R&S®RTH1002
R&S®RTH1004
HANDHELD OSCILLOSCOPE

Specifications

3 year warranty

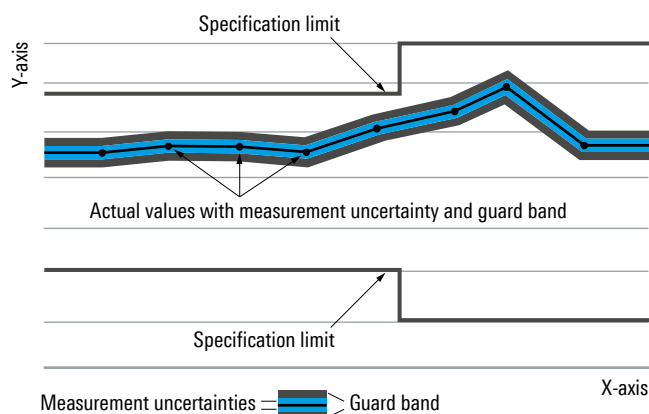## ROHDE & SCHWARZ

Make ideas real

CONTENTS

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
- All internal automatic adjustments performed, if applicable

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.

Non-traceable specifications with limits (n. trc.)

Represent product performance that is specified and tested as described under "Specifications with limits" above. However, product performance in this case cannot be warranted due to the lack of measuring equipment traceable to national metrology standards. In this case, measurements are referenced to standards used in the Rohde & Schwarz laboratories.

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.

Nominal values (nom.)

Characterize product performance by means of a representative value for the given parameter (e.g. nominal impedance). In contrast to typical data, a statistical evaluation does not take place and the parameter is not tested during production.

Measured values (meas.)

Characterize expected product performance by means of measurement results gained from individual samples.

Uncertainties

Represent limits of measurement uncertainty for a given measurand. Uncertainty is defined with a coverage factor of 2 and has been calculated in line with the rules of the Guide to the Expression of Uncertainty in Measurement (GUM), taking into account environmental conditions, aging, wear and tear.

Device settings and GUI parameters are designated with the format "parameter: value".

Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP/3GPP2 standard, chip rates are specified in million chips per second (Mcps), whereas bit rates and symbol rates are specified in billion bit per second (Gbps), million bit per second (Mbps), thousand bit per second (kbps), million symbols per second (Msps) or thousand symbols per second (ksps), and sample rates are specified in million samples per second (Msample/s). Gbps, Mcps, Mbps, Msps, kbps, ksps and Msample/s are not SI units.

Base unit

Vertical system

Input channels	R&S®RTH1002	2 oscilloscope channels, 1 multimeter
	R&S®RTH1004	4 oscilloscope channels
	All inputs are floating and fully isolated in line with CAT IV 600 V, CAT III 1000 V safety rating. See figure regarding isolation rating on page 14.	
Input impedance		1 MΩ ± 1 % ‖ 12 pF ± 2 pF (meas.)
Analog bandwidth (–3 dB)	R&S®RTH1002 and R&S®RTH1004	≥ 60 MHz
	R&S®RTH1002 with -B221 option and R&S®RTH1004 with -B241 option	≥ 100 MHz
	R&S®RTH1002 with -B222 option and R&S®RTH1004 with -B242 option	≥ 200 MHz
	R&S®RTH1002 with -B223 option and R&S®RTH1004 with -B243 option	≥ 350 MHz [1]
	R&S®RTH1002 with -B224 option and R&S®RTH1004 with -B244 option	≥ 500 MHz [1]
	Measurement of analog bandwidth at input sensitivities ≥ 20 V/div is limited by input voltage rating versus frequency, see figure "Input rating: Maximum signal voltage at oscilloscope input" on page 14.	
Lower frequency limit (–3 dB) at AC coupling		< 8 Hz (meas.)
Bandwidth limits		1/2/5/10/20/50/100/200/500 kHz, 1/2/5/10/20/50 MHz
	only with R&S®RTH-B222, -B242, -B223, -B243, -B224, -B244 options	100 MHz
	only with R&S®RTH-B223, -B243, -B224, -B244 options	200 MHz
Rise time (calculated)	R&S®RTH1002 and R&S®RTH1004	< 5.8 ns
	R&S®RTH1002 with -B221 option and R&S®RTH1004 with -B241 option	< 3.5 ns
	R&S®RTH1002 with -B222 option and R&S®RTH1004 with -B242 option	< 1.75 ns
	R&S®RTH1002 with -B223 option and R&S®RTH1004 with -B243 option	< 1 ns [2]
	R&S®RTH1002 with -B224 option and R&S®RTH1004 with -B244 option	< 700 ps [2]
ADC resolution		10 bit
Vertical resolution of overall system		9 bit; up to 16 bit with high resolution decimation
DC gain accuracy	offset and position set to zero, after self-alignment	
	input sensitivity > 5 mV/div	±1.5 % of reading
	input sensitivity > 2 mV/div to 5 mV/div	±2 % of reading
	input sensitivity 2 mV/div	±2.5 % of reading
Input coupling		DC, AC
Input sensitivity	in steps of 1, 2, 4, 5 in each decade	2 mV/div to 100 V/div
Maximum input voltage	at BNC inputs	CAT IV 300 V (RMS), 424 V (peak), derates at 20 dB/decade to 5 V (RMS) above 500 kHz (see figure "Input rating: Maximum signal voltage at oscilloscope input" on page 14)
	with R&S®RT-ZI10 or R&S®RT-ZI11 probe	CAT IV 600 V, CAT III 1000 V, derating in line with probe specification
Position range		±4 div
Invert	R&S®RTH1004	CH1, CH2, CH3, CH4
	R&S®RTH1002	CH1, CH2
Offset range	input sensitivity	
	≥ 40 V/div	0
	≥ 1 V/div to ≤ 20 V/div	±200 V
	≤ 500 mV/div	±4 V

---

[1] ≥ 200 MHz (meas.) for input sensitivities ≥ 20 V/div.

[2] < 1.75 ns (calculated) for input sensitivities ≥ 20 V/div.

Offset accuracy	after self-alignment	±(0.5 % ×	net offset	+ 0.1 div × input sensitivity + 1.5 mV) (net offset = offset – (position × input sensitivity))
DC measurement accuracy	after adequate suppression of measurement noise by using high-resolution sampling mode or waveform averaging or a combination of both	±(DC gain accuracy ×	reading – net offset	+ offset accuracy)
Channel-to-channel isolation	each channel at same input sensitivity, input frequency < analog bandwidth	> 40 dB (meas.)
Common mode rejection (CMRR)	DC and AC ≤ 100 kHz	> 100 dB (meas.)

Horizontal system

Timebase range		selectable between 1 ns/div and 500 s/div
Channel deskew		±100 ns
Reference position		10 %, 50 % or 90 % of measurement display area
Trigger offset range	max.	at least 2 s or 2000 screen widths at most 100 000 s
	min.	right edge of measurement display area
Modes		normal, roll
Timebase accuracy		±10 ppm

Acquisition system

Maximum realtime sampling rate	R&S®RTH1004	1 active channel with 5 Gsample/s
		2 active channels with 2.5 Gsample/s
		4 active channels with 1.25 Gsample/s
	R&S®RTH1002	1 active channel with 5 Gsample/s
		2 active channels with 2.5 Gsample/s
	definition: active channel	A channel is active if it is either acquired or used as a trigger source.
Maximum acquisition length for fast time bases (less than or equal to 20 ms/div)	1 active analog channel	500 ksample (sample acquisition mode)
		250 ksample (high resolution, peak detect, envelope and average acquisition modes)
	2 active analog channels	250 ksample for each channel (sample acquisition mode)
		125 ksample for each channel (high resolution, peak detect, envelope and average acquisition modes)
	3 or 4 active analog channels	125 ksample for each channel (sample acquisition mode)
		62.5 ksample for each channel (high resolution, peak detect, envelope and average acquisition modes)
Maximum acquisition length for slow time bases (greater than or equal to 50 ms/div)	1, 2, 3 or 4 active analog channels	125 ksample for each channel (sample acquisition modes)
		62.5 ksample for each channel (high resolution, peak detect, envelope and average acquisition modes)
Acquisition modes	sample	first sample in decimation interval
	high resolution	average value of samples in decimation interval
	peak detect	largest and smallest sample in decimation interval
	envelope	envelope of acquired waveforms; for timebases requiring decimation, peak-detect is used.
	average	average of acquired waveforms; for timebases requiring decimation, high resolution is used. Number of averaged waveforms can be power of 2 from 2 to 8192.
Realtime waveform acquisition rate	max.	50 000 waveforms/s

