

# R&S® RT-ZVCxx

## MULTI-CHANNEL POWER PROBE

Specifications



Specifications  
Version 06.00

**ROHDE & SCHWARZ**

Make ideas real



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



## 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”.

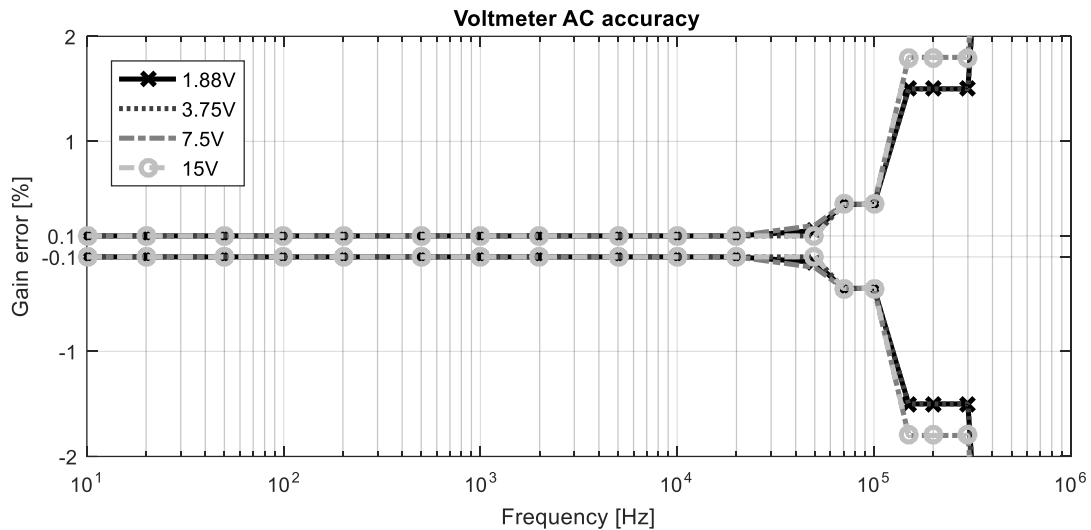
Non-traceable specifications with limits, typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

In line with the 3GPP 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.

