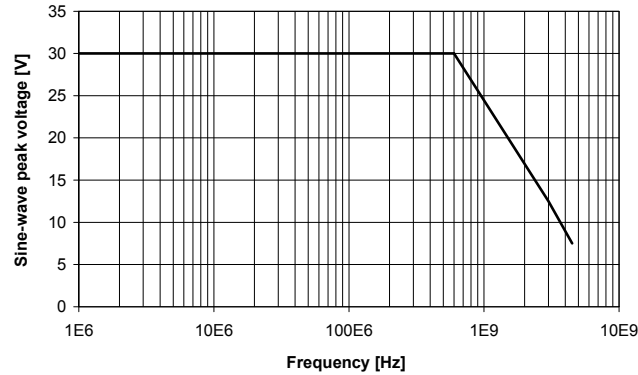
Temperature		
Temperature loading	operating temperature range	0 °C to +50 °C
	storage temperature range	-40 °C to +70 °C
Climatic loading		+25 °C/+40 °C cyclic at 95 % relative humidity without condensation, in line with IEC 60068-2-30
Altitude	operation	up to 3000 m
	transport	up to 4600 m
Calibration interval		2 years
Safety		in line with IEC/EN 61010-1
Mechanical data		
Dimensions	probe head (L × W × H)	approx. 68 mm × 12 mm × 7.5 mm (2.68 in × 0.47 in × 0.3 in)
	cable length	approx. 1.1 m (43 in)
	overall length	approx. 1.2 m (48 in)
Weight	probe only	approx. 40 g (0.1 lb)

R&S® RT-ZS10/-ZS10E/-ZS20/-ZS30 active probes

All parameters are valid for the probe only when connected to a host instrument with an input impedance of 50 Ω.
See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

		R&S® RT-ZS10/ R&S® RT-ZS10E	R&S® RT-ZS20	R&S® RT-ZS30
Step response				
Rise time	10 % to 90 %	< 350 ps	< 250 ps	< 135 ps
Flatness	starting 2 ns after edge	2 % (meas.)		
Propagation delay		5.5 ns (meas.)		
Frequency response				
Bandwidth	starting at DC, calculated from rise time	1.0 GHz	1.5 GHz	3.0 GHz
Flatness	100 kHz to 100 MHz	0.2 dB (meas.)	0.2 dB (meas.)	0.2 dB (meas.)
	100 MHz to 500 MHz	–	0.5 dB (meas.)	0.5 dB (meas.)
	500 MHz to 1 GHz	–	–	0.5 dB (meas.)
Input impedance				
DC input resistance		1 MΩ		
Input capacitance		0.8 pF (meas.)		

DC characteristics		
Attenuation		10:1
Attenuation error	after applying digital correction factors	±0.5 %
Temperature drift, attenuation		±60 ppm/°C
Zero error	after applying digital correction factors, referenced to probe input	
	+15 °C to +35 °C	±2 mV
	0 °C to +50 °C	±4 mV
Temperature drift, zero error	referenced to probe input	±90 µV/°C
Dynamic range		
DC		±8 V (+ offset compensation setting)
Offset compensation range	not available with R&S®RT-ZS10E	±12 V
Offset compensation error	offset compensation setting = 0 V	no additional error
	offset compensation setting ≠ 0 V	±0.2 % of setting ± 2 mV (meas.)
AC	with zero or compensated DC component	16 V (V _{pp})
Total harmonic distortion	16 V (V _{pp}) sine-wave input at 300 MHz for R&S®RT-ZS10/-ZS10E, 1 GHz for R&S®RT-ZS20/-ZS30	-35 dB (meas.)
Noise voltage	referenced to probe input	2 mV (RMS) (meas.)
Maximum nondestructive input voltage		
DC peak voltage		±30 V
AC peak voltage	derated, see figure on page 15	30 V
ESD tolerance	human body model	8 kV (meas.)



Maximum nondestructive sine-wave peak voltage versus frequency.

R&S® ProbeMeter

Specifications for measurement error apply only when offset compensation setting is 0 V. Specifications for input impedance, dynamic range and maximum nondestructive input voltage apply. The R&S®RT-ZS10E probe is not equipped with an R&S®ProbeMeter.