Trigger system

(see also R&S®RTH-B1 mixed signal option)

Trigger level	range	±4 div from center of screen
Trigger modes		auto, normal, single
Trigger sources	R&S®RTH1004	CH1, CH2, CH3, CH4
	R&S®RTH1002	CH1, CH2
Hold-off range	time	8 ns to 10 s, fixed and random
	events	1 to 1 000 000 000 events

Trigger types		
Edge	triggers on specified slope (positive, negative or either) and level	
Glitch	triggers on glitches of positive, negative or either polaritiy that are shorter or longer than specified width	
	glitch width	800 ps to 5000 s
Width	triggers on positive or negative pulse of specified width; width can be shorter, longer, inside or outside the interval	
	pulse width	800 ps to 5000 s
TV/video	triggers on baseband analog progressive and interlaced video signals PAL, NTSC, SECAM, PAL-M, SDTV and HDTV broadcast standards (SDTV and HDTV require R&S®RTH-K19 option)	
	trigger events	all fields, odd fields, even fields, all lines, line number
Pattern	triggers when a logical combination (and, nand, or, nor) of the input channels stays true for a period of time shorter, longer, inside or outside a specified range (requires R&S®RTH-K19 option)	
	pattern time	800 ps to 5000 s
State	triggers when a logical combination (and, nand, or, nor) of the input channels stays true at a slope (positive, negative or either) in one selected channel; state values may be high (H), low (L) or don't care (X) (requires R&S®RTH-K19 option)	
Runt	triggers on pulse of positive, negative or either polarity that crosses one threshold but fails to cross a second threshold before crossing the first one again; runt pulse width can be arbitrary, shorter, longer, inside or outside the interval (requires R&S®RTH-K19 option)	
	runt pulse width	800 ps to 5000 s
Slew rate	triggers when the time required by a signal edge to toggle between user-defined upper and lower voltage levels is shorter, longer, inside or outside the interval; edge slope may be positive, negative or either (requires R&S®RTH-K19 option)	
	toggle time	800 ps to 5000 s
Window	triggers when signal enters or exits a specified voltage range; triggers also when signal stays inside or outside the voltage range for a specified period of time (requires R&S®RTH-K19 option)	
	window time	800 ps to 5000 s
Data2clock	triggers on setup time and hold time violations between clock and data present on any two input channels; monitored time interval may be specified by the user with a step size of 800 ps in the range from –124 ns to 124 ns around a clock edge (requires R&S®RTH-K19 option)	
Serial pattern	triggers on serial data pattern up to 32 bit clocked by one input channel; pattern bits may be high (H), low (L) or don't care (X); clock edge slope may be positive, negative or either (requires R&S®RTH-K19 option)	
	max. data rate	< 250 Mbps
Timeout	triggers when signal stays high, low or unchanged for a specified period of time (requires R&S®RTH-K19 option)	
	timeout	800 ps to 5000 s
Interval	triggers when time between two consecutive edges of same slope (positive or negative) is shorter, longer inside or outside a specified range (requires R&S®RTH-K19 option)	
	interval time	800 ps to 5000 s
Protocol	see R&S®RTH-K1, R&S®RTH-K2, R&S®RTH-K3, R&S®RTH-K9 and R&S®RTH-K10 options	

Waveform measurements

(see also R&S®RTH-B1 mixed signal option)

Automatic measurements	total number of active measurements	4
	sources	
	R&S®RTH1004	CH1, CH2, CH3, CH4, math
	R&S®RTH1002	CH1, CH2, math
	time based measurements	period, frequency, rise time, fall time, positive pulse width, negative pulse width, positive duty cycle, negative duty cycle, delay, phase
	amplitude based measurements	mean value, RMS value, crest factor, standard deviation, minimum, maximum, peak-to-peak, base level, top level, amplitude, area, overshoot, preshoot, AC, DC, AC+DC
	count based measurements	count positive pulses, count negative pulses, count rising edges, count falling edges
	power based measurements	active power, apparent power, reactive power, power factor, V_{PWM}, f_{PWM}, V/f_{PWM}
Cursor measurements	sources	analog channels, math and reference waveforms
	vertical	2 cursors showing time, time difference and inverse time difference (frequency)
	horizontal	2 cursors showing voltage and voltage difference
	tracking	vertical cursor additionally showing voltage and voltage difference of selected waveform
	measure	defines gate for automatic measurements

Mask testing

Sources	R&S®RTH1004	CH1, CH2, CH3, CH4, math
	R&S®RTH1002	CH1, CH2, math
Mask definition		tolerance tube based on analog input waveform or math waveform
Number of simultaneous mask tests		up to 5
Actions on violation		none, beep, stop
History behavior	requires R&S®RTH-K15 option	store all

Waveform maths

Number of math waveforms		1
Functions		addition, subtraction, multiplication, square, absolute value, inverse
Sources	R&S®RTH1004	CH1, CH2, CH3, CH4
	R&S®RTH1002	CH1, CH2

FFT

Number of simultaneous spectra		1 (always on selected channel)
Sources	R&S®RTH1004	CH1, CH2, CH3, CH4
	R&S®RTH1002	CH1, CH2
FFT sizes		64 ksample or 8 ksample
Sampling frequency		equal to sampling rate of current horizontal scale for FFT size of 64 ksample; equal to 1/8th of sampling rate of current horizontal scale for FFT size of 8 ksample
Window types		rectangular, flat-top, Hamming, Hann, Blackman
Channel bandwidth		same as bandwidth limits in vertical system; additionally accessible over FFT menu
X-axis scaling		linear or logarithmic

Display characteristics

Diagram types	Yt, XY, zoom, FFT
XY mode	parallel display of XY diagram, Xt and Yt
Zoom	horizontal zoom with overview bar graph showing location of zoom window
Interpolation	sin(x)/x
Persistence	50 ms to 10 s; infinite
Reference signals	up to 1 reference signal

Protocol and logic

Bus trigger and decode	number of bus signals	1
	bus types	
	R&S®RTH-K1 option	SPI, I²C
	R&S®RTH-K2 option	UART
	R&S®RTH-K3 option	CAN, LIN
	R&S®RTH-K9 option	CAN-FD
	R&S®RTH-K10 option	SENT
	display types	decoded bus, logical signal, event table
	position and size	size and position on screen selectable
	data format of decoded bus	hex, decimal, binary

Data logger

Data acquisition method		roll mode recording of measurement results
Number of simultaneous logging channels		4
Sources	R&S®RTH1004	
	oscilloscope mode	up to 4 waveform measurements
	digital voltmeter mode	up to 4 digital voltmeter measurements
	counter mode (R&S®RTH-K33 option)	up to 2 counter measurements
	R&S®RTH1002	
	oscilloscope mode	up to 4 waveform measurements
	multimeter mode	multimeter measurement
	counter mode (R&S®RTH-K33 option)	up to 2 counter measurements
Timebase range		selectable between 5 s/div and 4 days/div
Measurement speed		1/2/5 measurements/s
Memory depth		2 Msample per logging channel
Slot memory		internal memory for up to 10 sets of data logger results; slots results can be reset, loaded and exported.

