

R&S® MXO 4 SERIES OSCILLOSCOPE



Data Sheet
Version 03.01

ROHDE & SCHWARZ
Make ideas real



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Definitions

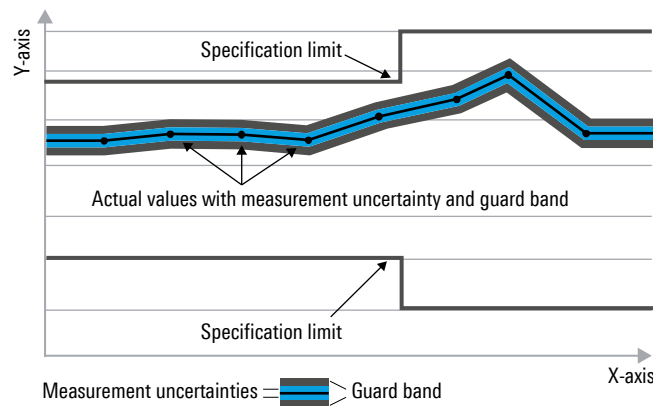
General

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/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: analog channels

| | | |
|---|---|---|
| Input channels | | 4 channels |
| Input impedance | | 50 Ω \pm 1.5 %, 1 M Ω \pm 1 % 12 pF (meas.) |
| Analog bandwidth (–3 dB) | at 50 Ω input impedance | |
| | R&S [®] MXO 4 | \geq 200 MHz |
| | R&S [®] MXO 4 with -B243 option | \geq 350 MHz |
| | R&S [®] MXO 4 with -B245 option | \geq 500 MHz |
| | R&S [®] MXO 4 with -B2410 option | \geq 1 GHz |
| | R&S [®] MXO 4 with -B2415 option | \geq 1.5 GHz ¹ |
| | at 1 M Ω input impedance | |
| | R&S [®] MXO 4 | \geq 200 MHz (meas.) |
| | R&S [®] MXO 4 with -B243 option | \geq 350 MHz (meas.) |
| | R&S [®] MXO 4 with -B245 option | \geq 500 MHz (meas.) |
| R&S [®] MXO 4 with -B2410 option | \geq 700 MHz (meas.) ² | |
| R&S [®] MXO 4 with -B2415 option | \geq 700 MHz (meas.) ² | |
| Bandwidth limits | max. –1.5 dB, min. –4 dB | 1 GHz, 500 MHz, 350 MHz, 200 MHz, 100 MHz, 50 MHz, 20 MHz (meas.) |
| Rise/fall time (calculated) | 10 % to 90 % at 50 Ω | |
| | R&S [®] MXO 4 | < 1.75 ns |
| | R&S [®] MXO 4 with -B243 option | < 1 ns |
| | R&S [®] MXO 4 with -B245 option | < 700 ps |
| | R&S [®] MXO 4 with -B2410 option | < 350 ps |
| | R&S [®] MXO 4 with -B2415 option | < 234 ps |
| Vertical resolution | | 12 bit, 18 bit for high definition mode |
| Input sensitivity | at 50 Ω | 0.5 mV/div to 1 V/div, entire analog bandwidth supported for all input sensitivities |
| | at 1 M Ω | 0.5 mV/div to 10 V/div, entire analog bandwidth supported for all input sensitivities |
| DC gain accuracy | offset and position set to 0 V, after self-alignment | |
| | input sensitivity > 5 mV/div | \pm 1 % full scale |
| | input sensitivity \leq 5 mV/div to \geq 1 mV/div | \pm 1.5 % full scale |
| | input sensitivity < 1 mV/div | \pm 2.5 % full scale |
| Input coupling | at 50 Ω | DC |
| | at 1 M Ω | DC, AC |
| Maximum input voltage | at 50 Ω | 5 V (RMS), 30 V (V_p) |
| | at 1 M Ω | 300 V (RMS), 400 V (V_p), derates at 20 dB/decade to 5 V (RMS) above 250 kHz |
| | at 1 M Ω with R&S [®] RT-ZP11 passive probe | 400 V (RMS), 1650 V (V_p), 300 V (RMS) CAT II; for derating and details, see R&S [®] RT-Zxx Standard Probes data sheet (PD 3607.3851.22) |

¹ 1.5 GHz analog bandwidth in interleave mode with 5 Gsample/s real-time sampling rate.

² With R&S[®]RT-ZP11 passive probe.

| | | |
|--|---|---|
| Position range | | ±5 div |
| Offset range at 50 Ω | input sensitivity | |
| | 100 mV/div to 1 V/div | ±20 V |
| | 0.5 mV/div to < 100 mV/div | ±5 V |
| Offset range at 1 MΩ | input sensitivity | |
| | 800 mV/div to 10 V/div | ±200 V |
| | 80 mV/div to < 800 mV/div | ±50 V |
| | 0.5 mV/div to < 80 mV/div | ±(5 V – input sensitivity × position) |
| Offset accuracy | | ±(0.35 % × net offset + 0.5 mV + 0.1 div × input sensitivity) (net offset = offset – position × input sensitivity) |
| DC measurement accuracy | after adequate suppression of measurement noise 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 inside instrument bandwidth | > 60 dB (1:1000) |