# Probe characteristics

## Voltmeter of the R&S®RT-ZVC02/02A/04/04A

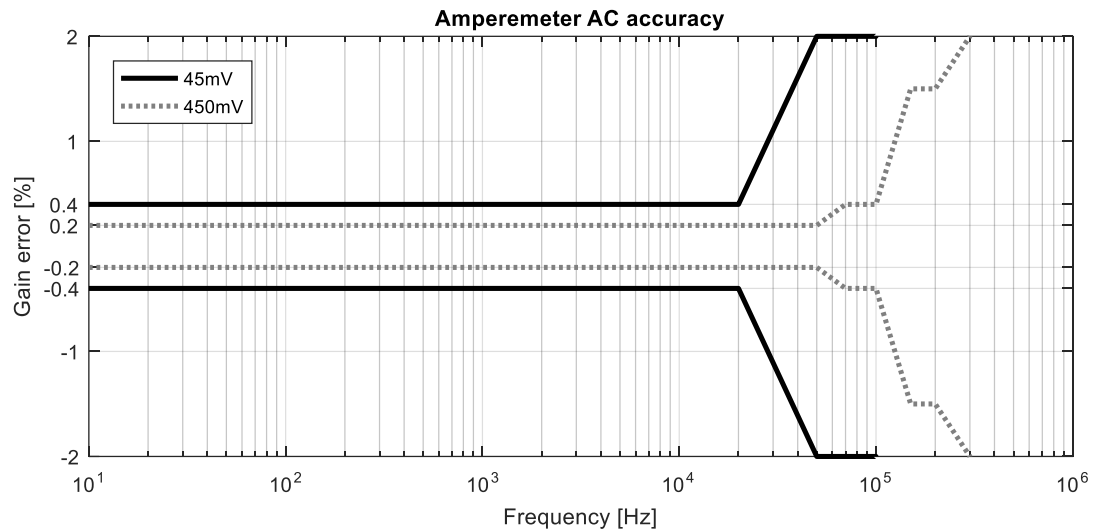
Number of signals		2/4
<b>DC characteristics</b>		
Voltage ranges		1.88 V, 3.75 V, 7.5 V, 15 V
DC accuracy	system	± (0.1 % of reading + 0.01 % of range)
Specified accuracy temperature range	rated accuracy applies after 30 min stabilization	+23 °C ± 5 °C
Temperature coefficient	from 0 °C to +18 °C or +28 °C to +50 °C	0.15 x specified accuracy/°C
<b>Dynamic range</b>		
Overall range	referred to LSB	102 dB (nom.)
Differential input	single socket	±7.5 V
Single-ended input	single socket	±15 V
<b>Maximum rated input voltage</b>		
Continuous voltage		±18 V (CAT I)
ESD tolerance	human body model	8 kV
<b>Input impedance</b>		
DC input resistance	between signal sockets	10 MΩ (nom.)
Input capacitance		48 pF (meas.)
<b>Sensitivity</b>		
Noise	AC RMS value computed with 5 Msample/s	
	1.88 V	< 50 μV (meas.)
	3.75 V	< 100 μV (meas.)
	7.5 V	< 200 μV (meas.)
	15 V	< 400 μV (meas.)
<b>Frequency response</b>		
Bandwidth	system, -1 dB (10.9 % error), starting at DC	
	1.88 V/3.75 V	1 MHz
	7.5 V	800 kHz
	15 V	700 kHz
AC accuracy	1.88 V	
	10 Hz to 20 kHz	± (0.1 % of reading + 0.01 % of range)
	20 kHz to 50 kHz	± (0.15 % of reading + 0.01 % of range)
	50 kHz to 100 kHz	± (0.4 % of reading + 0.01 % of range)
	100 kHz to 300 kHz	± (1.5 % of reading + 0.01 % of range)
	300 kHz to 400 kHz	± (5 % of reading + 0.01 % of range)
	400 kHz to 1 MHz	± (10.9 % of reading + 0.01 % of range)
	3.75 V	
	10 Hz to 50 kHz	± (0.1 % of reading + 0.01 % of range)
	50 kHz to 100 kHz	± (0.4 % of reading + 0.01 % of range)
	100 kHz to 300 kHz	± (1.5 % of reading + 0.01 % of range)
	300 kHz to 600 kHz	± (5 % of reading + 0.01 % of range)
	600 kHz to 1 MHz	± (10.9 % of reading + 0.01 % of range)
	7.5 V	
	10 Hz to 20 kHz	± (0.1 % of reading + 0.01 % of range)
	20 kHz to 50 kHz	± (0.2 % of reading + 0.01 % of range)
	50 kHz to 100 kHz	± (0.4 % of reading + 0.01 % of range)
	100 kHz to 300 kHz	± (1.8 % of reading + 0.01 % of range)
	300 kHz to 500 kHz	± (5 % of reading + 0.01 % of range)
	500 kHz to 800 kHz	± (10.9 % of reading + 0.01 % of range)
	15 V	
	10 Hz to 50 kHz	± (0.1 % of reading + 0.01 % of range)
	50 kHz to 100 kHz	± (0.4 % of reading + 0.01 % of range)
	100 kHz to 300 kHz	± (1.8 % of reading + 0.01 % of range)
	300 kHz to 400 kHz	± (5 % of reading + 0.01 % of range)
	400 kHz to 700 kHz	± (10.9 % of reading + 0.01 % of range)
Specified accuracy temperature range	rated accuracy applies after 30 min stabilization	+23 °C ± 5 °C
Temperature coefficient	from 0 °C to +18 °C or +28 °C to +50 °C	0.15 x specified accuracy/°C



## Amperemeter of the R&S®RT-ZVC02/-ZVC04

<b>Number of signals</b>		2/4
<b>DC characteristics</b>		
Current ranges	limited by internal overload protection and 15 A fuse, limits for continuous current given in brackets	
		4.5 $\mu$ A
		45 $\mu$ A
		4.5 mA
		45 mA
		4.5 A
		10 A (5 A)
	external shunt on DUT, recommended for currents > 3 A	45 mV
		450 mV
Shunt resistors	4.5 $\mu$ A, 45 $\mu$ A	10 k $\Omega$ $\pm$ 0.1 %
	4.5 mA, 45 mA	10 $\Omega$ $\pm$ 0.1 %
	4.5 A, 10 A	10 m $\Omega$ $\pm$ 0.1 %
Voltage burden	including total (round trip) input resistance	
	10 k $\Omega$ shunt (4.5 $\mu$ A, 45 $\mu$ A)	10 mV/ $\mu$ A, max. 500 mV
	10 $\Omega$ shunt (4.5 mA, 45 mA)	10.7 mV/mA, max. 535 mV
	10 m $\Omega$ shunt (4.5 A, 10 A)	128 mV/A, max. 1.28 V
DC accuracy	system, all ranges except 4.5 A and 10 A	$\pm$ (0.2 % of reading + 0.02 % of range)
	system, 4.5 A range	$\pm$ (0.3 % of reading + 0.02 % of range)
	system, 10 A range	$\pm$ (0.2 % of reading + 0.09 % of range)
Specified accuracy temperature range	rated accuracy applies after 30 min stabilization	+23 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C
Temperature coefficient	from 0 $^{\circ}$ C to +18 $^{\circ}$ C or +28 $^{\circ}$ C to +50 $^{\circ}$ C	0.15 $\times$ specified accuracy/ $^{\circ}$ C
<b>Dynamic range</b>		
Overall range	including range switching	228 dB
Differential input	single socket	$\pm$ 250 mV
Single-ended input	single socket	$\pm$ 500 mV
Common mode range	single socket	$\pm$ 15 V
<b>Maximum rated input voltage</b>		
Continuous voltage	external shunt	$\pm$ 18 V (CAT I)
ESD tolerance	human body model	8 kV