Digital voltmeter (DVM)

Sources	R&S®RTH1004	CH1, CH2, CH3, CH4
Measurements	voltage	DC, AC, AC+DC with indication of max., min. and average
Number of active measurements		4
Maximum resolution		999 counts, 3 digits

Digital multimeter (DMM)

Sources	R&S®RTH1002	multimeter, 4 mm banana inputs, fully isolated from scope inputs, interfaces and ground
Measurements	voltage	DC, AC, AC+DC
	current	with current clamp or shunt
	resistance	
	continuity test	
	diode test	
	temperature	resistance measurement with PT100 or PT500 platinum sensors (recommended accessory R&S®RT-ZA12 PT100 temperature probe)
	frequency	
	capacitance	
Number of active measurements		1
Maximum resolution		10000 counts, 4 digits
Input impedance (voltage DC, AC, AC+DC)	1 V, 10 V	11.11 MΩ (nom.)
	100 V	10.10 MΩ (nom.)
	1000 V	10.01 MΩ (nom.)
Input capacitance		< 100 pF
Common mode rejection ratio (CMRR)	DC and 50 Hz/60 Hz ± 0.1 %	> 100 dB (meas.)
Normal mode rejection ratio (NMRR)	50 Hz/60 Hz ± 0.1 %	> 60 dB (meas.)
Maximum input voltage		CAT III 1000 V (RMS), 1414 V (peak), CAT IV 600 V (RMS), 849 V (peak), derates at 20 dB/decade above 50 kHz (see figure "Input rating: Maximum signal voltage at meter input" on page 14)
Specified accuracy temperature range	rated accuracy applies after 1 h stabilization	+23 °C ± 5 °C
Temperature coefficient	from 0 °C to +18 °C or +28 °C to +50 °C	0.1 × specified accuracy/°C
Voltage ranges	10 % overrange except of 1000 V range	1.0000 V, 10.000 V, 100.00 V, 1000.0 V
DC accuracy	1 V	±(0.05 % + 0.05 % of range)
	10 V, 100 V	±(0.05 % + 0.03 % of range)
	1000 V	±(0.08 % + 0.03 % of range)
AC accuracy (AC coupling)	1 V, 10 V, 100 V	
	20 Hz to 20 kHz	±(0.2 % + 0.05 % of range)
	20 kHz to 100 kHz	±(0.5 % + 0.05 % of range)
	1000 V	
	20 Hz to 10 kHz	±(0.2 % + 0.05 % of range)
Resistance ranges	10 % overrange	1.0000 kΩ, 10.000 kΩ, 100.00 kΩ, 1.0000 MΩ, 10.000 MΩ, 100.00 MΩ
Resistance accuracy	1 kΩ, 10 kΩ, 100 kΩ, 1 MΩ	±(0.08 % + 0.03 % of range)
	10 MΩ	±(0.2 % + 0.05 % of range)
	100 MΩ	±(1.5 % + 0.1 % of range)
Resistance test currents	1 kΩ	1.004 mA (nom.)
	10 kΩ	101.3 µA (nom.)
	100 kΩ	10.13 µA (nom.)
	1 MΩ	1.003 µA (nom.)
	10 MΩ	100.3 nA (nom.)
	100 MΩ	100.3 nA || 11.11 MΩ (nom.)
Continuity range	test current 1.004 mA (nom.), continuous beep when resistance < 10 Ω	1.0000 kΩ
Continuity accuracy		±(0.1 % + 0.5 Ω)
Diode test ranges	test current 1.004 mA (nom.)	3.000 V
Diode test accuracy		±(0.1 % + 3 mV)
Capacity ranges	10 % overrange	10.000 nF, 100.00 nF, 1.0000 µF, 10.000 µF, 100.00 µF, 1.0000 mF, 10.000 mF
Capacity accuracy		±(1 % + 0.05 % of range)
Temperature (calculated)	with linearization for platinum sensors, in line with EN 60751, range from –200 °C to +850 °C	±(0.13 % + sensor tolerance + 1 °C)
Frequency ranges		1000.0 Hz, 10.000 kHz, 100.00 kHz, 250.0 kHz
Frequency accuracy		±0.005 %

Miscellaneous

Save/recall	device settings	save and recall on microSD card or USB drive
	reference waveforms	save and recall on microSD card or USB drive
	screenshots	save on microSD card or USB drive
	logger records	export to USB drive
	configurable fast setting slots	8 slots, F1 to F8 to easily activate preconfigured settings with a single keystroke
Screenshot	selectable file formats	png, jpg, bmp, tif
	screenshot modes	standard, inverse, black and white
Instrument security		User data and settings are stored on removable microSD card only.
Menu languages		available menu languages: • English • German • French • Russian • Simplified Chinese • Traditional Chinese • Japanese • Spanish • Italian • Portuguese • Korean • Czech • Polish
Help	online help on the instrument	available language: • English

Inputs and outputs

Channel inputs	R&S®RTH1004	4 BNC oscilloscope inputs
	R&S®RTH1002	2 BNC oscilloscope inputs, 2 banana jack meter inputs (4-mm type)
Probe compensation output	signal shape	rectangle V_{low} = 0 V, V_{high} = 1 V amplitude 1 V (peak-to-peak) ± 5 %
	frequency	1 kHz ± 5 %
USB host interface		1 port, type A plug, USB 2.0, memory sticks only; FAT32 formatting required
USB device port		1 port, mini USB-B, remote control only
LAN interface		RJ-45 connector, supports 10/100BASE-T
Logic probe input		8 logic channels, see R&S®RTH-B1 option
External trigger input	R&S®RTH1002	Meter input can also be used as external trigger input.
Security slot		for standard Kensington style lock
SD card slot	type	microSD card slot, memory cards only
	capacity	SDHC, min. 4 Gbyte, max. 32 Gbyte

General data

Display		
Type		7.0" LC TFT color display
Resolution		800 × 480 pixel (WVGA)

Temperature		
Temperature loading	operating temperature	
	battery only	0 °C to +50 °C
	power adapter	0 °C to +40 °C
	storage temperature	–20 °C to +50 °C
Climatic loading		+25 °C/+55 °C at 95 % rel. humidity cyclic, in line with IEC 60068-2-30

Altitude		
Operating	CAT IV 600 V, CAT III 1000 V	up to 2000 m above sea level
	CAT III 600 V, CAT II 1000 V	up to 3000 m above sea level
Nonoperating		up to 4600 m above sea level

Mechanical resistance		
IP rating		IP51, in line with IEC 60529
Vibration	sinusoidal	5 Hz to 150 Hz, max. 1.8 g at 55 Hz, 0.5 g from 55 Hz to 150 Hz, in line with EN 60068-2-6; MIL-PRF-28800F, 4.5.5.3.2, class 3
	random	8 Hz to 650 Hz, acceleration 1.9 g (RMS), in line with EN 60068-2-64; MIL-PRF-28800F, 4.5.5.3.1 random vibration, class 3
Shock		40 g shock spectrum, in line with MIL-STD-810E, method no. 516.4, procedure I; MIL-PRF-28800F, 4.5.5.4.1, functional shock, 30 g, 11 ms, halfsine