| RMS noise floor ³ | | | | | | |
|------------------------------|-------------------|--------------------------|----------|----------|----------|----------|
| At 50 Ω (meas.) | Input sensitivity | Analog bandwidth (–3 dB) | | | | |
| | | 20 MHz | 200 MHz | 350 MHz | 500 MHz | 1 GHz |
| | 0.5 mV/div | 20 µV | 43 µV | 47 µV | 50 µV | 98 µV |
| | 1 mV/div | 22 µV | 45 µV | 50 µV | 54 µV | 104 µV |
| | 2 mV/div | 25 µV | 52 µV | 56 µV | 61 µV | 116 µV |
| | 5 mV/div | 43 µV | 72 µV | 77 µV | 84 µV | 152 µV |
| | 10 mV/div | 76 µV | 118 µV | 120 µV | 131 µV | 238 µV |
| | 20 mV/div | 148 µV | 219 µV | 219 µV | 241 µV | 436 µV |
| | 50 mV/div | 360 µV | 508 µV | 492 µV | 543 µV | 1.01 mV |
| | 100 mV/div | 747 µV | 1.17 mV | 1.19 mV | 1.30 mV | 2.47 mV |
| | 200 mV/div | 1.40 mV | 2.13 mV | 2.14 mV | 2.34 mV | 4.43 mV |
| | 500 mV/div | 3.47 mV | 4.91 mV | 4.80 mV | 5.27 mV | 10.13 mV |
| | 1 V/div | 6.88 mV | 9.71 mV | 9.47 mV | 10.41 mV | 19.96 mV |
| 1 MΩ (meas.) | Input sensitivity | Analog bandwidth (–3 dB) | | | | |
| | | 20 MHz | 100 MHz | 200 MHz | 350 MHz | 500 MHz |
| | 0.5 mV/div | 28 µV | 40 µV | 42 µV | 47 µV | 51 µV |
| | 1 mV/div | 28 µV | 40 µV | 46 µV | 50 µV | 53 µV |
| | 2 mV/div | 30 µV | 43 µV | 49 µV | 54 µV | 58 µV |
| | 5 mV/div | 44 µV | 58 µV | 67 µV | 71 µV | 78 µV |
| | 10 mV/div | 73 µV | 92 µV | 109 µV | 109 µV | 120 µV |
| | 20 mV/div | 138 µV | 169 µV | 199 µV | 198 µV | 218 µV |
| | 50 mV/div | 344 µV | 442 µV | 525 µV | 529 µV | 586 µV |
| | 100 mV/div | 739 µV | 959 µV | 1.13 mV | 1.14 mV | 1.24 mV |
| | 200 mV/div | 1.40 mV | 1.74 mV | 2.06 mV | 2.07 mV | 2.27 mV |
| | 500 mV/div | 3.47 mV | 4.43 mV | 5.22 mV | 5.28 mV | 5.75 mV |
| | 1 V/div | 7.11 mV | 8.92 mV | 10.44 mV | 10.53 mV | 11.49 mV |
| | 2 V/div | 13.83 mV | 16.9 mV | 19.87 mV | 19.56 mV | 21.38 mV |
| 5 V/div | 34.84 mV | 44.32 mV | 52.43 mV | 53.39 mV | 57.97 mV | |
| 10 V/div | 57.16 mV | 68.58 mV | 80.66 mV | 78.53 mV | 85.46 mV | |

³ HD mode active for bandwidth ≤ 500 MHz.

Vertical system: digital channels

| | | |
|-------------------------------|--|---|
| Input channels | | 16 logic channels (D0 to D15) |
| Arrangement of input channels | | arranged in two logic probes with 8 channels each, assignment of the logic probes to the channels (D0 to D7 or D8 to D15) is displayed on the probe |
| Input impedance | | 100 k Ω \pm 2 % ~4 pF (meas.) at probe tips |
| Maximum input frequency | signal with minimum input voltage swing and hysteresis setting: normal | 400 MHz (meas.) |
| Maximum input voltage | | \pm 40 V (V_p) |
| Minimum input voltage swing | | 500 mV (V_{pp}) (meas.) |
| Threshold groups | | D0 to D3, D4 to D7, D8 to D11 and D12 to D15 |
| Threshold level | range | \pm 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 between \pm 4 V | \pm (100 mV + 3 % of threshold setting) |
| Comparator hysteresis | | normal, robust, maximum |

Horizontal system

| | | |
|--|--|---|
| Timebase range | | selectable between 200 ps/div and 10 000 s/div, time per div settable to any value within range |
| Deskew range (channel deskew) | between analog channels | \pm 100 ns |
| | between digital channels | \pm 100 ns |
| Reference position | | 0 % to 100 % of measurement display area |
| Horizontal position range (trigger offset range) | max. | +(memory depth/current sampling rate) |
| | min. | -5000 s |
| Modes | | normal |
| Channel-to-channel skew | between analog channels | < 100 ps (meas.) |
| | between digital channels | < 500 ps (meas.) |
| Timebase accuracy | after delivery/calibration, at +23 °C | \pm 0.2 ppm |
| | during calibration interval | \pm 1 ppm |
| Delta time accuracy | corresponds to time error between two edges on same acquisition and channel; signal amplitude greater than 5 divisions, measurement threshold set to 50 %, vertical gain 10 mV/div or greater; rise time lower than four sample periods; waveform acquired in real-time mode | \pm (0.20/real-time sampling rate + timebase accuracy \times reading) (peak) (meas.) |

Acquisition system

| | | |
|---------------------------|---|--|
| Sampling rate | analog channels (real time) | max. 5 Gsample/s on 2 channels, max. 2.5 Gsample/s on 4 channels |
| | analog channels (interpolated) | max. 5 Tsample/s |
| | digital channels | max. 5 Gsample/s on each channel |
| Waveform acquisition rate | max. | > 4 500 000 waveforms/s |
| Trigger rearm time | min. | < 21 ns |
| Memory depth ⁴ | standard | 400 Mpoints with 4 active channel (single), 400 Mpoints with 2 active channel (run) |
| | R&S®MXO4-B108 option | 800 Mpoints with 2 active channel (single), 800 Mpoints with 1 active channel (run) |
| Acquisition modes | sample | middle sample in decimation interval |
| | peak detect | largest and smallest sample in decimation interval |
| | average | average value of samples in decimation interval |
| | number of averaged waveforms | 2 to 16 777 215 |
| Sampling modes | envelope | envelope of acquired waveforms |
| | real-time mode | max. sampling rate set by digitizer |
| | interpolated time | enhancement of sampling resolution by interpolation; max. sampling rate is 5 Tsample/s |
| Interpolation modes | | linear, sin(x)/x, sample & hold |
| Fast segmentation mode | continuous recording of waveforms in acquisition memory without interruption due to visualization | |
| | max. real-time waveform acquisition rate | > 4 600 000 waveforms/s |
| | min. blind time between consecutive acquisitions | < 21 ns |

High definition mode

| | | |
|-------------------------|---|---|
| General description | The high definition mode increases the numeric resolution of the waveform signal by using digital filtering, leading to reduced noise. Because of the digital trigger concept of the R&S®MXO 4, signals with increased numeric resolution are used as the input for triggering. | |
| Numeric resolution | bandwidth, at 5 Gsample/s | bit resolution |
| | 1 kHz to 10 MHz | 18 bit |
| | 100 MHz | 16 bit |
| | 200 MHz | 15 bit |
| | 500 MHz | 14 bit |
| Real-time sampling rate | all models | max. 5 Gsample/s on 2 channels, max. 2.5 Gsample/s on 4 channels |

⁴ The maximum available memory depth depends on the bit depth of the acquired data and, therefore, on the settings of the acquisition system, such as decimation mode, waveform arithmetic or high definition mode.