Measurement error	+15 °C to +35 °C	±0.1 % of reading ± 750 µV
	0 °C to +50 °C	±0.2 % of reading ± 1.5 mV
Temperature drift		±50 ppm/°C of reading ± 40 µV/°C
50/60 Hz rejection		> 87 dB
Integration time		147 ms

General data

Temperature		
Temperature loading	operating temperature range	0 °C to +50 °C
	storage temperature range	-40 °C to +70 °C
Climatic loading		+25 °C/+40 °C cyclic at 95 % relative humidity without condensation, in line with IEC 60068-2-30
Altitude	operation	up to 3000 m
	transport	up to 4600 m
Mechanical resistance		
Vibration	sinusoidal	5 Hz to 150 Hz, max. 2 g at 55 Hz; 0.5 g from 55 Hz to 150 Hz; in line with EN 60068-2-6
	random	10 Hz to 500 Hz, acceleration 1.9 g (RMS) in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E
EMC		in line with EMC Directive 2004/108/EC, IEC/EN 61326-1 (class B, table 2), IEC/EN 61326-2-1, CISPR 11/EN 55011
Calibration interval		2 years
Safety		in line with IEC/EN 61010-1
Mechanical data		
Dimensions	probe head (W × H × L)	approx. 12 mm × 7.5 mm × 68 mm (0.47 in × 0.3 in × 2.68 in)
	cable length	approx. 1.1 m (43 in)
	overall length	approx. 1.3 m (51 in)
Weight	probe only	approx. 90 g (0.2 lb)

R&S[®] RT-ZS60 active probe

All parameters are valid for the probe only when connected to a host instrument with an input impedance of 50 Ω. See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

		R&S [®] RT-ZS60
Step response		
Rise time	10 % to 90 %	< 67 ps
Flatness	starting 2 ns after edge	2 % (meas.)
Propagation delay		5.5 ns (meas.)
Frequency response		
Bandwidth	starting at DC, calculated from rise time	6.0 GHz
Flatness	100 kHz to 100 MHz	0.3 dB (meas.)
	100 MHz to 1 GHz	0.3 dB (meas.)
Input impedance		
DC input resistance		1 MΩ
Input capacitance	see figure on page 19 for input impedance	0.3 pF (meas.)
DC characteristics		
Attenuation		10:1
Attenuation error	after applying digital correction factors	
	0 °C to +50 °C	±0.5 %
Temperature drift, attenuation		±100 ppm/°C
Zero error	after applying digital correction factors, referenced to probe input	
	+15 °C to +35 °C	±2 mV
	0 °C to +50 °C	±4 mV
Temperature drift, zero error	referenced to probe input	±100 μV/°C

Dynamic range		
DC		±8 V (+ offset compensation setting)
Offset compensation range		±10 V
Offset compensation error	not when offset compensation setting = 0 V	±0.2 % of setting ± 2 mV (meas.)
AC	with zero or compensated DC component	16 V (V_{pp})
Total harmonic distortion	16 V (V_{pp}) sine-wave input	-70 dB (meas.)
Noise voltage	referenced to probe input	2 mV (RMS) (meas.)
Maximum nondestructive input voltage		
DC peak voltage		±30 V
AC peak voltage	derated, see figure on page 19	30 V
ESD tolerance	human body model	2 kV (meas.)

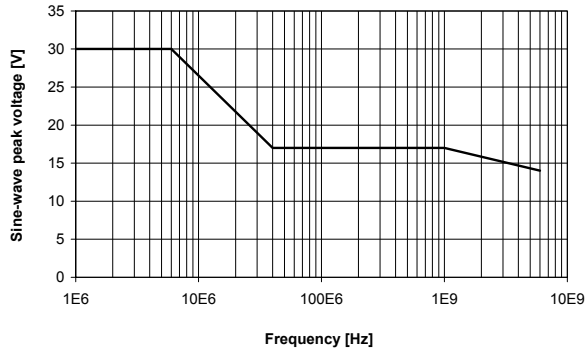
R&S® ProbeMeter

Specifications for measurement error apply only when offset compensation setting is 0 V. Specifications for input impedance, dynamic range and maximum nondestructive input voltage apply. The R&S®RT-ZS60 probe is not equipped with an R&S®ProbeMeter.