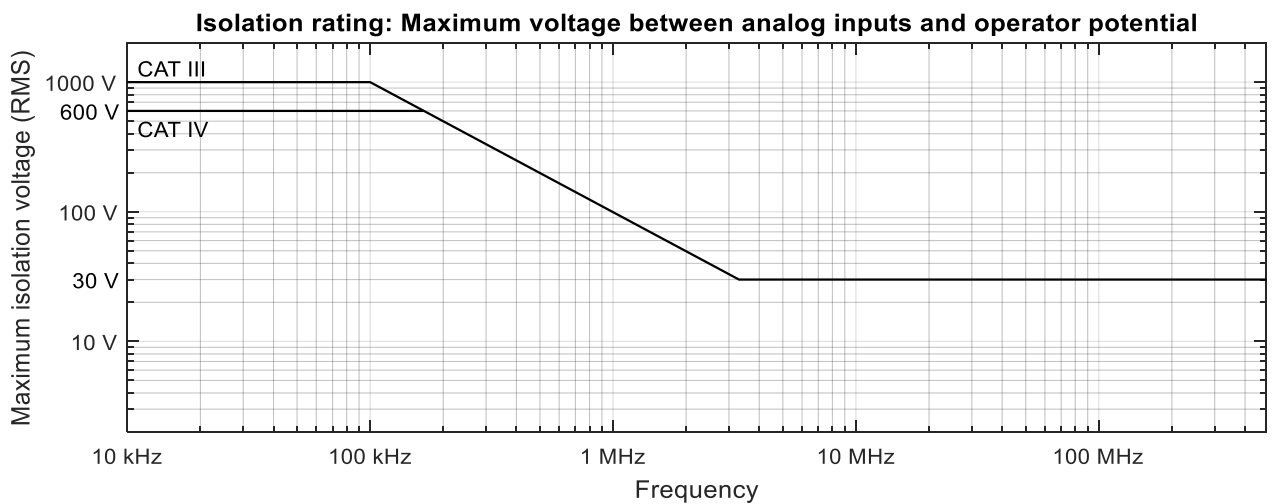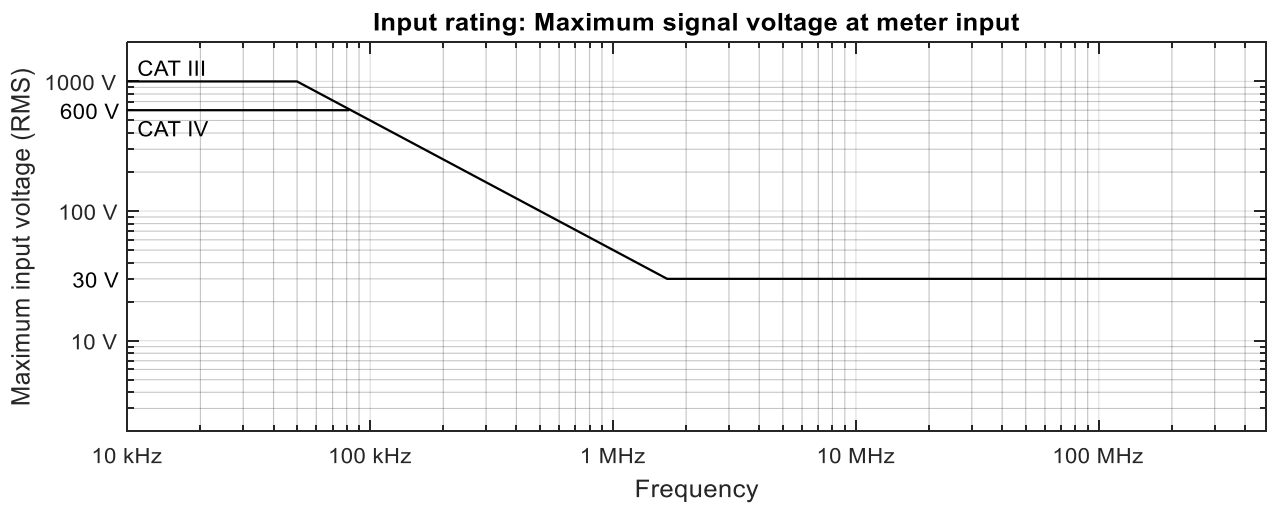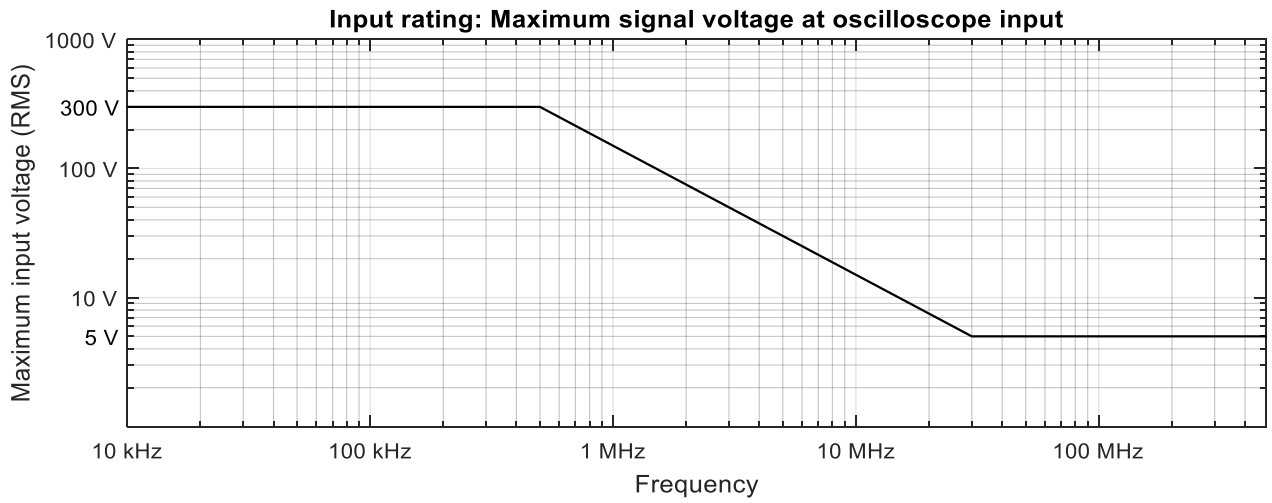| EMC		
RF emission		in line with CISPR 11/EN 55011 group 1 class A (for a shielded test setup); the instrument complies with the emission requirements stipulated by EN 55011, EN 61326-1 and EN 61326-2-1 class A, making the instrument suitable for use in industrial environments.
Immunity		in line with IEC/EN 61326-1 table 2, immunity test requirements for industrial environments [3]

Certifications	VDE, $_c$CSA$_{US,}$ KC

Calibration interval	1 year

---

[3] Test criterion is displayed noise level within ±2.5 div for input sensitivity of 200 mV/div.

Safety	in line with • IEC/EN/DIN EN 61010-1, • IEC/EN/DIN EN 61010-2-030, • UL/CSA 61010-1, • UL/CSA 61010-2-030, • IEC/EN/DIN EN 61010-2-033 (R&S®RTH1002), • UL/CSA 61010-2-033 (R&S®RTH1002)	
Battery/power supply		
Battery data		lithium-ion rechargeable smart battery
	operating time	approx. 4 h
	charging time	approx. 4 h while instrument is switched off
	capacity	72 Wh
	voltage	11.25 V
Power adapter	input	100 V to 240 V at 50 Hz to 60 Hz, 1.5 A
	output	+15 V DC, 4.0 A

Mechanical data		
Dimensions	W × H × D	201 mm × 293 mm × 74 mm (7.91 in × 11.54 in × 2.91 in)
Weight	with battery	2.4 kg (5.3 lb) (nom.)

Input rating: Maximum signal voltage at oscilloscope input

Input rating: Maximum signal voltage at meter input

Isolation rating: Maximum voltage between analog inputs and operator potential

Options

R&S®RTH-B1

Mixed signal option, additional 8 logic channels

Vertical system

Input channels		8 logic channels (from D0 to D7)
Input impedance		100 kΩ ± 2 % ‖ ~4 pF (meas.) at probe tips
Maximum input frequency	signal with minimum input voltage swing and hysteresis setting: normal	250 MHz (meas.)
Maximum input voltage		±40 V (peak)
Minimum input voltage swing		500 mV (peak-to-peak) (meas.)
Threshold groups		from D0 to D3, D4 to D7
Threshold level	range	±8 V in 25 mV steps
	predefined	CMOS 5.0 V, CMOS 3.3 V, CMOS 2.5 V, TTL, ECL, PECL, LVPECL
Threshold accuracy	threshold setting between ± 4 V	±(100 mV + 3 % of threshold setting)
Comparator hysteresis		normal, robust, maximum

Horizontal system

Channel deskew	range for each channel	±100 ns
Channel-to-channel skew		< 2 ns (meas.)