Trigger system

| | | |
|---------------------|---|--|
| Trigger sources | | analog channels (C1 to C4), digital channels (D0 to D15), trigger in, serial bus |
| Trigger level range | range | ± 5 div from center of screen |
| Trigger modes | | auto, normal, single, n single |
| Trigger sensitivity | | 10^{-4} div, from DC to instrument bandwidth for all vertical scales |
| Trigger jitter | full-scale sine wave of frequency set to –3 dB bandwidth | < 1 ps (RMS) (meas.) |
| Coupling mode | standard | same as selected channel |
| | HF reject | cutoff frequency selectable from 1 kHz to 500 MHz |
| | LF reject | attenuates < 50 kHz |
| Trigger hysteresis | modes | auto (standard) or manual |
| | sensitivity | 10^{-4} div, from DC to instrument bandwidth for all vertical scales |
| Holdoff range | time | 100 ns to 10 s, fixed and random |

| Main trigger modes | | |
|--------------------|---|------------------|
| Edge | triggers on specified slope (positive, negative or either) and level | |
| Glitch | triggers on glitches of positive, negative or either polarity that are shorter or longer than specified width | |
| | glitch width | 200 ps to 1000 s |
| Width | triggers on positive or negative pulse of specified width; width can be shorter, longer, inside or outside the interval | |
| | pulse width | 200 ps to 1000 s |
| 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 | |
| | runt pulse width | 200 ps to 1000 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 | |
| Timeout | triggers when signal stays high, low or unchanged for a specified period of time | |
| | timeout | 0 ps to 1000 s |
| Interval | triggers when time between two consecutive edges of same slope (positive or negative) is shorter, longer, inside or outside a specified range | |
| | interval time | 200 ps to 1000 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 | |
| | toggle time | 0 ps to 1000 s |
| Setup & hold | 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 in the range from –100 s to 100 s around a clock edge and must be at least 200 ps wide | |
| 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 | |
| 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 | |

| Advanced trigger modes | | |
|----------------------------------|---|--|
| Sequence trigger (A/B/R trigger) | triggers on B event after occurrence of A event; delay condition after A event specified as time interval; an optional R event resets the trigger sequence to A | |
| | A event | edge, glitch, width, runt, window, timeout, interval, slew rate |
| | B event | edge, glitch, width, runt, window, timeout, interval, slew rate |
| | R event | edge, glitch, width, runt, window, timeout, interval, slew rate |
| Serial bus trigger | optional | see dedicated triggering and decoding options |
| Trigger input | input impedance | 50 Ω (meas.) or 1 M Ω (meas.) 11 pF (meas.) |
| | max. input voltage at 50 Ω | 30 V (V_p) |
| | max. input voltage at 1 M Ω | 300 V (RMS), 400 V (V_p), derates at 20 dB/decade to 5 V (RMS) above 250 kHz |
| | trigger level | ± 5 V |
| | sensitivity | |
| | input frequency ≤ 500 MHz | 300 mV (peak-to-peak) (meas.) |
| | input coupling | AC, DC (50 Ω and 1 M Ω) |
| | trigger filter | HF reject (attenuates > 50 kHz), LF reject (attenuates < 50 kHz), noise reject |
| | trigger modes | edge (positive, negative or either) |
| | Trigger out | functionality |
| output voltage | | 0 V to 5 V (nom.) at high impedance; 0 V to 2.5 V (nom.) at 50 Ω |
| pulse width | | selectable between 16 ns and 50 ms |
| pulse polarity | | low active or high active |
| output delay | | depends on trigger settings |

Spectrum analysis

| | | |
|---------------------|---|---|
| General description | Spectrum analysis allows signal analysis in the frequency domain. | |
| Spectrum | sources | channel 1, channel 2, channel 3, channel 4 |
| | setup parameters | center frequency, frequency span, automatic RBW, resolution bandwidth, gate position, gate width, vertical scale, vertical position |
| | scaling | dBm, dBV, dB μ V, V (RMS) |
| | span | 1 Hz to 1.8 GHz ⁵ |
| | resolution bandwidth | span/4 \geq RBW \geq span/6000 |
| | windows | flat top, Hanning, Hamming, Blackman, rectangular, Kaiser Bessel, Gaussian |
| | trace types | normal, max. hold, min. hold, average |
| | max. real-time waveform acquisition rate | > 40 000 waveforms/s |
| Gate | delimits the display region used for spectrum analysis | |
| Peak list | peak list; diagram labels for easy identification of the peak list entries in the diagram | |

⁵ The stop frequency depends on the analog bandwidth of the instrument.

RF characteristics

| | | |
|---|--|-------------------------|
| Sensitivity/noise density | at 1 GHz (measurement of the power spectral density at 1 GHz at input sensitivity 2 mV/div, corresponding to -30 dBm input range of the oscilloscope, using spectrum analysis with center frequency 1 GHz, span 500 kHz, RBW 3 kHz) | -160 dBm (1 Hz) (meas.) |
| Noise figure | at 1 GHz (calculated based on the noise density above) | 14 dB (meas.) |
| Dynamic range | measured for an input carrier with a frequency of 1 GHz and a level of -3 dBm at the input of the oscilloscope, using spectrum analysis with center frequency 1 GHz, span 2 MHz, RBW 400 Hz at +20 MHz from the center frequency | 106 dB (meas.) |
| Absolute amplitude accuracy | 0 Hz to 1.2 GHz | ±1 dB (meas.) |
| Spurious-free dynamic range (excluding harmonics) | measured for an input carrier with frequency 250 MHz and level -3 dBm at input sensitivity 50 mV/div, using spectrum analysis with center frequency 900 MHz, span 1.8 GHz, RBW 300 kHz | 65 dBc (meas.) |
| Second harmonic distortion | measured for an input carrier with frequency 250 MHz and level -3 dBm at input sensitivity 50 mV/div, using spectrum analysis with center frequency 900 MHz, span 1.8 GHz, RBW 300 kHz | -60 dBc (meas.) |
| Third harmonic distortion | measured for an input carrier with frequency 250 MHz and level -3 dBm at input sensitivity 50 mV/div, using spectrum analysis with center frequency 900 MHz, span 1.8 GHz, RBW 300 kHz | -59 dBc (meas.) |

