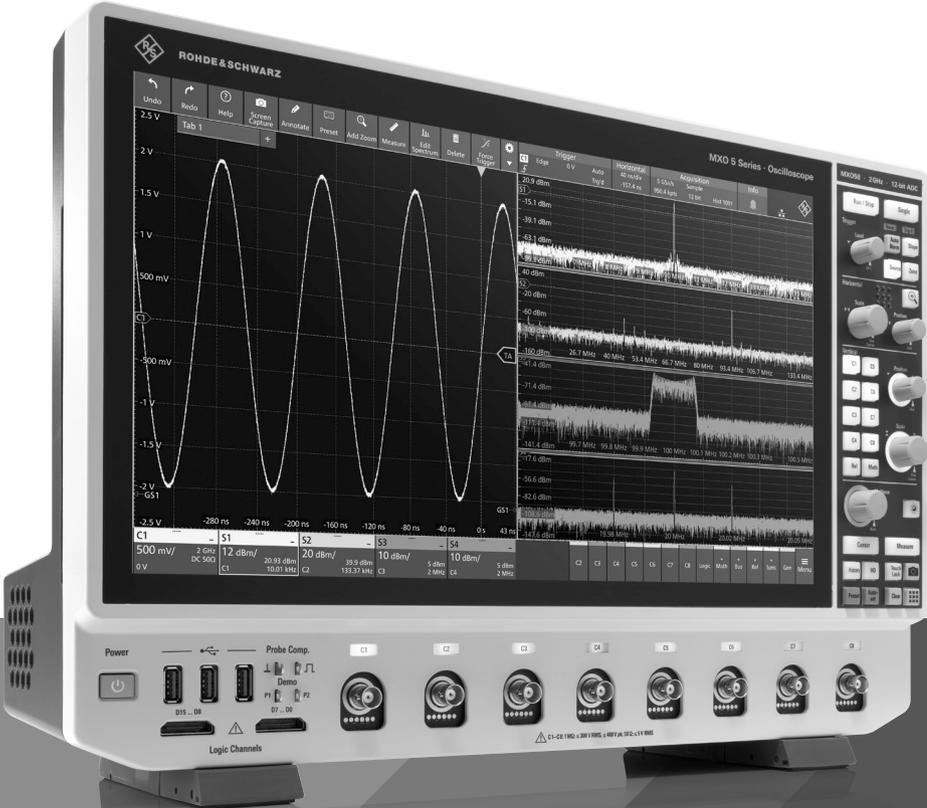


# R&S® MXO 5 Series OSCILLOSCOPE

## Specifications



Specifications  
Version 04.00

**ROHDE & SCHWARZ**  
Make ideas real



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# Definitions

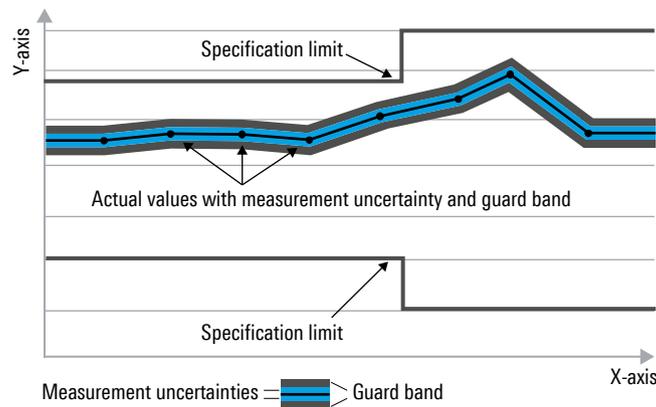
## General

Product data applies under the following conditions:

- Three hours of storage at ambient temperature followed by 60 minutes of 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.