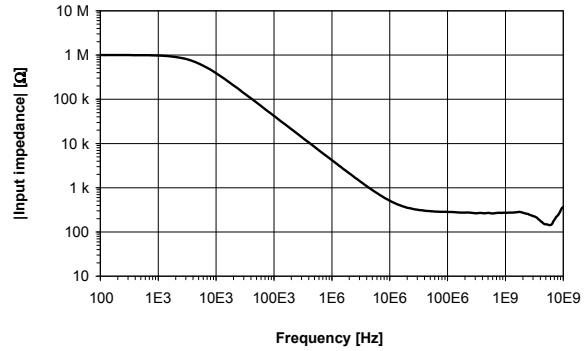
Measurement error	+15 °C to +35 °C	±0.1 % of reading ± 2 mV
	0 °C to +50 °C	±0.2 % of reading ± 4 mV
Temperature drift		±50 ppm/°C of reading ± 100 µV/°C
50/60 Hz rejection		> 87 dB
Integration time		147 ms

General data

See page 16.



Maximum nondestructive sine-wave peak voltage versus frequency.



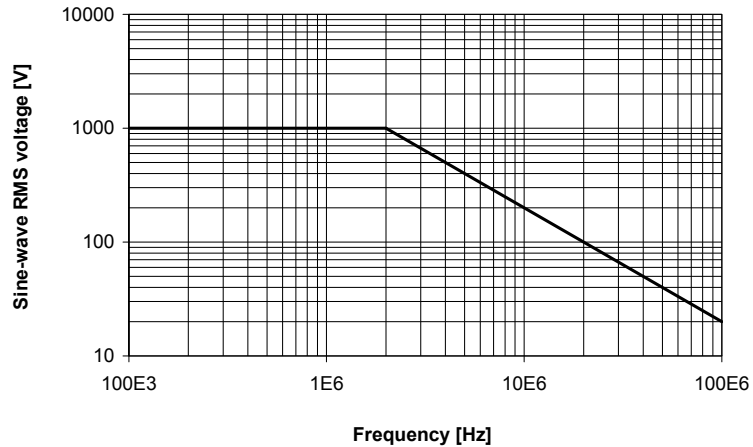
Input impedance versus frequency.

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 M Ω . 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 M Ω	
	single-ended (each signal socket to ground)	4 M Ω	
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 on page 21, each signal socket to ground	1000 V (RMS), CAT III
Base unit		
Input coupling		1 M Ω 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)

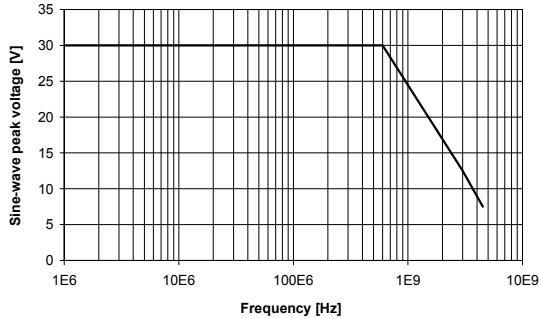
R&S® RT-ZD10/-ZD20/-ZD30 differential probes

All parameters are valid for the probe only when connected to a host instrument with an input impedance of 50 Ω. See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

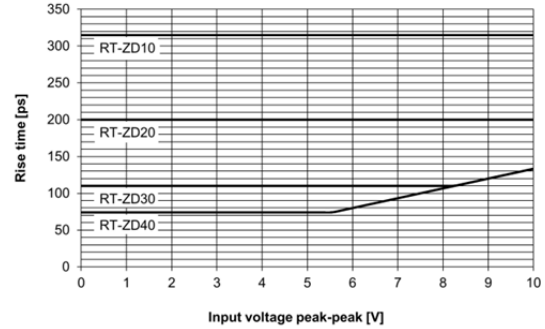
		R&S® RT-ZD10	R&S® RT-ZD20	R&S® RT-ZD30
Step response				
Rise time	10 % to 90 %	< 350 ps	< 250 ps	< 135 ps
Flatness	starting 2 ns after edge	2 % (meas.)		
Slew rate	referenced to probe input, see figure on page 25	60 V/ns (meas.)		
Propagation delay		5.5 ns (meas.)		
Frequency response				
Bandwidth	starting at DC, calculated from rise time	1.0 GHz	1.5 GHz	3.0 GHz
Flatness	100 kHz to 100 MHz	0.2 dB (meas.)	0.2 dB (meas.)	0.2 dB (meas.)
	100 MHz to 500 MHz	–	0.5 dB (meas.)	0.5 dB (meas.)
	500 MHz to 1 GHz	–	–	0.5 dB (meas.)
Common mode rejection	DC to 10 kHz	> 50 dB		
	10 kHz to 1 MHz	40 dB (meas.)		
	1 MHz to 1 GHz	30 dB (meas.)		
	> 1 GHz	20 dB (meas.)		
Input impedance				
DC input resistance	between signal sockets	1 MΩ		
	each signal socket to ground	500 kΩ		
Input capacitance	between signal sockets	0.6 pF (meas.)		
	each signal socket to ground	0.8 pF (meas.)		