Waveform measurements

| | | |
|------------------------|---|---|
| Automatic measurements | measurements on channels, math waveforms, reference waveforms | amplitude, high, low, maximum, minimum, peak-to-peak, mean, RMS, sigma, positive overshoot, negative overshoot, area, rise time, fall time, positive pulse width, negative pulse width, period, frequency, positive duty cycle, negative duty cycle, delay, phase, burst width, pulse count, edge count, pulse train, positive switching, negative switching, cycle area, cycle mean, cycle RMS, cycle sigma, setup, hold, setup/hold time, setup/hold ratio, slew rate rising, slew rate falling, delay to trigger |
| | gate | delimits the display region evaluated for automatic measurements |
| | reference levels | user-configurable vertical levels define support structures for automatic measurements |
| | statistics | displays maximum, minimum, mean, standard deviation and measurement count for each automatic measurement |
| | number of active measurements | 16 |
| Cursor measurements | setup | up to 2 cursor sets on screen, each set consisting of two horizontal and two vertical cursors. |
| | target | acquired waveforms (input channels), math waveforms, reference waveforms, XY diagrams |
| | operating mode | vertical measurements, horizontal measurements or both; vertical cursors either set manually or locked to waveform |

Waveform math

| | | |
|------------------|-------------------------------|--|
| General features | number of math equations | up to 5 |
| | number of reference waveforms | up to 4 |
| | sources | channel 1, channel 2, channel 3, channel 4, math waveforms 1 to 4, reference waveforms 1 to 4 |
| Functions | operators | add, subtract, multiply, divide, absolute value, square, square root, integrate, differentiate, \log_{10} , \log_e , \log_2 , reciprocal, invert, low pass, high pass, rescale ($a*x+b$) |
| | filter | low pass, high pass |
| | filter types | gaussian, rectangular |
| | gate | delimits the display region used for waveform math |

Display characteristics

| | |
|---------------------------------|---|
| Diagram types | Yt, zoom, spectrum |
| Display interface configuration | display area can be split up into separate diagram areas by dragging and dropping signal icons; each diagram area can hold any number of signals; diagram areas may be stacked on top of each other and later accessed via the dynamic tab menu |
| Signal icon | each active waveform is represented by a separate signal icon on the signal bar; the signal icon displays the individual vertical and acquisition settings |
| Toolbar | enables quick access to important tools; allows to directly set their most common parameters in a simple menu and gives access to more detailed parameters in the main menu; user-defined selection of tools in the toolbar |
| Upper menu | displays the trigger, horizontal, and acquisition settings; allows quick access to these settings |
| Main menu | provides access to all instrument settings in a compact menu structure |
| Axis label | X-axis ticks and Y-axis ticks labeled with tick value and physical unit |
| Diagram label | diagrams may be individually labeled with a descriptive user-defined name |
| Diagram layout | grid, crosshair, axis labels and diagram label may be switched on and off separately |
| Persistence | 50 ms to 50 s, or infinite |
| Zoom | user-defined zoom window provides vertical and horizontal zoom; touchscreen interface simplifies resize and drag operations on zoom window |
| Signal colors | predefined or user-defined color tables for persistence display |

History and segmented memory

| | | | | |
|---------------------|--|---|-------------------------------|---------------|
| Acquisition memory | automatic | automatic segment size and sample rate | | |
| | manual | user-defined size and sample rate | | |
| Memory segmentation | function | memory segments for the acquisition | | |
| | number of segments | record length | segments ⁶ (up to) | total memory |
| | | 1 kpoints | 1 048 575 | 1.048 Gpoints |
| | | 2 kpoints | 524 287 | 1.048 Gpoints |
| | | 5 kpoints | 262 143 | 1.310 Gpoints |
| | | 10 kpoints | 131 071 | 1.310 Gpoints |
| | | 20 kpoints | 65 535 | 1.310 Gpoints |
| | | 50 kpoints | 32 767 | 1.638 Gpoints |
| | | 100 kpoints | 16 383 | 1.638 Gpoints |
| | | 200 kpoints | 9 361 | 1.872 Gpoints |
| | | 500 kpoints | 4 095 | 2.047 Gpoints |
| | | 1 Mpoints | 2 113 | 2.113 Gpoints |
| | | 2 Mpoints | 1 056 | 2.112 Gpoints |
| | | 5 Mpoints | 427 | 2.135 Gpoints |
| | | 10 Mpoints | 213 | 2.130 Gpoints |
| | | 20 Mpoints | 106 | 2.120 Gpoints |
| | | 50 Mpoints | 41 | 2.050 Gpoints |
| | | 100 Mpoints | 20 | 2.000 Gpoints |
| | | 200 Mpoints | 9 | 1.800 Gpoints |
| | | 400 Mpoints | 4 | 1.600 Gpoints |
| 800 Mpoints | 2 | 1.600 Gpoints | | |
| | Segmentation is active on all analog and logic channels, protocol decoding and spectrum analysis. | | | |
| Fast-segmented mode | continuous recording of waveforms in acquisition memory without interruption due to visualization; blind time between consecutive acquisitions, see Acquisition system | | | |
| History mode | function | The history mode always provides access to past acquisitions in the segmented memory. | | |
| | timestamp resolution | 1 ns | | |
| | history player | replays the recorded waveforms; repetition possible; adjustable speed; manual next/previous segment; numerical segment number input | | |
| | analyze options | overlay all segments, average all segments, envelope all segments | | |

⁶ With R&S®MXO4-B108 memory option. The maximum number of segments without R&S®MXO4-B108 memory option is limited to 10 000. The maximum number of segments depends on the number of active channels and the bit depth of the acquired data and, therefore, on the settings of the acquisition system, such as decimation mode, waveform arithmetic or high definition mode.