# Base unit

## Vertical system: analog channels

Input channels		4 channels or 8 channels
Input impedance		50 $\Omega$ $\pm$ 1.5 %, 1 M $\Omega$ $\pm$ 1 %    12 pF (meas.)
Analog bandwidth (–3 dB)	R&S <sup>®</sup> MXO 54, 4-channel instrument	
	at 50 $\Omega$ input impedance	
	R&S <sup>®</sup> MXO 5	$\geq$ 350 MHz
	R&S <sup>®</sup> MXO 5 with -B245 option	$\geq$ 500 MHz
	R&S <sup>®</sup> MXO 5 with -B2410 option	$\geq$ 1 GHz
	R&S <sup>®</sup> MXO 5 with -B2420 option	$\geq$ 2 GHz <sup>1</sup>
	at 1 M $\Omega$ input impedance, 4 channels	
	R&S <sup>®</sup> MXO 5	$\geq$ 350 MHz (meas.)
	R&S <sup>®</sup> MXO 5 with -B245 option	$\geq$ 500 MHz (meas.)
	R&S <sup>®</sup> MXO 5 with -B2410 option	$\geq$ 700 MHz (meas.) <sup>2</sup>
	R&S <sup>®</sup> MXO 5 with -B2420 option	$\geq$ 700 MHz (meas.) <sup>2</sup>
	R&S <sup>®</sup> MXO 58, 8-channel instrument	
	at 50 $\Omega$ input impedance	
	R&S <sup>®</sup> MXO 5	$\geq$ 100 MHz
	R&S <sup>®</sup> MXO 5 with -B282 option	$\geq$ 200 MHz
	R&S <sup>®</sup> MXO 5 with -B283 option	$\geq$ 350 MHz
	R&S <sup>®</sup> MXO 5 with -B285 option	$\geq$ 500 MHz
	R&S <sup>®</sup> MXO 5 with -B2810 option	$\geq$ 1 GHz
	R&S <sup>®</sup> MXO 5 with -B2820 option	$\geq$ 2 GHz <sup>3</sup>
	at 1 M $\Omega$ input impedance, 4 channels	
R&S <sup>®</sup> MXO 5	$\geq$ 100 MHz (meas.)	
R&S <sup>®</sup> MXO 5 with -B282 option	$\geq$ 200 MHz	
R&S <sup>®</sup> MXO 5 with -B283 option	$\geq$ 350 MHz	
R&S <sup>®</sup> MXO 5 with -B285 option	$\geq$ 500 MHz (meas.)	
R&S <sup>®</sup> MXO 5 with -B2810 option	$\geq$ 700 MHz (meas.) <sup>2</sup>	
R&S <sup>®</sup> MXO 5 with -B2820 option	$\geq$ 700 MHz (meas.) <sup>2</sup>	
Additional bandwidth filters available up to instrument bandwidth		1 GHz, 500/350/200/100/50/20 MHz (meas.)
Rise/fall time (calculated)	10 % to 90 % at 50 $\Omega$	
	R&S <sup>®</sup> MXO 54, 4-channel instrument	
	R&S <sup>®</sup> MXO 5	< 1.75 ns
	R&S <sup>®</sup> MXO 5 with -B245 option	< 700 ps
	R&S <sup>®</sup> MXO 5 with -B2410 option	< 350 ps
	R&S <sup>®</sup> MXO 5 with -B2420 option	< 175 ps
	R&S <sup>®</sup> MXO 58, 8-channel instrument	
	R&S <sup>®</sup> MXO 5	< 3.5 ns
	R&S <sup>®</sup> MXO 5 with -B282 option	< 1.75 ns
	R&S <sup>®</sup> MXO 5 with -B283 option	< 1 ns
	R&S <sup>®</sup> MXO 5 with -B285 option	< 700 ps
	R&S <sup>®</sup> MXO 5 with -B2810 option	< 350 ps
R&S <sup>®</sup> MXO 5 with -B2820 option	< 234 ps	
Vertical resolution		12 bit, 18 bit for high definition (HD) mode
Input sensitivity	at 50 $\Omega$	0.5 mV/div to 3 V/div, entire analog bandwidth supported for all input sensitivities
	at 1 M $\Omega$	0.5 mV/div to 10 V/div, entire analog bandwidth supported for all input sensitivities

<sup>1</sup> 2 GHz analog bandwidth in interleave mode with 5 Gsample/s real-time sampling rate.

<sup>2</sup> With R&S<sup>®</sup>RT-ZP11 passive probe.

<sup>3</sup> 2 GHz analog bandwidth only in interleave mode with 5 Gsample/s real-time sampling rate, when channels 5 to 8 are disabled.