<b>Input impedance</b>		
DC input resistance	resistance between signal sockets	
	external shunt	1 M $\Omega$ (nom.)
	10 k $\Omega$ shunt (4.5 $\mu$ A, 45 $\mu$ A)	1 M $\Omega$    10 k $\Omega$ = 9.89 k $\Omega$ (nom.)
	10 $\Omega$ shunt (4.5 mA, 45 mA)	10.6 $\Omega$ (nom.)
	10 m $\Omega$ shunt (4.5 A, 10 A)	21.2 m $\Omega$ (nom.)
	additional resistance caused by cabling and connectors	
	AWG24 cable (standard shipping)	2*(41 + 0.77/cm) m $\Omega$ (nom.)
	AWG20 cable (used in accessory sets)	2*(41 + 0.33/cm) m $\Omega$ (nom.)
	total (round trip) resistance including connectors and standard cabling (length: 16 cm), causes total voltage burden seen at the lead ends	
	10 k $\Omega$ shunt (4.5 $\mu$ A, 45 $\mu$ A)	9.89 k $\Omega$ (nom.)
	10 $\Omega$ shunt (4.5 mA, 45 mA)	10.7 $\Omega$ (nom.)
10 m $\Omega$ shunt (4.5 A, 10 A)	128 m $\Omega$ (nom.)	
Input capacitance	between signal sockets	
	external shunt	< 2.3 nF (meas.)
<b>Sensitivity</b>		
Noise	AC RMS value computed with 5 Msample/s	
	4.5 $\mu$ A	< 2 nA (meas.)
	45 $\mu$ A	< 6 nA (meas.)
	4.5 mA	< 2 $\mu$ A (meas.)
	45 mA	< 6 $\mu$ A (meas.)
	4.5 A	< 2 mA (meas.)
	10 A	< 6 mA (meas.)
	45 mV	< 30 $\mu$ V (meas.)
	450 mV	< 60 $\mu$ V (meas.)
<b>Frequency response</b>		
Bandwidth	system, -1 dB (10.9 % error), starting at DC, only characterized in external shunt mode (worst case condition in terms of input capacitance, comparable specification for current ranges using internal shunts are given in brackets)	
	45 mV (4.5 $\mu$ A, 4.5 mA, 4.5 A)	300 kHz
	450 mV (45 $\mu$ A, 45 mA, 10 A)	1 MHz
AC accuracy	45 mV (4.5 $\mu$ A, 4.5 mA, 4.5 A)	
	10 Hz to 40 kHz	$\pm$ (0.4 % of reading + 0.02 % of range)
	40 kHz to 100 kHz	$\pm$ (2 % of reading + 0.02 % of range)
	100 kHz to 270 kHz	$\pm$ (10.9 % of reading + 0.02 % of range)
	450 mV (45 $\mu$ A, 45 mA, 10 A)	
	10 Hz to 50 kHz	$\pm$ (0.2 % of reading + 0.02 % of range)
	50 kHz to 100 kHz	$\pm$ (0.4 % of reading + 0.02 % of range)
	100 kHz to 200 kHz	$\pm$ (1.5 % of reading + 0.02 % of range)
	200 kHz to 300 kHz	$\pm$ (2 % of reading + 0.02 % of range)
	300 kHz to 800 kHz	$\pm$ (5 % of reading + 0.02 % of range)
800 kHz to 1 MHz	$\pm$ (10.9 % of reading + 0.02 % of range)	
Specified accuracy temperature range	rated accuracy applies after 30 min stabilization	+23 $^{\circ}$ C $\pm$ 5 $^{\circ}$ C
Temperature coefficient	from 0 $^{\circ}$ C to +18 $^{\circ}$ C or +28 $^{\circ}$ C to +50 $^{\circ}$ C	0.15 x specified accuracy/ $^{\circ}$ C
Vx-to-Ix channel isolation	input frequency < analog bandwidth, from voltmeter to amperemeter channel of same channel number (not relevant between voltmeter and amperemeter of different channel numbers)	
	4.5 $\mu$ A	> 67 dB (meas.)
	45 $\mu$ A	> 54 dB (meas.)
	4.5 mA	> 65 dB (meas.)
	45 mA	> 54 dB (meas.)
	4.5 A	> 87 dB (meas.)
	10 A	> 114 dB (meas.)
	45 mV	> 64 dB (meas.)
	450 mV	> 64 dB (meas.)