Miscellaneous

| | | |
|----------------|--|--|
| Remote control | web interface | full operation of the instrument's touch interface, keys and multifunction wheel via web browser |
| | VNC | control of the instrument through virtual network computing |
| | SCPI | standard instrument programming interface through VISA |
| Languages | available languages for the user interface | English, German, French, Simplified Chinese, Traditional Chinese, Japanese, Russian, Spanish, Italian, Portuguese, Korean, Czech, Polish |
| | online help on the instrument | English |

Input and output

| Front | | |
|---|---------------------|---|
| Channel inputs | | BNC; for details, see Vertical system |
| | probe interface | auto-detection of passive probes, Rohde & Schwarz active probe interface |
| Trigger input | | BNC; for details, see Trigger system |
| | probe interface | auto detection of passive probes |
| Waveform generator outputs (requires R&S®MXO4-B6 option) | | BNC; for details, see R&S®MXO4-B6, waveform generator, demo lugs and GND lug |
| Digital channel inputs | D15 to D8, D7 to D0 | interface for R&S®RT-ZL04 logic probe |
| Probe compensation output | signal shape | rectangle, $V_{low} = 0\text{ V}$, $V_{high} = 3.3\text{ V}$ amplitude $3.3\text{ V (}V_{pp}\text{)} \pm 5\%$ (meas.) |
| | frequency | $1\text{ kHz} \pm 1\%$ (meas.) |
| USB interface | | 1 × USB 3.1 gen1 port, type A plug, 2 × USB 2.0 high speed ports, type A plug |

| Rear | | |
|----------------------------|-----------------------|--|
| Trigger out | | BNC; for details, see Trigger system |
| USB interface | | 2 × USB 3.1 gen1 ports, type A plug, 1 × USB 3.1 gen1, type B plug |
| LAN interface | | RJ-45 connector, supports 10/100/1000BASE-T |
| External monitor interface | | HDMI™, 1920 × 1080 pixel at 60 Hz, output of oscilloscope display |
| Reference input | connector | BNC |
| | impedance | 50 Ω (nom.) |
| | input frequency range | 10 MHz ($\pm 20\text{ ppm}$) |
| | sensitivity | $\geq -10\text{ dBm}$ into 50 Ω, $\leq 10\text{ dBm}$ at 10 MHz |
| Reference output | connector | BNC |
| | impedance | 50 Ω (nom.) |
| | output signal | 10 MHz (specified in timebase accuracy), 8 dBm (nom.) |
| Security slot | | for standard Kensington style lock |
| VESA mount | | VESA compatibility mounting interface, 100 mm × 100 mm pattern size |

| Right side | | |
|-------------|--|---------------------|
| Ground jack | | connected to ground |

General data

| | | |
|----------------|------------|--|
| Display | type | 13.3" LC TFT color display with capacitive touchscreen |
| | resolution | 1920 x 1080 pixel (Full HD) |

| | | |
|---------------------|-----------------------------|--|
| Temperature | | |
| Temperature loading | operating temperature range | 0 °C to +50 °C |
| | storage temperature range | -40 °C to +70 °C |
| | | in line with MIL-PRF-28800F section 4.5.5.1.1.1 class 3 tailored to +45 °C for operation |
| Climatic loading | | +25 °C/+50 °C at 85 % relative humidity cyclic, in line with IEC 60068-2-30 |

| | | |
|-----------------|--|------------------------------|
| Altitude | | |
| Operating | | up to 3000 m above sea level |
| Nonoperating | | up to 4600 m above sea level |

| | | |
|------------------------------|------------|---|
| Mechanical resistance | | |
| 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 |
| | | 10 Hz to 55 Hz, in line with MIL-PRF-28800F, section 4.5.5.3.2 class 3 |
| | random | 10 Hz to 300 Hz, acceleration 1.2 g (RMS), in line with EN 60068-2-64 |
| | | 5 Hz to 500 Hz, acceleration 2.058 g (RMS), in line with MIL-PRF-28800F, section 4.5.5.3.1 class 3 |
| Shock | | 40 g shock spectrum, in line with MIL-STD-810G, method no. 516.6, procedure I |
| | | 30 g functional shock, halvesine, duration 11 ms, in line with MIL-PRF-28800F, section 4.5.5.4.1 |

| | | |
|--|--|--|
| Electromagnetic compatibility (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 environment ⁷ |

| | | |
|-----------------------|--|------------------------------|
| Certifications | | VDE, cCSA _{US} , KC |
|-----------------------|--|------------------------------|

| | | |
|-----------------------------|--|--------|
| Calibration interval | | 1 year |
|-----------------------------|--|--------|

⁷ Test criterion is displayed noise level within ± 1 div for input sensitivity of 5 mV/div.

| Power supply | | |
|---------------------|--|---|
| AC supply | | 100 V to 240 V $\pm 10\%$ at 50 Hz to 60 Hz and 400 Hz $\pm 5\%$, max. 2.3 A to 1.3 A, in line with MIL-PRF 28800F, section 3.5 |
| Power consumption | | max. 210 W |
| Safety | | in line with IEC 61010-1, EN 61010-1, CAN/CSA-C22.2 No. 61010-1, UL 61010-1 |

| Mechanical data | | |
|------------------------|--|--|
| Dimensions | W x H x D | 414 mm x 279 mm x 162 mm (16.3 in x 10.99 in x 6.38 in) |
| Weight | without options, nominal | 6.0 kg (13.23 lb) |
| Rackmount height | with R&S [®] ZZA-MXO4 rackmount kit | 6 HU |

Options

R&S®MXO4-B1 mixed signal option

Mixed signal capability is a standard functionality of the R&S®MXO 4 series oscilloscopes. The R&S®MXO4-B1 mixed signal option provides 16 digital channels with two R&S®RT-ZL04 probes.

R&S®MXO4-B6 arbitrary waveform generator

Arbitrary function/waveform generator, 2 analog channels

| General | | |
|---------------------|--|---|
| Output channel | | 2 channels |
| Vertical resolution | | 16 bit |
| Operating modes | | function generator, arbitrary waveform generator, modulation, frequency sweep |

| | | |
|---------------------------|---|--|
| Function generator | output of predefined waveforms | |
| Sample rate | | 625 Msample/s |
| Waveforms | sine, square/pulse, ramp, DC, noise, sine cardinal (sinc), Gaussian pulse, Lorentz, exponential fall, exponential rise, cardiac | |
| Sine | frequency range | 1 mHz to 100 MHz |
| | amplitude flatness (relative to 1 kHz) | $\leq \pm 0.5$ dB (meas.) |
| | total harmonic distortion (into 50 Ω) | |
| | f \leq 10 MHz | ≤ -60 dBc (meas.) |
| | f > 10 MHz | ≤ -40 dBc (meas.) |
| Square/pulse | nonharmonic spurious | |
| | -75 dBc (meas.) | |
| | frequency range | 1 mHz to 30 MHz |
| | duty cycle (if pulse width limit is not exceeded) | 0.01 % to 99.99 %, 0.01 % resolution |
| | pulse width | ≥ 16.5 ns, 0.1 ns resolution |
| | rise/fall time | 9 ns (meas.) |
| Ramp (triangle, sawtooth) | overshoot | ≤ 2 % (meas.) |
| | jitter (cycle-to-cycle) (≥ 0.2 V (V_{pp})) | ≤ 40 ps (RMS) (meas.) |
| | frequency range | 1 mHz to 1 MHz |
| | variable symmetry | 0 % to 100 %, 0.1 % resolution |
| | DC | level range |
| into 50 Ω | | ± 2.5 V |
| into open circuit | | ± 5 V |
| resolution | | 1 mV |
| Noise | amplitude | |
| | DC | 0 V to 5 V (V_{pp}) (into 50 Ω), 0 V to 10 V (V_{pp}) (into open circuit), 1 mV resolution |
| | all other waveforms | 0 % to 100 % of AC signal amplitude, 1 % resolution |
| | bandwidth | ≥ 100 MHz |
| Sine cardinal (sinc) | frequency range | 1 mHz to 5 MHz |
| Gaussian pulse | frequency range | 1 mHz to 25 MHz |
| Lorentz | frequency range | 1 mHz to 10 MHz |
| Exponential rise/fall | frequency range | 1 mHz to 10 MHz |
| Cardiac | frequency range | 1 mHz to 1 MHz |