Acquisition system

Maximum realtime sampling rate		1.25 Gsample/s on each channel
Maximum acquisition length for fast time bases (less than or equal to 20 ms/div)		125 ksample for each channel
Maximum acquisition length for slow time bases (greater than or equal to 50 ms/div)		125 ksample for each channel (sample acquisition mode of analog channels even if no analog channel is active)
		62.5 ksample for each channel (high resolution, peak detect, envelope and average acquisition modes of analog channels even if no analog channel is active)

Trigger system

Trigger level	range	±4 div from center of screen
Trigger modes		auto, normal, single
Trigger sources	R&S®RTH1004	logic channels from D0 to D7 CH1, CH2, CH3, CH4
	R&S®RTH1002	logic channels from D0 to D7 CH1, CH2
Hold off range	time	8 ns to 10 s, fixed and random
	events	1 to 1 000 000 000 events

Trigger types		
Edge	triggers on specified slope (positive, negative or either) and level	
Glitch	triggers on glitches of positive, negative or either polaritiy that are shorter or longer than specified width	
	glitch width	800 ps to 5000 s (CH1, CH2, CH3, CH4)
		800 ps to 5000 s (D0 to D7)
Width	triggers on positive or negative pulse of specified width; width can be shorter, longer, inside or outside the interval	
	pulse width	800 ps to 5000 s (CH1, CH2, CH3, CH4)
		800 ps to 5000 s (D0 to D7)
Pattern	triggers when a logical combination (and, nand, or, nor) of the input channels stays true for a period of time shorter, longer, inside or outside a specified range (requires R&S®RTH-K19 option)	
	pattern time	800 ps to 5000 s (CH1, CH2, CH3, CH4)
		800 ps to 5000 s (D0 to D7)
State	triggers when a logical combination (and, nand, or, nor) of the input channels stays true at a slope (positive, negative or either) in one selected channel; state values may be high (H), low (L) or don't care (X) (requires R&S®RTH-K19 option)	
Data2clock	triggers on setup time and hold time violations between clock and data present on any two input channels; monitored time interval may be specified by the user with a step size of 800 ps in the range from –124 ns to 124 ns around a clock edge (requires R&S®RTH-K19 option)	
Serial pattern	triggers on serial data pattern up to 32 bit clocked by one input channel; pattern bits may be high (H), low (L) or don't care (X); clock edge slope may be positive, negative or either (requires R&S®RTH-K19 option)	
	max. data rate	< 250 Mbps
Timeout	triggers when signal stays high, low or unchanged for a specified period of time (requires R&S®RTH-K19 option)	
	timeout	800 ps to 5000 s (CH1, CH2, CH3, CH4)
		800 ps to 5000 s (D0 to D7)
Interval	triggers when time between two consecutive edges of same slope (positive or negative) is shorter, longer inside or outside a specified range (requires R&S®RTH-K19 option)	
	interval time	800 ps to 5000 s (CH1, CH2, CH3, CH4)
		800 ps to 5000 s (D0 to D7)
Protocol	see R&S®RTH-K1, R&S®RTH-K2, R&S®RTH-K3, R&S®RTH-K9 and R&S®RTH-K10 options	

Waveform measurements

Automatic measurements on	total number of active measurements	4
	sources	logic channels from D0 to D7
	time based measurements	period, frequency, positive pulse width, negative pulse width, positive duty cycle, negative duty cycle, delay, phase
	amplitude based measurements	mean value
	count based measurements	count positive pulses, count negative pulses, count rising edges, count falling edges
Cursor measurements	sources	logic channels from D0 to D7
	vertical	2 cursors showing time, time difference and inverse time difference (frequency)
	tracking	vertical cursor additionally showing logic level and logic level difference of selected channel
	measure	defines gate for automatic measurements

R&S®RTH-K1

I²C serial triggering and decoding		
Protocol configuration	bit rate	up to 3.4 Mbps (auto-detected)
	auto threshold setup	assisted threshold configuration for I²C triggering and decoding (software)
	device list	associate frame address with symbolic ID (software)
Trigger	source (clock and data)	any input channel or logical channel
	trigger event setup	start, stop, restart, missing ACK, address, data, address + data
	address setup	7 bit or 10 bit address (value in hex or binary); read, write or either; condition =, ≠
	data setup	data pattern up to 8 byte (hex or binary); condition =, ≠; >, <; offset within frame in range from 0 byte to 4095 byte
Decode	source (clock and data)	any input channel, logical channel
	display type	decoded bus, tabulated list
	color coding	frame, start/restart, address (r/w), data, ACK/NACK, stop, error
	address and data format	hex, decimal, octal, binary, ASCII; symbolic names for user-defined subset of addresses (software)

SPI serial triggering and decoding		
Protocol configuration	type	2-wire, 3-wire and 4-wire SPI
	bit rate	up to 50 Mbps (auto-detected)
	bit order	LSB first, MSB first
	word size	4/8/12/16/20/24/28/32 bit
	frame condition	SS, timeout
	polarity (MOSI, MISO, SS)	active high, active low
	slope (CLK)	rising edge, falling edge
	auto threshold setup	assisted threshold configuration for SPI triggering and decoding (software)
Trigger	source (MOSI, MISO, SS, CLK)	any input channel or logical channel
	trigger event setup	start of frame, end of frame, MOSI, MISO
	data setup	data pattern up to 32 bit (hex or binary); condition =, ≠; offset within frame in range from 0 to 4095 bit
Decode	source (MOSI, MISO, SS, CLK)	any input channel, logical channel
	display type	decoded bus, tabulated list
	color coding	frame start, frame stop, word, error
	data format	hex, decimal, octal, binary, ASCII (software)

R&S®RTH-K2

UART/RS-232/RS-422/RS-485 serial triggering and decoding		
Protocol configuration	bit rate	300 bps to 20 Mbps
	signal polarity	idle low, idle high
	number of bits	5 bit to 9 bit
	bit order	LSB first, MSB first
	parity	odd, even, none
	stop bits	1, 1.5 or 2
	end of packet	timeout, none
	auto threshold setup	assisted threshold configuration for UART triggering and decoding (software)
Trigger	source	any input channel or logical channel
	trigger event setup	start bit, packet start, data, parity error, stop error, break condition
	data setup	data pattern (hex, decimal, octal, binary or ASCII); condition =, ≠; >, <; offset within packet in range 0 to 4095 words
Decode	source	any input channel, logical channel
	display type	decoded bus, tabulated list
	color coding	start, data payload, parity, stop, start error, parity error, stop error
	data format	hex, decimal, octal, binary, ASCII

R&S®RTH-K3

CAN triggering and decoding			
Protocol configuration	signal type	CAN_H, CAN_L	
	bit rate	standard bit rate (10/20/33.3/50/83.3/ 100/125/250/500/1000 kbps) or user-defined bit rate in range from 10 kbps to 1 Mbps	
	sampling point	10 % to 95 % within bit period	
	device list	associate frame identifier with symbolic ID, load DBC file content	
	auto threshold setup	assisted threshold configuration for CAN triggering and decoding (software)	
Trigger	source	any input channel or logical channel	
	trigger event setup	start of frame, end of frame, frame type, identifier, identifier + data, error condition (any combination of CRC error, bit stuffing error, form error and ACK error)	
	identifier setup	frame type (data, remote or both), identifier type (11 bit or 29 bit); condition =, ≠; identifier selectable from label list	
	data setup	data pattern up to 8 byte (hex or binary); condition =, ≠	
Decode	source	any input channel, logical channel	
	display type	decoded bus, tabulated list	
	color coding	start of frame, identifier, DLC, data payload, CRC, end of frame, error frame, overload frame, CRC error	
	data format	hex, decimal, octal, binary, ASCII, symbolic	