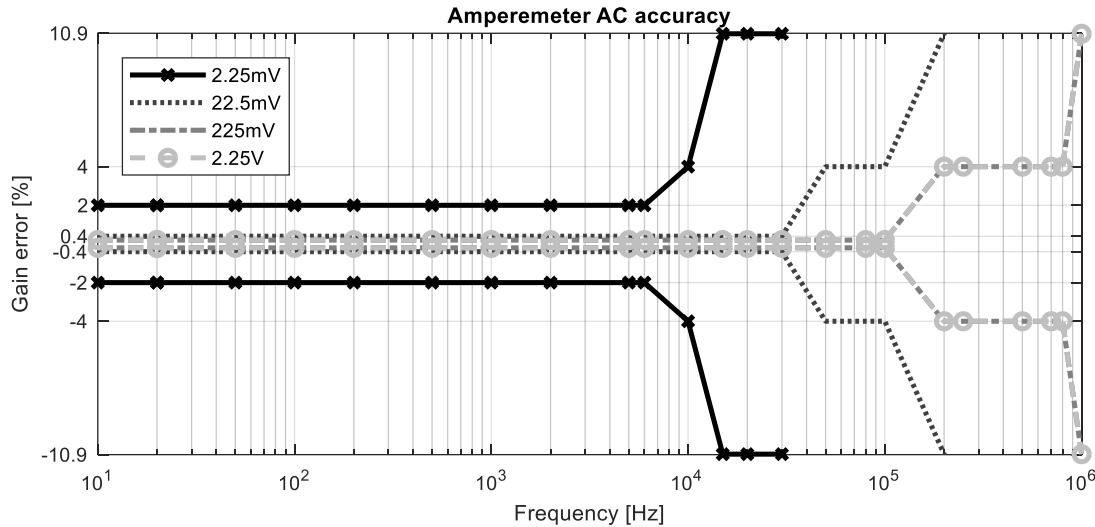


## Amperemeter of the R&S®RT-ZVC02A/ZVC04A

Number of signals	2/4	
<b>DC characteristics</b>		
Current ranges	limited by internal overload protection and 15 A fuse, limits for continuous current given in brackets	
		2.25 mA
		11.25 mA
		22.5 mA
		45 mA
		112.5 mA
		225 mA
		450 mA
		900 mA
		1.125 A
		3 A (1.5 A)
		4.5 A
		6 A (3 A)
	external shunt on DUT, recommended for currents > 3 A	2.25 mV
		22.5 mV
		225 mV
		2.25 V
Shunt resistors	2.25/22.5/225/900 mA	1 Ω ± 0.1 %
	11.25 mA, 112.5 mA, 1.125 A, 3 A	200 mΩ ± 0.1 %
	45 mA, 450 mA, 4.5 A, 6 A	50 mΩ ± 0.1 %
Voltage burden	including total (round trip) input resistance	
	50 mΩ shunt	128 mV/A, max. 300 mV
	200 mΩ shunt	0.2 mV/mA, max. 600 mV
	1 Ω shunt	1 μV/μA, max. 900 mV
DC accuracy (system)	2.25/11.25/45 mA	± (0.2 % of reading + 0.16 % of range)
	2.25 mV	± (0.2 % of reading + 0.25 % of range)
	22.5 mV, 22.5/112.5/450 mA	± (0.2 % of reading + 0.03 % of range)
	225 mA, 1.125 A, 4.5A, 225 mV, 2.25 V	± (0.2 % of reading + 0.02 % of range)
	900 mA	± (0.2 % of reading + 0.05 % of range)
	3 A	± (0.2 % of reading + 0.08 % of range)
	6 A	± (0.2 % of reading + 0.15 % of range)
Minimum current with best accuracy	2 % accuracy	
	50 mΩ shunt	4 mA
	200 mΩ shunt	1 mA
	1 Ω shunt	200 μA
	5 % accuracy	
	50 mΩ shunt	1.6 mA
	200 mΩ shunt	400 μA
	1 Ω shunt	80 μA