| | | |
|-------------------------------------|-----------------------------------|--|
| Arbitrary waveform generator | output of user-defined waveforms | |
| Waveform length | | 1 sample to 40 Msample on each channel |
| Sample rate | | 1 sample/s to 312.5 Msample/s |
| Filter bandwidth | | 100 MHz |
| Modulation | | |
| Modulation types | | amplitude modulation (AM), frequency modulation (FM), frequency-shift key modulation (FSK), pulse width modulation (PWM) |
| Carrier waveform | AM, FM, FSK | sine |
| | PWM | square/pulse |
| AM | modulation signals | sine, square, ramp (triangle, sawtooth) |
| | modulation frequency | 1 mHz to 1 MHz |
| | depth | 0 % to 100 %, 0.1 % resolution |
| FM | modulation signals | sine, square, triangle, ramp, inverse ramp |
| | modulation frequency | 1 mHz to 1 MHz |
| | frequency deviation | 1 mHz to 10 MHz |
| FSK | modulation signal | 50 % duty cycle square wave |
| | range of frequency 1, frequency 2 | 1 mHz to 100 MHz |
| | hop rate | 1 mHz to 1 MHz |
| PWM | modulation signals | sine, square, ramp |
| | depth | 0 % to 99.99 % of the duty cycle, 0.01 % resolution |

| | | |
|------------------------|---|---|
| Frequency sweep | output of a sinusoidal waveform with the frequency changing linearly between the start frequency and the stop frequency within the sweep time | |
| | waveform | sine |
| | frequency range | 1 mHz to 100 MHz |
| | direction | up (start frequency < stop frequency) |
| | | down (start frequency > stop frequency) |
| | sweep time | 1 ms to 500 s |

| | | |
|------------------------------|--|--|
| Two-channel operation | operating modes | independent channels, coupled parameters, differential |
| | parameter coupling | none, frequency and/or amplitude |
| | relative phase | -180° to 180°, 0.1° resolution |
| | channel-to-channel skew (each channel with same output amplitude) | ≤ 200 ps (meas.) |
| | channel-to-channel isolation (each channel with same output amplitude) | ≥ 70 dB (meas.) |

| Outputs | | |
|------------------------------|---|--|
| Connectors | | BNC; on the front of the instrument |
| Function | | on, off, inverted |
| Output impedance | | nom. 50 Ω |
| Overload protection | $V_{pp} > 200$ mV into open circuit | a short-circuit to ground is tolerated indefinitely, automatic shutoff in case of voltages $\geq +12$ V or ≤ -12 V (meas.) |
| | $V_{pp} \leq 200$ mV into open circuit | a short-circuit to ground is tolerated indefinitely, automatic shutoff in case of voltages $\geq +4$ V or ≤ -4 V (meas.) |
| Amplitude range ⁸ | sine, square/pulse, ramp, exponential rise/fall, arbitrary waveforms, sine cardinal (sinc), Gauss, Lorentz, cardiac | |
| | into 50 Ω | 5 mV to 5 V (V_{pp}) |
| | into open circuit | 10 mV to 10 V (V_{pp}) |
| | resolution | 1 mV |
| | accuracy | ± 1 % at 1 kHz |
| DC offset range | sine, square/pulse, ramp, exponential rise/fall, arbitrary waveforms | |
| | into 50 Ω | ± 2.5 V ($V_{pp} > 100$ mV), ± 1.25 V ($V_{pp} \leq 100$ mV) |
| | into open circuit | ± 5.0 V ($V_{pp} > 200$ mV), ± 2.5 V ($V_{pp} \leq 200$ mV) |
| | sine cardinal (sinc): DC offset range is signal amplitude dependent | |
| | into 50 Ω | -2.823 V to $+2.177$ V ($V_{pp} = 1$ V) |
| | into open circuit | -5.323 V to $+4.677$ V ($V_{pp} = 1$ V) |
| | Gauss, Lorentz: DC offset range is signal amplitude dependent | |
| | into 50 Ω | -3.000 V to $+2.000$ V ($V_{pp} = 1$ V) |
| | into open circuit | -5.500 V to $+4.500$ V ($V_{pp} = 1$ V) |
| | Cardiac: DC offset range is signal amplitude dependent | |
| | into 50 Ω | -2.814 V to $+2.186$ V ($V_{pp} = 1$ V) |
| | into open circuit | -5.314 V to $+4.686$ V ($V_{pp} = 1$ V) |
| | resolution | 1 mV |
| | accuracy | $\pm(1$ % of control + (0.5 % of amplitude) + 2 mV) |
| | Frequency accuracy | |

R&S®MXO4-B108 memory upgrade to option, 800 Mpoints on 2 channels

| Extension of memory depth and memory segments | | |
|--|----------------------------|---|
| Memory depths | | 800 Mpoints with 2 active channels (single), 800 Mpoints with 1 active channel (run) |
| Memory segmentation | maximum number of segments | 1 048 575 segments |

⁸ Amplitude is the sum of the AC amplitude and the noise amplitude.