DC characteristics		
Attenuation		10:1
Attenuation error	after applying digital correction factors	±0.5 %
Temperature drift, attenuation		±50 ppm/°C
Zero error	after applying digital correction factors, referenced to probe input	
	+15 °C to +35 °C	±3 mV
	0 °C to +50 °C	±6 mV
Temperature drift, zero error	referenced to probe input	±150 µV/°C
Dynamic range		
Differential input	between signal sockets	±5 V (+ offset compensation setting)
Offset compensation range		±5 V
Offset compensation error	offset compensation setting = 0 V	no additional error
	offset compensation setting ≠ 0 V	±0.2 % of setting ± 2 mV (meas.)
Operating voltage window	each signal socket to ground	±8 V (+ cm offset compensation setting) ¹
CM offset compensation range ¹		±22 V
CM offset compensation error	cm offset compensation setting = 0 V	no additional error
	cm offset compensation setting ≠ 0 V	±0.2 % of setting ± 2 mV (meas.)
Total harmonic distortion	10 V (V _{pp}) sine-wave input at 1 GHz	-35 dB (meas.)
Noise voltage	referenced to probe input	3 mV (RMS) (meas.)
Maximum nondestructive input voltage		
DC peak voltage	each signal socket to ground	±30 V
AC peak voltage	each signal socket to ground, derated, see figure on page 25	30 V
ESD tolerance	human body model, each signal socket to ground	8 kV (meas.)

¹ Available starting with serial number 200000. Older probes have ±5 V operating voltage window and no cm offset compensation.



Maximum nondestructive sine-wave peak voltage versus frequency.



Rise time versus input voltage (meas.).

R&S® ProbeMeter

Specifications for measurement error apply only when offset compensation setting is 0 V. Specifications for input impedance, dynamic range and maximum nondestructive input voltage apply. The R&S®ProbeMeter can be used to measure differential and common mode voltages.

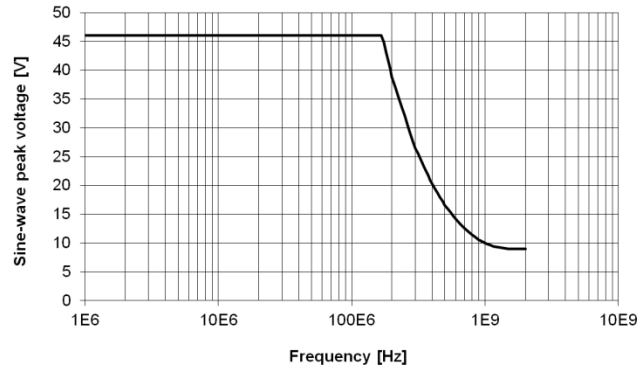
Measurement error, differential mode and common mode	+15 °C to +35 °C	±0.1 % of reading ± 2 mV
	0 °C to +50 °C	±0.2 % of reading ± 4 mV
Temperature drift		±40 ppm/°C of reading ± 100 µV/°C
Common mode rejection	for differential measurement, 0 °C to +50 °C	> 50 dB
50/60 Hz rejection		> 87 dB
Integration time		147 ms

R&S® RT-ZA15 external attenuator

All parameters are valid for the R&S® RT-ZA15 external attenuator when connected to an R&S® RT-ZD10/-ZD20/-ZD30 differential probe.