Specified accuracy temperature range	rated accuracy applies after 30 min stabilization and typical device operation	+23 °C ± 3 °C
Temperature coefficient	from 0 °C to +20 °C or +26 °C to +50 °C	
	2.25/11.25/45 mA, 2.25 mV	0.7 × specified accuracy/°C
	22.5/112.5/450 mA, 22.5 mV	0.35 × specified accuracy/°C
	all other ranges	0.15 × specified accuracy/°C
<b>Dynamic range</b>		
Overall range	gain switching only	up to 161 dB
	including shunt switching	170 dB
Differential input	single socket	±125 mV
Single-ended input	single socket	±250 mV
Common mode range	single socket	±15 V
<b>Autoranging</b>		
Application	only available for R&S®RT-ZVC02A/-ZVC04A, for operation with R&S®CMWrun	all amperemeter ranges with internal and external shunts
Mode		gain switching only (fixed shunt), range by range
Settling time	to ranges 2.25/2.25/11.25/45 mA	≤ 10 µs
	all other transitions	≤ 2.5 µs
Seamless measurement rate	voltage, current, and power	50 ksample/s
<b>Maximum rated input voltage</b>		
Continuous voltage	external shunt	±18 V (CAT I)
ESD tolerance	human body model	8 kV
<b>Input impedance</b>		
DC input resistance	resistance between signal sockets	
	external shunt	1 MΩ (nom.)
	50 mΩ shunt (45 mA, 450 mA, 4.5 A, 6 A)	150 mΩ (nom.)
	200 mΩ shunt (11.25 mA, 112.5 mA, 1.125 A, 3 A)	300 mΩ (nom.)
	1 Ω shunt (2.25/22.5// 225/900 mA)	1.1 Ω (nom.)
	additional resistance caused by cabling and connectors	
	AWG24 cable (standard shipping)	2*(41 + 0.77/cm) mΩ (nom.)
	AWG20 cable (used in accessory sets)	2*(41 + 0.33/cm) mΩ (nom.)
	total (round trip) resistance including connectors and standard cabling (length: 16 cm), causes total voltage burden seen at the lead ends	
	50 mΩ shunt (45 mA, 450 mA, 4.5 A, 6 A)	257 mΩ (nom.)
200 mΩ shunt (11.25 mA, 112.5 mA, 1.125 A, 3 A)	407 mΩ (nom.)	
1 Ω shunt (2.25/22.5/225/900 mA)	1.2 Ω (nom.)	
Input capacitance	between signal sockets	
	external shunt	< 2.2 nF (meas.)
<b>Sensitivity</b>		
Noise	AC RMS value computed with 5 Msample/s	
	2.25 mA	< 5 µA (meas.)
	11.25 mA	< 26 µA (meas.)
	22.5 mA	< 20 µA (meas.)
	45 mA	< 105 µA (meas.)
	112.5 mA	< 90 µA (meas.)
	225 mA	< 60 µA (meas.)
	450 mA	< 380 µA (meas.)
	900 mA	< 260 µA (meas.)
	1.125 A	< 300 µA (meas.)
	3 A	< 1.5 mA (meas.)
	4.5 A	< 1.2 mA (meas.)
	6 A	< 5.5 mA (meas.)
	2.25 mV	< 8 µV (meas.)
	22.5 mV	< 20 µV (meas.)
	225 mV	< 65 µV (meas.)
2.25 V	< 270 µV (meas.)	





Noise (cont.)	AC RMS value computed with 50 ksamples/s	
	2.25 mA	< 2.3 $\mu$ A (meas.)
	11.25 mA	< 11.2 $\mu$ A (meas.)
	22.5 mA	< 2.7 $\mu$ A (meas.)
	45 mA	< 46.1 $\mu$ A (meas.)
	112.5 mA	< 13.4 $\mu$ A (meas.)
	225 mA	< 6.4 $\mu$ A (meas.)
	450 mA	< 54 $\mu$ A (meas.)
	900 mA	< 38 $\mu$ A (meas.)
	1.125 A	< 32 $\mu$ A (meas.)
	3 A	< 199 $\mu$ A (meas.)
	4.5 A	< 131 $\mu$ A (meas.)
	6 A	< 787 $\mu$ A (meas.)
	2.25 mV	< 3.2 $\mu$ V (meas.)
	22.5 mV	< 3.6 $\mu$ V (meas.)
225 mV	< 7.1 $\mu$ V (meas.)	
2.25 V	< 40 $\mu$ V (meas.)	

<b>Frequency response</b>		
Bandwidth	system, $-1$ dB (10.9 % error), starting at DC, only characterized in external shunt mode (worst case condition in terms of input capacitance, comparable specification for current ranges using internal shunts are given in brackets)	
	2.25 mV (2.25/11.25/45 mA)	30 kHz
	22.5 mV (22.5/112.5/450 mA)	230 kHz
	225 mV (225 mA, 1.125 A, 4.5 A)	1 MHz
	2.25 V (900 mA, 3 A, 6 A)	1 MHz
AC accuracy	2.25 mV (2.25/11.25/45 mA)	
	10 Hz to 4 kHz	$\pm$ (2 % of reading + 0.25 % of range)
	4 kHz to 10 kHz	$\pm$ (4 % of reading + 0.25 % of range)
	10 kHz to 30 kHz	$\pm$ (10.9 % of reading + 0.25 % of range)
	22.5 mV (22.5/112.5/450 mA)	
	10 Hz to 40 kHz	$\pm$ (0.4 % of reading + 0.03 % of range)
	40 kHz to 100 kHz	$\pm$ (4 % of reading + 0.03 % of range)
	100 kHz to 230 kHz	$\pm$ (10.9 % of reading + 0.03 % of range)
	225 mV (225 mA, 1.125 A, 4.5 A), 2.25 V (900 mA, 3 A, 6 A)	
	10 Hz to 100 kHz	$\pm$ (0.2 % of reading + 0.02 % of range)
100 kHz to 800 kHz	$\pm$ (4 % of reading + 0.02 % of range)	
800 kHz to 1 MHz	$\pm$ (10.9 % of reading + 0.02 % of range)	
Specified accuracy temperature range	rated accuracy applies after 30 min stabilization and typical device operation	$+23$ °C $\pm$ 3 °C
Temperature coefficient	from 0 °C to +20 °C or +26 °C to +50 °C	
	2.25/11.25/45 mA, 2.25 mV	0.7 $\times$ specified accuracy/°C
	all other ranges	0.15 $\times$ specified accuracy/°C