DC gain accuracy	offset and position set to 0 V, after self-alignment	
	input sensitivity > 5 mV/div	±1 % full scale
	input sensitivity ≤ 5 mV/div to ≥ 1 mV/div	±1.5 % full scale
	input sensitivity 500 µV/div	±2.5 % full scale
Input coupling	at 50 Ω	DC
	at 1 MΩ	DC, AC
Maximum input voltage	at 50 Ω	5 V (RMS), 30 V (V <sub>p</sub> )
	at 1 MΩ	300 V (RMS), 400 V (V <sub>p</sub> ), derates at 20 dB/decade to 5 V (RMS) above 250 kHz
	at 1 MΩ with R&S®RT-ZP11 passive probe	400 V (RMS), 1650 V (V <sub>p</sub> ), 300 V (RMS) CAT II; for derating and details, see R&S®RT-Zxx Standard Probes specifications (PD 3607.3851.22)
Position range		±5 div
Offset range at 50 Ω	input sensitivity	
	120 mV/div to 3 V/div	±(15 V – input sensitivity × position)
	33 mV/div to < 120 mV/div	±(7 V – input sensitivity × position)
	0.5 mV/div to < 33 mV/div	±(2 V – input sensitivity × position)
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 definition (HD) 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 <sup>4</sup>							
At 50 Ω (meas.)	Input sensitivity	Analog bandwidth (–3 dB)					
		100 MHz	200 MHz	350 MHz	500 MHz	1 GHz	2 GHz
	0.5 mV/div	19 μV	26 μV	33 μV	39 μV	66 μV	111 μV
	1 mV/div	24 μV	33 μV	42 μV	51 μV	85 μV	141 μV
	2 mV/div	25 μV	35 μV	44 μV	53 μV	89 μV	146 μV
	5 mV/div	34 μV	46 μV	59 μV	71 μV	116 μV	182 μV
	10 mV/div	66 μV	89 μV	115 μV	138 μV	226 μV	350 μV
	20 mV/div	134 μV	181 μV	233 μV	280 μV	461 μV	713 μV
	50 mV/div	324 μV	436 μV	563 μV	677 μV	1.12 mV	1.78 mV
	100 mV/div	610 μV	815 μV	1.05 mV	1.26 mV	2.08 mV	3.25 mV
	200 mV/div	1.26 mV	1.69 mV	2.17 mV	2.60 mV	4.31 mV	6.74 mV
	500 mV/div	4.21 mV	5.54 mV	6.94 mV	8.21 mV	12.93 mV	18.63 mV
	1 V/div	6.88 mV	9.20 mV	11.71 mV	14.02 mV	22.57 mV	32.89 mV
	2 V/div	11.45 mV	15.21 mV	19.45 mV	23.21 mV	37.85 mV	54.59 mV
	3 V/div	15.77 mV	20.78 mV	26.54 mV	31.71 mV	51.80 mV	73.68 mV
At 1 MΩ (meas.)	Input sensitivity	Analog bandwidth (–3 dB)					
		100 MHz	200 MHz	350 MHz	500 MHz	700 MHz	
	0.5 mV/div	35 μV	40 μV	46 μV	54 μV	85 μV	
	1 mV/div	36 μV	42 μV	49 μV	57 μV	89 μV	
	2 mV/div	38 μV	45 μV	54 μV	64 μV	101 μV	
	5 mV/div	47 μV	58 μV	77 μV	92 μV	141 μV	
	10 mV/div	68 μV	89 μV	126 μV	152 μV	229 μV	
	20 mV/div	120 μV	161 μV	235 μV	285 μV	428 μV	
	50 mV/div	297 μV	401 μV	592 μV	719 μV	1.08 mV	
	100 mV/div	678 μV	892 μV	1.25 mV	1.47 mV	2.16 mV	
	200 mV/div	1.21 mV	1.62 mV	2.33 mV	2.77 mV	4.09 mV	
	500 mV/div	2.88 mV	3.88 mV	5.68 mV	6.76 mV	10.01 mV	
	1 V/div	6.11 mV	8.08 mV	11.54 mV	13.56 mV	18.51 mV	
	2 V/div	11.42 mV	15.20 mV	22.04 mV	25.98 mV	35.39 mV	
	5 V/div	29.10 mV	38.75 mV	56.46 mV	66.60 mV	90.40 mV	
	10 V/div	44.33 mV	58.62 mV	85.77 mV	101.12 mV	137.86 mV	