R&S®MXO4-K36 frequency response analysis

| Frequency response analysis (requires R&S®MXO4-B6 option) | | |
|---|--|--|
| Stimulus | frequency mode | single sweep or repeated sweep |
| | frequency range | 10 Hz to 100 MHz |
| | amplitude mode | fixed or amplitude profile |
| | amplitude level | 10 mV to 10 V into high Z 5 mV to 5 V into 50 Ω |
| Input and output sources | | channel 1, channel 2, channel 3, channel 4 |
| Number of test points | | 10 points to 500 points per decade |
| Measurement | | dual pair of tracking gain and phase cursors |
| Diagram types | manually changeable vertical window size | parallel display of result window and input and output signal view |
| Result table | | navigation and export functions |
| Scaling | during and after test | auto-scale and manual scaling and positioning |

R&S®MXO4-K510 low speed serial buses

| I ² C decoding | | |
|---------------------------|-------------------------|---|
| Protocol configuration | bit rate | auto-detected |
| 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 =, ≠, ≥, ≤, in range, out of range |
| | 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 |

| SPI decoding | | |
|------------------------|--------------------------------|--|
| Protocol configuration | type | 2-wire, 3-wire and 4-wire SPI |
| | bit rate | auto-detected |
| | bit order | LSB first, MSB first |
| | word size | 4/8/12/16/20/24/28/32 bit |
| | frame condition | CS, timeout |
| | polarity (MOSI, MISO, CS, CLK) | active high, active low |
| | phase (CLK) | first edge, second edge |
| Trigger | source (MOSI, MISO, CS, CLK) | any input channel or logical channel |
| | bit rate | up to 50 Mbps |
| | 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, CS, CLK) | any input channel, logical channel |
| | display type | decoded bus, tabulated list |
| | color coding | frame, word, error |
| | data format | hex, decimal, octal, binary, ASCII |

| UART/RS-232/RS-422/RS-485 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, mark, space, none |
| | stop bit | 1, 1.5 or 2 |
| Trigger | end of packet | timeout, none |
| | source (TX and RX) | 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 (TX and RX) | any input channel, logical channel |
| | display type | decoded bus, tabulated list |
| | color coding | packet, data payload, start error, parity error, stop error |
| | data format | hex, decimal, octal, binary, ASCII |

R&S®MXO4-K520 automotive protocols

| CAN FD/XL decoding⁹ | | |
|---------------------------------------|---------------------|---|
| Protocol configuration | signal type | CAN_H, CAN_L |
| | bit rate | |
| | nominal bit rate | 100 kbps to 1 Mbps |
| | FD data rate | 100 kbps to 15 Mbps |
| | XL data rate | 100 kbps to 15 Mbps |
| | sampling point | 10 % to 95 % within bit period; independent settings for nominal bit rate, FD data rate and XL data rate |
| | device list | associate frame identifier with symbolic ID, load DBC file content |
| Trigger | source | any input channel or logical channel |
| | trigger event setup | start of frame, frame type, identifier, identifier + data, symbolic, 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 (standard or extended); condition =, ≠, ≥, ≤, in range, out of range |
| | FD bits | FDF, BRS and ESI (0, 1, X) |
| | data setup | data pattern up to 8 byte (hex or binary); condition =, ≠ |
| | symbolic setup | message name, signal name; numeric signal condition =, ≠, ≥, ≤, in range, out of range; enumerated signal condition =, ≠, ≥, ≤ |
| Decode | source | any input channel, logical channel |
| | display type | decoded bus, tabulated list |
| | color coding | start of frame, identifier, DLC, ADS, SDT, VCID, AF, data payload, CRC, end of frame, error frame, overload frame, CRC error, bit stuffing error |
| | data format | hex, decimal, octal, binary, ASCII, symbolic |

⁹ Available with future firmware release.