Vx-to-Ix channel isolation	input frequency < analog bandwidth, from voltmeter to amperemeter channel of same channel number (not relevant between voltmeter and amperemeter of different channel numbers)	
	2.25 mA	> 81 dB (meas.)
	11.25 mA	> 82 dB (meas.)
	22.5 mA	> 63 dB (meas.)
	45 mA	> 81 dB (meas.)
	112.5 mA	> 64 dB (meas.)
	225 mA	> 53 dB (meas.)
	450 mA	> 63 dB (meas.)
	900 mA	> 50 dB (meas.)
	1.125 A	> 53 dB (meas.)
	3 A	> 50 dB (meas.)
	4.5 A	> 53 dB (meas.)
	6 A	> 49 dB (meas.)
	2.25 mV	> 61 dB (meas.)
	22.5 mV	> 57 dB (meas.)
	225 mV	> 55 dB (meas.)
2.25 V	> 52 dB (meas.)	

## Digital backend of the R&S®RT-ZVC02/02A/04/04A

<b>A/D conversion</b>		
Number of channels	1 per input signal	4/8
Readings per second (speed)		5 Msample/s
Resolution		18 bit
Resolution voltmeter (LSB)	1.88 V	14 $\mu$ V
	3.75 V	28 $\mu$ V
	7.5 V	57 $\mu$ V
	15 V	114 $\mu$ V
Resolution amperemeter (LSB)	R&S®RT-ZVC02/-ZVC04	
	4.5 $\mu$ A	0.038 nA
	45 $\mu$ A	0.38 nA
	4.5 mA	38 nA
	45 mA	381 nA
	4.5 A	38 $\mu$ A
	10 A	381 $\mu$ A
	45 mV	381 nV
	450 mV	3.81 $\mu$ V
	R&S®RT-ZVC02A/-ZVC04A	
	2.25 mA	19 nA
	11.25 mA	95 nA
	22.5 mA	191 nA
	45 mA	381 nA
	112.5 mA	954 nA
	225 mA	1.91 $\mu$ A
	450 mA	3.81 $\mu$ A
	900 mA	19 $\mu$ A
	1.125 A	9.54 $\mu$ A
	3 A	95.4 $\mu$ A
	4.5 A	38.1 $\mu$ A
	6 A	381 $\mu$ A
	2.25 mV	19 nV
	22.5 mV	191 nV
	225 mV	1.91 $\mu$ V
	2.25 V	19 $\mu$ V
	<b>Oscilloscope interface</b>	
Use with	R&S®RT-ZVC02/-ZVC04	R&S®RTO2000/RTO6/RTP
Connector	as shipped with article 1326.0259.02/04 or accessory 1333.1770.02	HDMR-29
<b>USB interface</b>		
Connector		USB 3.0 Micro B
Maximum cable length	as shipped with article 1326.0259.22/24/32/34	1.5 m

## R&S®CMWrun interface

Use with	R&S®CMW-KT051 software option plus dedicated signaling extension for control and evaluation of power consumption monitoring and battery life measurements	R&S®CMW500, R&S®CMW290
<b>PC prerequisites</b>		
Operating system		Windows PC, Windows version $\geq 7$
CPU	minimum	Intel™ Core i3 or similar processor performance
RAM		$\geq 8$ Gbyte
HDD		high performance HDD or SSD for storing sample data
Peripherals		USB 3.0 interface
<b>Graphical user interface for results</b>		
Number of supported power measurement groups in parallel	Each power measurement group consists of a voltmeter and amperemeter with internal multiplier for instantaneous power calculation.	
	R&S®RT-ZVC02/-ZVC02A	up to 2
	R&S®RT-ZVC04/-ZVC04A	up to 4
Displayed measurements in the R&S®CMWrun report/power consumption monitor		parallel monitoring of voltage and current samples with calculation and display of the instantaneous power in R&S®CMWrun software
Sample rate displayed in the R&S®CMWrun report/power consumption monitor	available sample rate per measured channel (voltage, current and instantaneous power)	10/50/100/500/1000/5000/10000/50000 sample/s
Decimation methods		peak or average
Output formats		PDF, XML, CSV, TXT
Trigger events		signaling events in red lines IP analysis triggers in blue lines