LIN triggering and decoding			
Protocol configuration	version	1.3, 2.x or SAE J602; mixed traffic is supported	
	bit rate	standard bit rate (1.2/2.4/4.8/9.6/10.417/ 19.2 kbps) or user-defined bit rate in range from 1 kbps to 20 kbps	
	signal polarity	idle low, idle high	
	device list	associate frame address with symbolic ID (software)	
	auto threshold setup	assisted threshold configuration for LIN triggering and decoding (software)	
Trigger	source	any input channel or logical channel	
	trigger event setup	start of frame (sync break), identifier, identifier + data, wakeup frame, error condition (any combination of checksum error, parity error and sync field error)	
	identifier setup	range from 0d to 63d; condition =, ≠; identifier selectable from label list	
	data setup	data pattern up to 8 byte (hex or binary); condition =, ≠	
Decode	source	any input channel, logical channel	
	display type	decoded bus, tabulated list	
	color coding	frame, frame identifier, parity, data payload, checksum, error condition	
	data format	hex, decimal, octal, binary, ASCII	

R&S®RTH-K9

CAN-FD triggering and decoding (requires option R&S®RTH-K3 as basis)			
Protocol configuration	signal polarity		CAN_H, CAN_L
	standard		ISO, non-ISO (Bosch)
	bit rate		
		arbitration rate	standard bit rate (10/20/33.3/50/83.3/ 100/125/250/500/1000 kbps) or user-defined bit rate in range from 10 kbps to 1 Mbps
		data rate	standard bit rate (10/20/33.3/50/83.3/ 100/125/250/500 kbps; 1/1.5/2/4/6/8/10/12/14/15 Mbps) or user-defined bit rate in range from 10 kbps to 15 Mbps
	sampling point		10 % to 95 % within bit period; independent settings for arbitration phase and data phase
	device list		associate frame identifier with symbolic ID, load DBC file content
	auto threshold setup		assisted threshold configuration for CAN triggering and decoding (software)
Trigger	source		any input channel or logical channel
	trigger event setup		start of frame, end of frame, frame type, identifier, identifier + data, error condition (any combination of CRC error, bit stuffing error, form error, stuff count error and ACK error)
	identifier setup		frame type (data, remote or both), identifier type (11 bit or 29 bit); condition =, ≠; identifier selectable from label list
	FD bits		FDF, BRS and ESI (0, 1, X)
	data setup		data pattern up to 8 byte (hex or binary); condition =, ≠
Decode	source		any input channel, logical channel
	display type		decoded bus, tabulated list
	color coding		start of frame, identifier, FD bits, DLC, data payload, stuff count, CRC, end of frame, error frame, overload frame, CRC error
	data format		hex, decimal, octal, binary, ASCII, symbolic

R&S®RTH-K10

SENT triggering and decoding			
Protocol configuration	signal polarity	idle low, idle high	
	clock period (clock tick)	1 µs to 100 µs	
	clock tolerance	0 % to 25 %	
	data nibbles	1 to 6	
	serial message type	none, short serial message and enhanced serial message	
	CRC version	legacy (Feb 2008) and v2010, v2016 (latest)	
	CRC calculation	SAE J2716 standard and TLE 4998X	
	pause pulse	no, yes, for constant frame length	
	frame length in clock ticks (applicable only when pause pulse = constant frame length)	104 to 922	
	auto threshold setup	assisted threshold configuration for SENT triggering and decoding (software)	
Trigger	source	any input channel or logical channel	
	trigger event setup	calibration or sync, transmission sequence status, transmission sequence status + data, serial message identifier, serial message identifier + data, error condition (any combination of calibration pulse error, pulse period error, transmission sequence CRC error, serial message CRC error and irregular frame length error)	
	transmission sequence status nibble setup	from 0 to F, condition =, ≠	
	transmission sequence data nibbles setup	each nibble value from 0 to F, condition =, ≠	
	serial message identifier setup	from 00 to FF, condition =, ≠; identifier selectable from label list	
	serial message identifier type setup (applicable only when the serial protocol = enhanced serial message in protocol configuration)	4 bit and 8 bit	
	serial message data setup	00 to FF (short serial message)	
		000 to FFF (enhanced serial message with 8 bit ID)	
		0000 to FFFF (enhanced serial message with 4 bit ID)	
Decode	source	any input channel, logical channel	
	display type	decoded bus, tabulated list	
	color coding	transmission sequence: sync/calibration, status, data bits, CRC, pause pulse, calibration pulse error, pulse period error, irregular frame length error and CRC error; serial message: identifier, data, CRC, CRC error	
	data format	hex, decimal, octal, binary, ASCII, symbolic	

R&S®RTH-K15

History and segmented memory							
Memory segmentation	function	Provides an adjustable number of memory segments for the acquisition. Segmentation is active on all analog and logic channels and protocol decoding. Combinations with zoom and math functions are supported, but reduce the effectively used number of segments.					
	maximum record length per channel (analog channels in sample acquisition mode)	segments	1 active analog channel (sample)	2 active analog channels (sample)	3 or 4 active analog channels (sample)	digital channels (sample)	serial channel (protocol memory in byte)
		5000	10k	5k	2.5k	2.5k	5.12k
		1000	50k	25k	12.5k	12.5k	25.6k
		100	500k	250k	125k	125k	256k
	total memory per channel		50M	25M	12.5M	12.5M	25.6M
	maximum record length per channel (analog channels in high resolution, peak detect, envelope and average acquisition modes)	segments	1 active analog channel (sample)	2 active analog channels (sample)	3 or 4 active analog channels (sample)	digital channels (sample)	serial channel (protocol memory in byte)
		5000	5k	2.5k	1.25k	1.25k	5.12k
		1000	25k	12.5k	6.25k	6.25k	25.6k
		100	250k	125k	62.5k	62.5k	256k
	total memory per channel		25M	12.5M	6.25M	6.25M	25.6M
History mode	function	If active, the history mode provides access to past acquisitions in the segmented memory.					
	timestamp resolution	1.6 ps					
	time format	relative, absolute					
	history player	replays the recorded waveforms; start and stop waveform can be set; repetition possible					

R&S®RTH-K18

Spectrum analysis		
Spectrum	R&S®RTH1004	CH1, CH2, CH3, CH4
	R&S®RTH1002	CH1, CH2
	scaling x-axis	linear or logarithmic frequency axis
	scaling y-axis	dBm, dBV, dBA
	setup parameters	center frequency and span (linear frequency axis), start and stop frequency (logarithmic frequency axis), resolution bandwidth, vertical scale
	span	1 kHz up to instrument bandwidth
	resolution bandwidth	span/10 ≥ RBW ≥ span/1000
	window types	flat-top, Hann, Hamming, Blackman, rectangular
	trace types	normal, max. hold, min. hold, average
Marker	peak marker search	parameters: threshold, excursion, distance
	markers on peak	up to 15
	sources	any spectrum trace
	marker values	absolute frequency and amplitude level or frequency and amplitude level relative to reference marker
Cursor	sources	any spectrum trace
	cursor values	absolute frequency and amplitude level of cursor 1 and absolute frequency and amplitude level of cursor 2 or frequency and amplitude level of cursor 2 relative to cursor 1
	cursor functions	track scaling, coupling, set to screen

R&S®RTH-K19

Advanced triggering
Additional trigger types: TV/video: SDTV and HDTV broadcast standards; pattern, state, runt, slew rate, window, data2clock, serial pattern, timeout and interval. For more details see Trigger system.