Ordering information

| Designation | Type | Order No. |
|---|----------------|--------------|
| R&S®MXO 4 series, base model | | |
| Oscilloscope, 200 MHz, 4 channels | R&S®MXO 4 | 1335.5050.04 |
| Base unit (including standard accessories: 700 MHz passive probe (10:1) per channel, accessories bag, quick start guide, power cord) | | |
| Choose your bandwidth upgrade | | |
| Upgrade of R&S®MXO 4 series oscilloscopes to 350 MHz bandwidth | R&S®MXO4-B243 | 1335.4276.02 |
| Upgrade of R&S®MXO 4 series oscilloscopes to 500 MHz bandwidth | R&S®MXO4-B245 | 1335.4299.02 |
| Upgrade of R&S®MXO 4 series oscilloscopes to 1 GHz bandwidth | R&S®MXO4-B2410 | 1335.4318.02 |
| Upgrade of R&S®MXO 4 series oscilloscopes to 1.5 GHz bandwidth | R&S®MXO4-B2415 | 1335.4330.02 |
| Choose your options | | |
| Mixed signal option for R&S®MXO 4 series with 16 digital channels | R&S®MXO4-B1 | 1335.4130.02 |
| Arbitrary waveform generator, 100 MHz, 2 analog channels | R&S®MXO4-B6 | 1335.4147.02 |
| Memory upgrade to 800 Mpoints on 2 channels | R&S®MXO4-B108 | 1335.5772.02 |
| Low speed serial triggering and decode (I ² C/SPI/UART/RS-232/RS-422/RS-485) | R&S®MXO4-K510 | 1335.5195.02 |
| Automotive serial triggering and decode (CAN/CAN FD/CAN XL/LIN) ¹⁰ | R&S®MXO4-K520 | 1335.5550.02 |
| Frequency response analysis | R&S®MXO4-K36 | 1335.5572.02 |
| Application bundle, consists of the following options: R&S®MXO4-K510, R&S®MXO4-K520 ¹⁰ , R&S®MXO4-K36, R&S®MXO4-B6 | R&S®MXO4-PK1 | 1335.5237.02 |
| Choose your additional probes | | |
| Single-ended passive probes | | |
| 700 MHz, 10 MΩ, 10:1, 400 V, 9.5 pF, 2.5 mm | R&S®RT-ZP11 | 1803.0005.02 |
| 500 MHz, 10 MΩ, 10:1, 400 V, 9.5 pF, 2.5 mm | R&S®RT-ZP10 | 1409.7550.00 |
| 500 MHz, 10 MΩ, 10:1, 300 V, 10 pF, 5 mm | R&S®RT-ZP05S | 1333.2401.02 |
| 38 MHz, 1 MΩ, 1:1, 55 V, 39 pF, 2.5 mm | R&S®RT-ZP1X | 1333.1370.02 |
| Active broadband probes: single-ended | | |
| 1.0 GHz, 10:1, 1 MΩ, BNC interface | R&S®RT-ZS10L | 1333.0815.02 |
| 1.0 GHz, active, 1 MΩ, Rohde & Schwarz probe interface | R&S®RT-ZS10E | 1418.7007.02 |
| 1.0 GHz, active, 1 MΩ, R&S®ProbeMeter, micro button, Rohde & Schwarz probe interface | R&S®RT-ZS10 | 1410.4080.02 |
| 1.5 GHz, active, 1 MΩ, R&S®ProbeMeter, micro button, Rohde & Schwarz probe interface | R&S®RT-ZS20 | 1410.3502.02 |
| Active broadband probes: differential | | |
| 1.0 GHz, active, differential, 1 MΩ, R&S®ProbeMeter, micro button, incl. 10:1 external attenuator, 1 MΩ, 70 V DC, 46 V AC (peak), Rohde & Schwarz probe interface | R&S®RT-ZD10 | 1410.4715.02 |
| 1.5 GHz, active, differential, 1 MΩ, R&S®ProbeMeter, micro button, Rohde & Schwarz probe interface | R&S®RT-ZD20 | 1410.4409.02 |
| Power rail probe | | |
| 2.0 GHz, 1:1, 50 kΩ, ±0.85 V, ±60 V offset, Rohde & Schwarz probe interface | R&S®RT-ZPR20 | 1800.5006.02 |
| High voltage probes | | |
| 250 MHz, 100:1, 100 MΩ, 850 V, 6.5 pF | R&S®RT-ZH03 | 1333.0873.02 |
| 400 MHz, 100:1, 50 MΩ, 1000 V, 7.5 pF | R&S®RT-ZH10 | 1409.7720.02 |
| 400 MHz, 1000:1, 50 MΩ, 1000 V, 7.5 pF | R&S®RT-ZH11 | 1409.7737.02 |
| High voltage probes: differential | | |
| 100 MHz, 8 MΩ, 1 kV (RMS) (CAT III), BNC interface | R&S®RT-ZD01 | 1422.0703.02 |
| 200 MHz, 250:1/25:1, 5 MΩ, 750 V (peak), 300 V CAT III, Rohde & Schwarz probe interface | R&S®RT-ZHD07 | 1800.2307.02 |
| 100 MHz, 500:1/50:1, 10 MΩ, 1500 V (peak), 1000 V CAT III, Rohde & Schwarz probe interface | R&S®RT-ZHD15 | 1800.2107.02 |
| 200 MHz, 500:1/50:1, 10 MΩ, 1500 V (peak), 1000 V CAT III, Rohde & Schwarz probe interface | R&S®RT-ZHD16 | 1800.2207.02 |
| 100 MHz, 1000:1/100:1, 40 MΩ, 6000 V (peak), 1000 V CAT III, Rohde & Schwarz probe interface | R&S®RT-ZHD60 | 1800.2007.02 |
| Current probes | | |
| 20 kHz, AC/DC, 0.01 V/A and 0.001 V/A, ±200 A and ±2000 A, BNC interface | R&S®RT-ZC02 | 1333.0850.02 |
| 100 kHz, AC/DC, 0.1 V/A, 30 A, BNC interface | R&S®RT-ZC03 | 1333.0844.02 |
| 2 MHz, AC/DC, 0.01 V/A, 500 A (RMS), Rohde & Schwarz probe interface | R&S®RT-ZC05B | 1409.8204.02 |
| 10 MHz, AC/DC, 0.01 V/A, 150 A (RMS), BNC interface | R&S®RT-ZC10 | 1409.7750K02 |
| 10 MHz, AC/DC, 0.01 V/A, 150 A (RMS), Rohde & Schwarz probe interface | R&S®RT-ZC10B | 1409.8210.02 |
| 50 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde & Schwarz probe interface | R&S®RT-ZC15B | 1409.8227.02 |
| 100 MHz, AC/DC, 0.1 V/A, 30 A (RMS), BNC interface | R&S®RT-ZC20 | 1409.7766K02 |

¹⁰ Available with future firmware release.

| Designation | Type | Order No. |
|--|---------------------------------|--------------|
| 100 MHz, AC/DC, 0.1 V/A, 30 A (RMS), Rohde & Schwarz probe interface | R&S®RT-ZC20B | 1409.8233.02 |
| 120 MHz, AC/DC, 1 V/A, 5 A (RMS), BNC interface | R&S®RT-ZC30 | 1409.7772K02 |
| EMC near-field probe | | |
| Probe set for E and H near-field measurements, 30 MHz to 3 GHz | R&S®HZ-15 | 1147.2736.02 |
| Logic probe | | |
| 400 MHz logic probe, 8 channels | R&S®RT-ZL04 | 1333.0721.02 |
| Probe accessories | | |
| Accessory set for R&S®RT-ZP11 passive probe (2.5 mm probe tip) | R&S®RT-ZA1 | 1409.7566.00 |
| Probe power supply for R&S®RT-ZC10/-ZC20/-ZC30 | R&S®RT-ZA13 | 1409.7789.02 |
| External attenuator 10:1, 2.0 GHz, 1.3 pF, 60 V DC, 42.4 V AC (peak), for R&S®RT-ZD20/-ZD30 probes | R&S®RT-ZA15 | 1410.4744.02 |
| Probe pouch | R&S®RT-ZA19 | |
| Power deskew and calibration test fixture | R&S®RT-ZF20 | 1800.0004.02 |
| 3D positioner with central tensioning knob for easy clamping and positioning of probes (span width: 200 mm, clamping range: 15 mm) | R&S®RT-ZA1P | 1326.3641.02 |
| Choose your accessories | | |
| Front cover | R&S®MXO4-Z1 | 1335.4360.02 |
| Soft bag | R&S®MXO4-Z3 | 1335.5589.02 |
| Transit case | R&S®MXO4-Z4 | 1335.5595.02 |
| Rackmount kit, for R&S®MXO 4 oscilloscopes with 6 HU | R&S®ZZA-MXO4 | 1335.5108.02 |
| VESA mount (compatible with standard 100 mm x 100 mm pattern) | Choose industry standard mounts | |

| Warranty | | |
|---|---------|---|
| Base unit | | 3 years |
| All other items ¹¹ | | 1 year |
| 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 ¹². 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 ¹² 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 ¹² and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

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¹¹ For options installed, the remaining base unit warranty applies if longer than 1 year. Exception: all batteries have a 1 year warranty.

¹² Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

Service that adds value

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

Rohde & Schwarz

The Rohde&Schwarz technology group is among the trail-blazers 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

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