## R&S®RTO2000/RTO6/RTP interface (R&S®RT-ZVC02/-ZVC04 only)

### Vertical system

Input channels	depending on number (up to 2) and type of connected probes (2 × 2 or 2 × 4 voltage/current channel version)	
	1 × R&S®RT-ZVC02	2 voltage, 2 current channels
	2 × R&S®RT-ZVC02	4 voltage, 4 current channels
	1 × R&S®RT-ZVC04	4 voltage, 4 current channels
	1 × R&S®RT-ZVC02, 1 × R&S®RT-ZVC04	6 voltage, 6 current channels
	2 × R&S®RT-ZVC04	8 voltage, 8 current channels
Arrangement of input channels	arranged in two probes Z1 and Z2 with up to 4 voltage/current channels each, assignment of the power probe to the port at the back of the oscilloscope is indicated on the probe (probe Z1, probe Z2)	Z1V1 to Z1V4, Z1I1 to Z1I4 Z2V1 to Z2V4, Z2I1 to Z2I4

### Horizontal system

Channel deskew	for each channel	
	min.	-6 $\mu$ s
	max.	+6 $\mu$ s
	step	200 ns
Oscilloscope to R&S®RT-ZVC channel skew (CH1 to CH4 to V1 to V4, I1 to I4)	R&S®RT-ZVC bandwidth set to 1 MHz, oscilloscope channels not filtered	
	amperemeter channels: 45 $\mu$ A, 45 mA, 10 A, 450 mV; voltmeter channels: 1.88 V, 3.75 V, 7.5 V, 15 V	$\leq \pm 200$ ns (meas.)
	amperemeter channels: 4.5 $\mu$ A, 4.5 mA, 4.5 A, 45 mV	$\leq +400$ ns (meas.)

**Acquisition system**

Acquisition mode		realtime and interpolated time
Acquisition history		supported
Sampling rate	max.	5 Msample/s
Realtime waveform acquisition rate	max.	500 waveforms/s
Memory depth	1 active power probe (R&S®RT-ZVC02/-ZVC04)	16 Msample for every channel
	2 active power probes (R&S®RT-ZVC02/-ZVC04)	8 Msample for every channel
acquisition and postprocessing settings can reduce the memory depth		
Decimation	modes	sample, peak, highres
	min. sample rate	25 ksample/s
Bandwidth	reduction performed by first order digital lowpass filtering	
	min.	5 kHz
	max.	1 MHz
	step	5 kHz

**Trigger system**

Edge trigger on R&S®RT-ZVC channels	triggers on specified slope (positive, negative or either) in the source signal sources	
Other trigger features	any channel from V1 to V4, I1 to I4 all trigger features of the base unit on oscilloscope channels	

**Prerequisites**

Hardware option	R&S®RTO2000/RTO6/RTP	R&S®RTO-B1/RTO6-B1/RTP-B1 mixed signal option (latest version with included B1E digital extension port) or R&S®RTO-B1E/RTO6-B1E/RTP-B1E digital extension port
	for details, see ordering information in the R&S®RTO2000/RTO6/RTP data sheets	
R&S®RTx software version	R&S®RT-ZVC02/-ZVC04 support	with 3.60.1.0 onwards

**Features**

General features	waveform measurements, mask testing, waveform math, search and mark function, display characteristics	all features of base unit as well as R&S®RTO-K18 and R&S®RTO-K19 options are supported
	sources	all channels from V1 to V4, I1 to I4
Mixed operation	R&S®RT-ZL04 logic probe and R&S®RT-ZVC02/04 power probe	simultaneous connection, but no parallel operation on screen
	R&S®RT-ZL04 logic probe or R&S®RT-ZVC02/04 power probe together with analog input channels	supported, running on same horizontal scale