		R&S® RT-ZA15
Dynamic response		
Rise time	10 % to 90 %	
	with R&S® RT-ZD10	< 350 ps (meas.)
	with R&S® RT-ZD20	< 250 ps (meas.)
	with R&S® RT-ZD30	< 200 ps (meas.)
Bandwidth	starting at DC, calculated from rise time	
	with R&S® RT-ZD10	1.0 GHz
	with R&S® RT-ZD20	1.5 GHz
	with R&S® RT-ZD30	2.0 GHz
Common mode rejection	DC to 10 kHz, after adjustment	80 dB (meas.)
	10 kHz to 1 MHz	40 dB (meas.)
	1 MHz to 100 MHz	30 dB (meas.)
	100 MHz to 1 GHz	20 dB (meas.)
Input impedance		
DC input resistance	between signal sockets	1 MΩ
	each signal socket to ground	500 kΩ
Input capacitance	between signal sockets	1.3 pF (meas.)
	each signal socket to ground	2.1 pF (meas.)
DC characteristics		
External attenuation		10:1
External attenuation error		±0.3 % (nom.)

Dynamic range		
Differential input	between signal sockets	± 50 V (+ offset compensation setting)
Offset compensation range		± 50 V
Operating voltage window	each signal socket to ground	± 70 V
Maximum rated input voltage		
DC voltage	each signal socket to ground	± 70 V
AC voltage	each signal socket to ground, derated, see figure on page 29	33 V (RMS)
Transient peak voltage	each signal socket to ground	± 46 V
ESD tolerance	human body model, each signal socket to ground	8 kV (meas.)



Maximum rated sine-wave peak voltage versus frequency.

General data

See page 16.

R&S® RT-ZD40 differential probe

All parameters are valid for the probe only when connected to a host instrument with an input impedance of 50 Ω. See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

		R&S® RT-ZD40
Step response		
Rise time	10 % to 90 %	< 90 ps, < 73 ps (typ.)
Flatness	starting 2 ns after edge	2 % (meas.)
Slew rate	referenced to probe input, see figure on page 25	60 V/ns (meas.)
Propagation delay		5.5 ns (meas.)
Frequency response		
Bandwidth	starting at DC, calculated from rise time system bandwidth with R&S® RTO1044	4.5 GHz, 5.5 GHz (typ.) 4.0 GHz (meas.)
Flatness	100 kHz to 100 MHz	0.2 dB (meas.)
	100 MHz to 500 MHz	0.5 dB (meas.)
	500 MHz to 1 GHz	0.5 dB (meas.)
Common mode rejection	DC to 10 kHz	> 50 dB
	10 kHz to 1 MHz	40 dB (meas.)
	1 MHz to 1 GHz	30 dB (meas.)
	> 1 GHz	20 dB (meas.)
Input impedance		
DC input resistance	between signal sockets	1 MΩ
	each signal socket to ground	500 kΩ
Input capacitance	between signal sockets	0.4 pF (meas.)
	each signal socket to ground	0.65 pF (meas.)
DC characteristics		
Attenuation		10:1

Attenuation error	after applying digital correction factors 0 °C to +50 °C	±0.5 %
Temperature drift, attenuation		±50 ppm/°C
Zero error	after applying digital correction factors, referenced to probe input +15 °C to +35 °C	±3 mV
	0 °C to +50 °C	±6 mV
Temperature drift, zero error	referenced to probe input	±150 µV/°C
Dynamic range		
Differential input	between signal sockets	±5 V (+ offset compensation setting)
Offset compensation range		±5 V
Offset compensation error	offset compensation setting = 0 V	no additional error
	offset compensation setting ≠ 0 V	±0.2 % of setting ± 2 mV (meas.)
Operating voltage window	each signal socket to ground	±8 V (+ cm offset compensation setting) ¹
CM offset compensation range ¹		±22 V
CM offset compensation error	cm offset compensation setting = 0 V	no additional error
	cm offset compensation setting ≠ 0 V	±0.2 % of setting ± 2 mV (meas.)
Total harmonic distortion	10 V (V _{pp}) sine-wave input at 1 GHz	-35 dB (meas.)
Noise voltage	referenced to probe input	3 mV (RMS) (meas.)
Maximum nondestructive input voltage		
DC peak voltage	each signal socket to ground	±30 V
AC peak voltage	each signal socket to ground, see figure on page 25	30 V
ESD tolerance	human body model, each signal socket to ground	8 kV (meas.)

¹ Available starting from serial number 200000. Older probes have ±5 V operating voltage window and no cm offset compensation.

Version 10.00, August 2013

R&S® ProbeMeter

See page 26.