R&S®RTH-K33

Frequency counter		
Sources	R&S®RTH1004	CH1, CH2, CH3, CH4
	R&S®RTH1002	CH1, CH2
Number of counters		2
Number of measurements		up to 2 using internal clock as reference; 1 using external signal to second counter as reference
Frequency range	R&S®RTH1002 and R&S®RTH1004	10 Hz up to 66 MHz
	R&S®RTH1002 with -B221 option and R&S®RTH1004 with -B241 option	10 Hz up to 110 MHz
	R&S®RTH1002 with -B222 option and R&S®RTH1004 with -B242 option	10 Hz up to 220 MHz
	R&S®RTH1002 with -B223 option and R&S®RTH1004 with -B243 option	10 Hz up to 385 MHz
	R&S®RTH1002 with -B224 option and R&S®RTH1004 with -B244 option	10 Hz up to 550 MHz
Long term statistics		max., min. and average since (re-)start; max. and min. are time stamped with a resolution of 1 s.
Precision (measurement accuracy must also take reference clock accuracy into account)	f ≥ 10 kHz	7 digits (meas.)
	1 kHz ≤ f < 10 kHz	6 digits (meas.)
	100 Hz ≤ f < 1 kHz	4 digits (meas.)
	10 Hz ≤ f < 100 Hz	3 digits (meas.)
		(greater precision can be achieved by observing the long term average)
Coupling		Measured channels are automatically switched to AC coupling.

R&S®RTH-K34

Harmonic analysis		
Harmonics	R&S®RTH1004	CH1, CH2, CH3, CH4
	R&S®RTH1002	CH1, CH2
	setup parameters	fundamental frequency, scale
	scaling	linear (percent) or logarithmic (dB)
	fundamental frequency	10 Hz to 1 MHz
	harmonics	up to 64 harmonics
	statistic	current, max., min.
	limits	predefined limits or user defined
Display	bar graph	up to 64 harmonics on one screen
	displayed harmonics	all harmonics, even harmonics, odd harmonics, odd and multiple of 3, odd and not multiple of 3 or user defined
Measurements	signal measurements	fundamental frequency, total harmonic distortion relative to fundamental (THD_F) or relative to RMS amplitude (THD_R)
	harmonic measurements	RMS amplitude and amplitude relative to amplitude of the fundamental, phase angle relative to the fundamental and frequency
Fundamental amplitude accuracy [4]	absolute	±(DC gain accuracy + 1.0 % of the fundamental amplitude) (meas.)
	relative (percent)	–
Harmonics amplitude accuracy [4]	absolute	±(DC gain accuracy + 0.2 % of the fundamental amplitude + 1.0 % of the harmonic amplitude) (meas.)
	relative (percent)	±(2.0 % of the relative harmonic amplitude + 0.2 %) (meas.)
THD accuracy [4]	THD_F	±0.8 % absolute (meas.)
	THD_R	±0.8 % absolute (meas.)
Frequency accuracy		±0.5 % of fundamental frequency (meas.)

R&S®RTH-K38

User scripting
Enables to run user scripts on the R&S®RTH1002 and R&S®RTH1004. The script allows to control the instrument via SCPI commands and access all parameters. The option also supports to display measurement results on the instrument in an individual screen area. Supported script languages: Html, Javascript The R&S®RTH-K38 option requires an external computer to program the script and copy it onto the instrument. Once the script has been loaded into the R&S®RTH1002/R&S®RTH1004, it can be started from the instrument without any PC connected.

---

[4] For a base frequency ≤ 1 kHz.

R&S®RTH-K200

Wireless LAN
Interface wireless LAN 802.11 b/g/n 2x2, 2.4 GHz Operating modes: access point and client mode Certification: SRCC, valid for China Certification, valid for Japan   ⊖   R 003-160047 Complies with IDA Standards DB102020, valid for Singapore Certification: WPC, valid for India Other countries where operation of R&S®RTH-K200 is permitted: Armenia, Australia, Belarus, Kazakhstan, Kyrgyz Republic, New Zealand, Russian Federation, Taiwan For operation in countries that are not listed, it is the sole responsibility of the user to ensure that the above certification is accepted and in line with the applicable laws of those countries. Rohde & Schwarz does not expressly warrant wireless LAN compliance for countries that are not listed above.

R&S®RTH-K200US

Wireless LAN
Interface wireless LAN 802.11 b/g/n 2x2, 2.4 GHz Operating modes: access point and client mode Certifications: FCC and IC, valid for Canada and the United States For operation outside Canada and the US, it is the sole responsibility of the user to ensure that the above certifications are accepted and in line with the applicable laws of that particular country. Rohde & Schwarz does not expressly warrant wireless LAN compliance for countries that are not listed above.

R&S®RTH-K201

Web interface remote control
Remote operation via Ethernet port or wireless LAN (requires R&S®RTH-K200 or R&S®RTH-K200US option in addition). Control of the instrument from the web browser on a PC, laptop or handheld device. Full operation of the instrument's touch interface, keys and multifunction wheel via web browser.

Ordering information

Designation	Type	Order No.
Choose your R&S®Scope Rider base models		
Handheld oscilloscope, 60 MHz, 2 channels, CAT IV, DMM	R&S®RTH1002	1317.5000k02
Handheld oscilloscope, 60 MHz, 4 channels, CAT IV	R&S®RTH1004	1317.5000k04
Base unit (including R&S®RTH-K15 history and segmented memory option and standard accessories: one 500 MHz, 10:1, 600 V CAT IV voltage probe for each oscilloscope input channel; one 600 V CAT IV test lead per meter input; microSD card (installed in the instrument), compact manual; lithium-ion battery pack; power supply with plugs for EU, CH, UK, US, CAN, China, Australia)		
Choose your bandwidth upgrade		
Upgrade of R&S®RTH1002 oscilloscopes to 100 MHz bandwidth	R&S®RTH-B221	1325.9717.02
Upgrade of R&S®RTH1002 oscilloscopes to 200 MHz bandwidth	R&S®RTH-B222	1325.9723.02
Upgrade of R&S®RTH1002 oscilloscopes to 350 MHz bandwidth	R&S®RTH-B223	1325.9730.02
Upgrade of R&S®RTH1002 oscilloscopes to 500 MHz bandwidth	R&S®RTH-B224	1326.0571.02
Upgrade of R&S®RTH1004 oscilloscopes to 100 MHz bandwidth	R&S®RTH-B241	1326.0588.02
Upgrade of R&S®RTH1004 oscilloscopes to 200 MHz bandwidth	R&S®RTH-B242	1326.0594.02
Upgrade of R&S®RTH1004 oscilloscopes to 350 MHz bandwidth	R&S®RTH-B243	1326.0607.02
Upgrade of R&S®RTH1004 oscilloscopes to 500 MHz bandwidth	R&S®RTH-B244	1326.0613.02
Choose your options		
Mixed signal upgrade for non-MSO models, 250 MHz	R&S®RTH-B1	1325.9981.02
I^{2}C/SPI serial triggering and decoding	R&S®RTH-K1	1325.9969.02
UART/RS-232/RS-422/RS-485 serial triggering and decoding	R&S®RTH-K2	1325.9975.02
CAN/LIN serial triggering and decoding	R&S®RTH-K3	1333.0550.02
CAN-FD serial triggering and decoding (requires active R&S®RTH-K3 option as basis)	R&S®RTH-K9	1326.3829.02
SENT serial triggering and decoding	R&S®RTH-K10	1326.3835.02
History and segmented memory	R&S®RTH-K15	1326.1803.02
Spectrum analysis	R&S®RTH-K18	1333.0680.02
Advanced triggering	R&S®RTH-K19	1326.0642.02
Frequency counter	R&S®RTH-K33	1333.0696.02
Harmonics analysis	R&S®RTH-K34	1333.0673.02
User scripting	R&S®RTH-K38	1801.4632.02
Wireless LAN, all countries except US and Canada	R&S®RTH-K200	1326.0620.02
Wireless LAN, for US and Canada only	R&S®RTH-K200US	1332.9890.02
Web interface remote control	R&S®RTH-K201	1326.0636.02
Choose your probes		
Passive probe, 500 MHz, isolated, 10:1, 10 MΩ,12 pF, 600 V CAT IV, 1000 V CAT III	R&S®RT-ZI10	1326.1761.02
Passive probe, 500 MHz, isolated, 100:1, 100 MΩ, 4.6 pF, 600 V CAT IV, 1000 V CAT III, (3540 V CAT I)	R&S®RT-ZI11	1326.1810.02
Passive probe (laboratory model), 500 MHz, isolated, 10:1, 10 MΩ, 11 pF, 300 V CAT III	R&S®RT-ZI10C	1326.3106.02
Set 2 × R&S®RT-ZI10C passive probe	R&S®RT-ZI10C-2	1333.1811.02
Set 4 × R&S®RT-ZI10C passive probe	R&S®RT-ZI10C-4	1333.1328.02
20 kHz, AC/DC, 0.01 V/A and 0.001 V/A, ±200 A and ±2000 A	R&S®RT-ZC02	1333.0850.02
100 kHz, AC/DC, 0.1 V/A, 30 A	R&S®RT-ZC03	1333.0844.02
Accessory replacement set for R&S®RT-ZI10/R&S®RT-ZI11	R&S®RT-ZA20	1326.1978.02
Accessory extension set for R&S®RT-ZI10/R&S®RT-ZI11	R&S®RT-ZA21	1326.1984.02
Safety test leads, red and black, silicone, 600 V CAT IV	R&S®RT-ZA22	1326.0988.02
PT100 temperature probe	R&S®RT-ZA12	1333.0809.02
Choose your accessories		
Soft carrying bag	R&S®HA-Z220	1309.6175.00
Ethernet cable, length: 2 m, crossover	R&S®HA-Z210	1309.6152.00
USB cable, length: 1.8 m, standard/mini USB connector	R&S®HA-Z211	1309.6169.00
Hard shell protective carrying case	R&S®RTH-Z4	1326.2774.02
Car adapter	R&S®HA-Z302	1321.1340.02
Battery charger for lithium-ion battery	R&S®HA-Z303	1321.1328.02
Replacement battery	R&S®HA-Z306	1321.1334.02
Spare power supply for R&S®RTH incl. power plugs for EU, GB, US	R&S®RT-ZA14	1326.2874.02