## General data of the R&S®RT-ZVC02/02A/04/04A

<b>Environmental conditions</b>		
Temperature	operating temperature range, for probe and for operation via USB and power adapter	0 °C to +50 °C
	operating temperature range, with oscilloscope	0 °C to +45 °C
	storage temperature range	-10 °C to +60 °C
Damp heat		+25 °C/+40 °C, 95 % relative humidity, cyclic, in line with EN 60068-2-30
Altitude	operating	up to 2000 m
	transport	up to 4500 m
<b>Mechanical resistance</b>		
Vibration	sinusoidal	5 Hz to 55 Hz, 0.15 mm amplitude const., 55 Hz to 150 Hz, 0.5 g const., in line with EN 60068-2-6
	random	8 Hz to 500 Hz, acceleration 1.2 g RMS, in line with EN 60068-2-64
Shock		40 g shock spectrum, in line with MIL-STD-810E, method 516.4, procedure I
<b>Power rating</b>		
Probe	all channels enabled, all sampling	6 V DC, 2 A
Power adapter	input	100 V to 240 V at 47 Hz to 63 Hz, 0.4 A
	output	+5.9 V DC, 1.5 A
<b>Product conformity</b>		
Electromagnetic compatibility	EU: in line with EMC Directive 2014/30/EU	applied harmonized standards: <ul style="list-style-type: none"> <li>• EN 61326-1 (industrial environment)</li> <li>• EN 61326-2-1</li> <li>• EN 55011 (class A)</li> <li>• EN 61000-3-2</li> <li>• EN 61000-3-3</li> </ul>
Electrical safety	EU: in line with Low Voltage Directive 2014/35/EU	applied harmonized standard: EN 61010-1
	USA	UL 61010-1
	Canada	CAN/CSA-C22.2 No. 61010-1
Certifications		VDE, cCSA <sub>US</sub> , KC
<b>Calibration interval</b>	recommended for highest accuracy	1 year
	for general test and measurement applications	2 years
<b>Dimensions</b>	probe head (L x W x H)	approx. 150 mm x 103 mm x 40 mm (5.9 in x 4.1 in x 1.6 in)
	cable lengths of shipped test leads	approx. 16 cm (6.3 in)
	current cable size	AWG24
	voltage cable size	AWG28
<b>Weight</b>	probe only	approx. 500 g (1.1 lb)

## Ordering information

Designation	Type	Order No.
Multi-channel power probe, 2 × 4 voltage/current channels, for R&S®RTO2000/RTO6/RTP	R&S®RT-ZVC04	1326.0259.04
Multi-channel power probe, 2 × 4 voltage/current channels, for R&S®CMWrun	R&S®RT-ZVC04	1326.0259.24
Multi-channel power probe, 2 × 2 voltage/current channels, for R&S®RTO2000/RTO6/RTP	R&S®RT-ZVC02	1326.0259.02
Multi-channel power probe, 2 × 2 voltage/current channels, for R&S®CMWrun	R&S®RT-ZVC02	1326.0259.22
Multi-channel power probe with autoranging, 2 × 4 voltage/current channels, for R&S®CMWrun	R&S®RT-ZVC04A	1326.0259.34
Multi-channel power probe with autoranging, 2 × 2 voltage/current channels, for R&S®CMWrun	R&S®RT-ZVC02A	1326.0259.32
<b>Accessories</b>		
Extended cable set for R&S®RT-ZVC, PCB probing, 1 current and voltage lead, length: 32 cm	R&S®RT-ZA30	1333.1686.02
Extended cable set for R&S®RT-ZVC, 4 mm probing, 1 current and voltage lead, length: 32 cm	R&S®RT-ZA31	1333.1692.02
Power Adapter for R&S®RT-ZVC02/04 (only for operation with R&S®CMWrun)	R&S®RT-ZA32	1333.1705.02
Oscilloscope interface cable for R&S®RT-ZVC (included in R&S®RT-ZVC02/-ZVC04, 1326.0259.02/.04)	R&S®RT-ZA33	1333.1770.02
Extended cable set for R&S®RT-ZVC, 4 mm probing, 1 current and voltage lead, length: 1 m	R&S®RT-ZA34	1333.1892.02
Extended cable set for R&S®RT-ZVC, PCB probing, 1 current and voltage lead, length: 1 m	R&S®RT-ZA35	1333.1905.02
Solder-in cable set for R&S®RT-ZVC, 4 current and voltage solder-in cables, solder-in pins	R&S®RT-ZA36	1333.1911.02
Extended cable set for R&S®RT-ZVC, BNC connector, 1 current and voltage lead, length: 16 cm	R&S®RT-ZA37	1337.9130.02
<b>Graphical user interface based on R&amp;S®CMWrun (USB connection to the PC with R&amp;S®CMWrun environment)</b>		
R&S®CMWrun general-purpose (adds battery life, GUI and features such as audio and E2E applications)	R&S®CMW-KT051	1203.4157.02

<b>Service options</b>		
Extended warranty, one year	R&S®WE1	Contact your local Rohde & Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty, three years	R&S®WE3	
Extended warranty, four years	R&S®WE4	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with calibration coverage, three years	R&S®CW3	
Extended warranty with calibration coverage, four years	R&S®CW4	
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 accredited calibration coverage, three years	R&S®AW3	
Extended warranty with accredited calibration coverage, four years	R&S®AW4	

#### **Extended warranty with a term of one to four years (WE1 to WE4)**

Repairs carried out during the contract term are free of charge <sup>1</sup>. Necessary calibration and adjustments carried out during repairs are also covered.

#### **Extended warranty with calibration (CW1 to CW4)**

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 <sup>1</sup> and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

#### **Extended warranty with accredited calibration (AW1 to AW4)**

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 <sup>1</sup> and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

<sup>1</sup> Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

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