General data

See page 16.

R&S® RT-ZC10/-ZC20 current probes

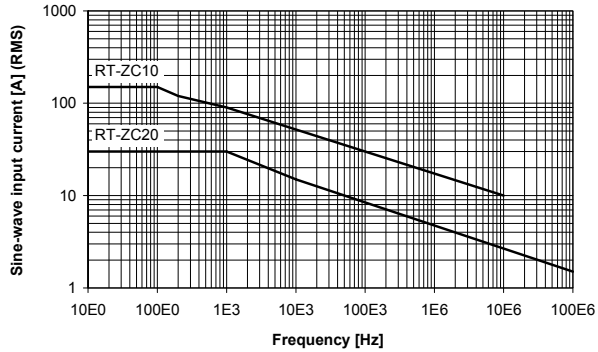
All parameters are valid when the probe is connected to an appropriate Rohde & Schwarz oscilloscope with an input impedance of 1 MΩ. See table on page 4 and Rohde & Schwarz oscilloscope operating manual for more details.

		R&S® RT-ZC10	R&S® RT-ZC20
Step response			
Rise time	10 % to 90 %	35 ns (meas.)	3.5 ns (meas.)
Frequency response			
Bandwidth	–3 dB, starting at DC	10 MHz (meas.)	100 MHz (meas.)
Input impedance		see figure on page 35	
DC characteristics			
Sensitivity		0.01 V/A	0.1 V/A
Sensitivity error (at +23 °C ± 5 °C)	up to 150 A (RMS)	±1 %	
	up to ±300 A	±2 % (meas.)	
	up to 30 A (RMS)		±1 %
	up to ±50 A		±2 % (meas.)
Temperature drift, sensitivity	0 °C to +40 °C	±2 % (meas.)	
Zero error	referenced to probe input after demagnetizing and zero adjustment	±100 mA (meas.)	±10 mA (meas.)
Measurement due to external magnetic fields	400 A/m magnetic field, DC or 60 Hz, referenced to probe input	< 150 mA (meas.)	< 5 mA (meas.)
Maximum rated input			
Maximum continuous current	derated, see figures on page 35	150 A (RMS)	30 A (RMS)
Maximum transient current	peak (within max. continuous current)	±300 A	±50 A
	single pulse, pulse width < 30 µs	±500 A	±50 A
Maximum circuit voltage	insulated conductor, voltage to earth	600 V (RMS), CAT II 300 V (RMS), CAT III	300 V (RMS), CAT I

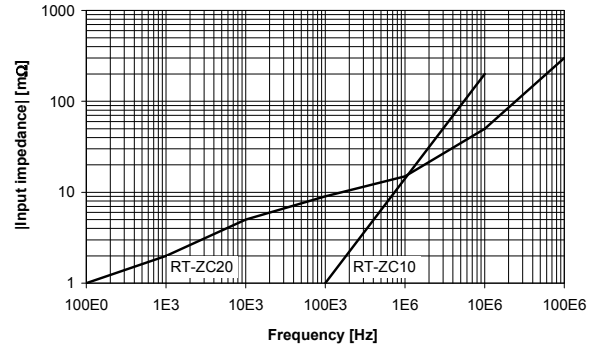
Other			
Noise	20 MHz measurement bandwidth, referenced to probe input	25 mA (RMS)	2.5 mA (RMS)
Supply voltage	external power supply necessary, e.g. R&S®RT-ZA13	±12 V ± 0.5 V	
Maximum power		5.5 W	5.3 W
Interface		BNC	BNC

General data

		R&S® RT-ZC10	R&S® RT-ZC20
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	
EMC		in line with EN 61326-1 (class B equipment)	
Calibration interval		2 years	
Mechanical data			
Dimensions	max. conductor diameter	20 mm (0.79 in)	5 mm (0.2 in)
	cable length, probe	approx. 2 m (78.7 in)	approx. 1.5 m (59 in)
	cable length, power supply	approx. 1 m (39.4 in)	approx. 1 m (39.4 in)
	probe head (W × H × L)	approx. 69 mm × 27 mm × 176 mm (2.72 in × 1.06 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)



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



Insertion impedance (meas.).