Application packages

Designation	Consists of	Type	Order No.
Application bundle	R&S®RTH-K1, R&S®RTH-K2, R&S®RTH-K3, R&S®RTH-K9, R&S®RTH-K10, R&S®RTH-K15, R&S®RTH-K18, R&S®RTH-K19, R&S®RTH-K33, R&S®RTH-K34, R&S®RTH-K38, R&S®RTH-K201	R&S®RTH-PK1	1801.3242.02
Power electronics package	R&S®RTH-K15 history mode R&S®RTH-K19 advanced trigger R&S®RTH-K34 harmonic analysis function	R&S®RTH-PKPWR	1338.0413.02
Automotive package	R&S®RTH-K10 SENT	R&S®RTH-PKAUTO	1338.0420.02
Industrial package	R&S®RTH-Z4 carrying case R&S®HA-Z303 battery charger R&S®HA-Z306 lithium-ion battery pack 6.4 Ah	R&S®RTH-ZELEC	1338.0436P02

Warranty		
Base unit		3 years
All other items [5]		1 year
Service options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with accredited calibration coverage, one year	R&S®AW1	
Extended warranty with accredited calibration coverage, two years	R&S®AW2	

Extended warranty with a term of one and two years (WE1 and WE2)
Repairs carried out during the contract term are free of charge [6]. Necessary calibration and adjustments carried out during repairs are also covered.

Extended warranty with calibration coverage (CW1 and CW2)
Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs [6] and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

Extended warranty with accredited calibration (AW1 and AW2)
Enhance your extended warranty by adding accredited calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated under accreditation, inspected and maintained during the term of the contract. It includes all repairs [6] and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

---

[5] For options installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

[6] Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

Preconfigered two-channel R&S®Scope Rider RTH packages

Name	Specifications	Order No.	Package consists of		Order No.
Two-channel base models					
RTH1002	60 MHz, 2 channels, CAT IV, DMM	1317.5000P02	RTH1002	60 MHz, 2 channels base model	1317.5000k02
RTH1012	100 MHz, 2 channels, CAT IV, DMM	1317.5000P12	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B221	100 MHz bandwidth upgrade for RTH1002	1325.9717.02
RTH1022	200 MHz, 2 channels, CAT IV, DMM	1317.5000P22	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B222	200 MHz bandwidth upgrade for RTH1002	1325.9723.02
RTH1032	350 MHz, 2 channels, CAT IV, DMM	1317.5000P32	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B223	350 MHz bandwidth upgrade for RTH1002	1325.9730.02
RTH1052	500 MHz, 2 channels, CAT IV, DMM	1317.5000P52	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B224	500 MHz bandwidth upgrade for RTH1002	1326.0571.02
Two-channel mixed signal models					
RTH1002	MSO 60 MHz, 2 channels, CAT IV, DMM, MSO	1317.5000P03	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1012	MSO 100 MHz, 2 channels, CAT IV, DMM, MSO	1317.5000P13	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B221	100 MHz bandwidth upgrade for RTH1002	1325.9717.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1022	MSO 200 MHz, 2 channels, CAT IV, DMM, MSO	1317.5000P23	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B222	200 MHz bandwidth upgrade for RTH1002	1325.9723.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1032	MSO 350 MHz, 2 channels, CAT IV, DMM, MSO	1317.5000P33	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B223	350 MHz bandwidth upgrade for RTH1002	1325.9730.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1052	MSO 500 MHz, 2 channels, CAT IV, DMM, MSO	1317.5000P53	RTH1002	60 MHz, 2 channels base model	1317.5000k02
			RTH-B224	500 MHz bandwidth upgrade for RTH1002	1326.0571.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02

Preconfigered four-channel R&S®Scope Rider RTH packages

Name	Specifications	Order No.	Package consists of		Order No.
Four-channel base models					
RTH1004	60 MHz, 4 channels, CAT IV	1317.5000P04	RTH1004	60 MHz, 4 channels base model	1317.5000k04
RTH1014	100 MHz, 4 channels, CAT IV	1317.5000P14	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B241	100 MHz bandwidth upgrade for RTH1004	1326.0588.02
RTH1024	200 MHz, 4 channels, CAT IV	1317.5000P24	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B242	200 MHz bandwidth upgrade for RTH1004	1326.0594.02
RTH1034	350 MHz, 4 channels, CAT IV	1317.5000P34	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B243	350 MHz bandwidth upgrade for RTH1004	1326.0607.02
RTH1054	500 MHz, 4 channels, CAT IV	1317.5000P54	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B244	500 MHz bandwidth upgrade for RTH1004	1326.0613.02
Four-channel mixed signal models					
RTH1004 MSO	60 MHz, 4 channels, CAT IV, MSO	1317.5000P05	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1014 MSO	100 MHz, 4 channels, CAT IV, MSO	1317.5000P15	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B241	100 MHz bandwidth upgrade for RTH1004	1326.0588.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1024 MSO	200 MHz, 4 channels, CAT IV, MSO	1317.5000P25	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B242	200 MHz bandwidth upgrade for RTH1004	1326.0594.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1034 MSO	350 MHz, 4 channels, CAT IV, MSO	1317.5000P35	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B243	350 MHz bandwidth upgrade for RTH1004	1326.0607.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02
RTH1054 MSO	500 MHz, 4 channels, CAT IV, MSO	1317.5000P55	RTH1004	60 MHz, 4 channels base model	1317.5000k04
			RTH-B244	500 MHz bandwidth upgrade for RTH1004	1326.0613.02
			RTH-B1	mixed signal (logic analyzer) option	1325.9981.02

Rohde & Schwarz

The Rohde & Schwarz technology group is among the trailblazers when it comes to paving the way for a safer and connected world with its leading solutions in test & measurement, technology systems and networks & cybersecurity. Founded more than 85 years ago, the group is a reliable partner for industry and government customers around the globe. The independent company is headquartered in Munich, Germany and has an extensive sales and service network with locations in more than 70 countries.

www.rohde-schwarz.com

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

Rohde & Schwarz training

www.training.rohde-schwarz.com

Rohde & Schwarz customer support

www.rohde-schwarz.com/support