R&S® RT-ZA13 probe power supply

Electrical data		
Number of channels		4
Output voltage		$\pm 12 \text{ V} \pm 0.5 \text{ V}$
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.
Passive probes		
500 MHz Passive Voltage Probe, 10:1, 10 M Ω , 9.5 pF, 400 V (RMS) Incl. adjustment tool; coding rings (set) 3 \times 4 colors; ground lead 15 cm; ground spring 2.5; solid tip CuBe 0.5 mm; sprung hook 2.5; spring tip gold-plated 0.5 mm; operating manual	R&S [®] RT-ZP10	1409.7550.00
500 MHz Passive Voltage Probe, 10:1, 10 M Ω , 9.5 pF, 400 V (RMS) See R&S [®] RT-ZH10 for equipment included	R&S [®] RTM-ZP10	1409.7708.02
400 MHz High-Voltage Probe, passive, 100:1, 50 M Ω , 7.5 pF, 1 kV (RMS) Incl. adjustment tool; BNC adapter 5.0-L; coding rings (set) 3 \times 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 M Ω , 7.5 pF, 1 kV (RMS) See R&S [®] RT-ZH10 for equipment included	R&S [®] RT-ZH11	1409.7737.02
8.0 GHz Transmission Line Probe, 10:1, 500 Ω , 0.3 pF, 20 V (RMS) Incl. signal pin, solder-in (50); ground pin, solder-in (10); signal pin (2); ground pin, pogo (2); signal adapter, square pin (2); ground adapter, square pin (2); SMA(f) to BNC(m) adapter; marker band kit; accessory box; carrying case; operating manual	R&S [®] RT-ZZ80	1409.7608.02

Designation	Type	Order No.
Active probes		
1.0 GHz Active Voltage Probe, single-ended, 1 M Ω , 0.8 pF Incl. R&S [®] RT-ZA2 accessory set; R&S [®] ProbeMeter; micro button	R&S [®] RT-ZS10	1410.4080.02
1.0 GHz Active Voltage Probe, single-ended, 1 M Ω , 0.8 pF Incl. signal pin (5); ground pin, pogo (2); ground pin, solderable, offset (2); marker band kit; mini clip (1); lead 15 cm (5.9 in) (1)	R&S [®] RT-ZS10E	1418.7007.02
1.5 GHz Active Voltage Probe, single-ended, 1 M Ω , 0.8 pF Incl. R&S [®] RT-ZA2 accessory set; R&S [®] ProbeMeter; micro button	R&S [®] RT-ZS20	1410.3502.02
3.0 GHz Active Voltage Probe, single-ended, 1 M Ω , 0.8 pF Incl. R&S [®] RT-ZA2 accessory set; R&S [®] ProbeMeter; micro button	R&S [®] RT-ZS30	1410.4309.02
6.0 GHz Active Voltage Probe, single-ended, 1 M Ω , 0.3 pF Incl. R&S [®] ProbeMeter; micro button Incl. signal pin, solder-in (100); ground pin, solder-in (20); signal pin (5); ground pin, pogo (5); signal adapter, square pin (2); ground adapter, square pin (2); marker band kit; mini clip (2); micro clip (2); lead 6 cm (2.4 in) (2); lead 15 cm (5.9 in) (2); accessory box; carrying case; operating manual	R&S [®] RT-ZS60	1418.7307.02

Designation	Type	Order No.
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
1.0 GHz Active Voltage Probe, differential, 1 M Ω , 0.6 pF Incl. R&S®ProbeMeter; micro button, RT-ZA15 external attenuator See R&S®RT-ZD20 for additional equipment included	R&S®RT-ZD10	1410.4715.02
1.5 GHz Active Voltage Probe, differential, 1 M Ω , 0.6 pF Incl. R&S®ProbeMeter; micro button Incl. signal pin, solder-in (10); signal pin, variable spacing (4); browser adapter; adapter, square pin (2); flex adapter, solder-in 4 cm (1.6 in) and 10 cm (3.9 in); flex adapter, square pin 4 cm (1.6 in) and 10 cm (3.9 in); lead 6 cm (2.4 in) (2); lead 15 cm (5.9 in) (1); mini clip (2); micro clip (2); marker band kit; carrying case; operating manual	R&S®RT-ZD20	1410.4409.02
3.0 GHz Active Voltage Probe, differential, 1 M Ω , 0.6 pF See R&S®RT-ZD20 for equipment included	R&S®RT-ZD30	1410.4609.02
4.5 GHz Active Voltage Probe, differential, 1 M Ω , 0.4 pF Incl. R&S®ProbeMeter; micro button Incl. signal pin, solder-in (100); socket adapter, variable spacing (2); browser adapter, rigid (2); browser adapter, spring loaded (2); lead 6 cm (2.4 in) (2); lead 15 cm (5.9 in) (1); mini clip (2); micro clip (2); marker band kit; carrying case; operating manual	R&S®RT-ZD40	1410.5205.02
Current probes		
10 MHz Current Probe, AC/DC, 0.01 V/A, 150 A (RMS)	R&S®RT-ZC10	1409.7750.02
100 MHz Current Probe, AC/DC, 0.1 V/A, 30 A (RMS)	R&S®RT-ZC20	1409.7766.02

Designation	Type	Order No.
Accessories and sets		
Accessory Kit for R&S®RT-ZP10, R&S®RTM-ZP10 passive voltage probes Contains: adjustment tool; BNC adapter 2.5; coding rings (set) 3 × 4 colors; dual adapter 2.5 mm to 0.8 mm sockets; ground blade 2.5; copper pad, self adhesive (2 cm × 2 cm) (0.79 in × 0.79 in) (2); ground lead 15 cm; ground spring 2.5 (5); IC-cap 2.5 0.5 mm pitch green; IC-cap 2.5 0.65 mm pitch blue; IC-cap 2.5 0.8 mm pitch grey; IC-cap 2.5 1.0 mm pitch brown; IC-cap 2.5 01.27 mm pitch black; insulating cap 2.5; solid tip CuBe 0.5 mm (5); sprung hook 2.5; spring tip gold-plated 0.5 mm (5)	R&S®RT-ZA1	1409.7566.02
Spare Accessory Set for R&S®RT-ZS10/-ZS10E/-ZS20/-ZS30 active voltage probes Contains: signal pin (10); ground pin, pogo (5); ground pin, solderable, offset (10); ground adapter, square pin (2); marker band kit; mini clip (2); micro clip (2); lead 6 cm (2.4 in) (2); lead 15 cm (5.9 in) (2); accessory box; carrying case; operating manual	R&S®RT-ZA2	1416.0405.02
Pin Set for R&S®RT-ZS10/-ZS10E/-ZS20/-ZS30 active voltage probes Contains: signal pin (20); ground pin, pogo (5); ground pin, solderable, offset (20); ground adapter, square pin (2); marker band kit	R&S®RT-ZA3	1416.0411.02
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
Differential Pin Set for R&S®RT-ZD20/-ZD30 Contains: signal pin, solder-in (20); signal pin, variable spacing (10); browser adapter (2); adapter, square pin (2)	R&S®RT-ZA7	1417.0609.02
Differential Pin Set for R&S®RT-ZD40 Contains: signal pin, solder-in (100); socket adapter, variable spacing (2); browser adapter, rigid (2); browser adapter, spring loaded (2)	R&S®RT-ZA8	1417.0867.02

Designation	Type	Order No.
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
External Attenuator Incl. adjustment tool	R&S®RT-ZA15	1410.4744.02

Service you can rely on

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

Environmental commitment

- | Energy-efficient products
- | Continuous improvement in environmental sustainability
- | ISO 14001-certified environmental management system

Certified Quality System
ISO 9001

Rohde & Schwarz GmbH & Co. KG

www.rohde-schwarz.com

Regional contact

- | Europe, Africa, Middle East | +49 89 4129 12345
customersupport@rohde-schwarz.com
- | North America | 1 888 TEST RSA (1 888 837 87 72)
customer.support@rsa.rohde-schwarz.com
- | Latin America | +1 410 910 79 88
customersupport.la@rohde-schwarz.com
- | Asia/Pacific | +65 65 13 04 88
customersupport.asia@rohde-schwarz.com
- | China | +86 800 810 8228/+86 400 650 5896
customersupport.china@rohde-schwarz.com

R&S® is a registered trademark of Rohde & Schwarz GmbH & Co. KG

Trade names are trademarks of the owners

PD 5214.2362.22 | Version 10.00 | August 2013 (sk/fi)

R&S®RT-Zxx

Data without tolerance limits is not binding | Subject to change

© 2009 - 2013 Rohde & Schwarz GmbH & Co. KG | 81671 München, Germany



5214236222