<sup>4</sup> 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 and D8 to D15) is displayed on the probe
Input impedance		100 k $\Omega$ $\pm$ 2 %    $\sim$ 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 level 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 10000 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 five 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 4 channels, max. 2.5 Gsample/s on 8 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 <sup>5</sup>	standard	
	analog channels only	R&S <sup>®</sup> MXO 58, 8-channel instrument: max. 500 Mpoints with 8 active channels (single capture), max. 500 Mpoints with 4 active channels (run continuous); R&S <sup>®</sup> MXO 54, 4-channel instrument: max. 500 Mpoints (single capture and run continuous)
	digital channels only (MSO)	max. 500 Mpoints with 16 digital channels (single capture), max. 500 Mpoints with 8 digital channels (run continuous)
	mix analog and digital	max. 500 Mpoints with 2 analog and 8 digital channels (single capture), max. 250 Mpoints with 2 analog and 8 digital channels (run continuous)
	with R&S <sup>®</sup> MXO5-B110 memory option 1 Gpoints	
	analog channels only	max. 1 Gpoints with 4 active channels (single capture), max. 1 Gpoints with 2 active channels (run continuous)
	digital channels only (MSO)	max. 1 Gpoints with 8 digital channels (single capture), max. 500 Mpoints with 8 digital channels (run continuous)
	mix analog and digital	max. 500 Mpoints with 2 analog and 8 digital channels (single capture), max. 250 Mpoints with 2 analog and 8 digital channels (run continuous)
	math	
	with 1 active math	max. 87.5 Mpoints
	with 2 active math	max. 42.5 Mpoints
	with 2 active math	max. 20 Mpoints
	with 2 active math	max. 10 Mpoints
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
	envelope	envelope of acquired waveforms
Sampling modes	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

<sup>5</sup> The maximum available memory depth depends on the bit resolution of the acquired data and, therefore, on the acquisition system settings such as decimation mode, use of waveform arithmetics or high definition (HD) mode. Interleave channels of the R&S<sup>®</sup>MXO 58 are on C1 and C5, C2 and C6, C3 and C7 as well as C4 and C8. For the R&S<sup>®</sup>MXO 54, all 4 channels run with 5 Gsample/s and maximum bandwidth.

## High definition mode

General description	The high definition mode increases the bit resolution of the waveform signal by using digital filtering, leading to reduced noise. Because of the digital trigger concept of the R&S®MXO 5, 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. 2.5 Gsample/s on 4 channels, max. 1.25 Gsample/s on 8 channels

## Trigger system

Trigger sources		analog channels (C1 to C8), digital channels (D0 to D15), trigger input, line trigger, serial bus
Trigger level range		±5 div from center of screen
Trigger modes		auto, normal, single, n single
Trigger sensitivity		0.0001 div, from DC to instrument bandwidth for all vertical scales, user adjustable
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 frequencies < 50 kHz
Trigger hysteresis	modes	auto (default setting) or manual
	adjustment resolution	0.0001 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 edge (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 a specified range	
	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 a specified range	
	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 a specified range; edge slope may be positive, negative or either	
	toggle time	0 ps to 1000 s

Advanced trigger modes		
Serial bus trigger	optional	see dedicated triggering and decoding options
Trigger input	input impedance	50 $\Omega$ (meas.) or 1 M $\Omega$ (meas.)    11 pF (meas.)
	max. input voltage at 50 $\Omega$	30 V ( $V_p$ )
	max. input voltage at 1 M $\Omega$	300 V (RMS), 400 V ( $V_p$ ), derates at 20 dB/decade to 5 V (RMS) above 250 kHz
	trigger level	$\pm 5$ V
	sensitivity	
	input frequency $\leq 500$ MHz	300 mV ( $V_{pp}$ ) (meas.)
	input coupling	AC, DC (50 $\Omega$ and 1 M $\Omega$ )
	trigger filter	HF reject (attenuates > 50 kHz), LF reject (attenuates < 50 kHz), noise reject
Trigger output	trigger modes	edge (positive, negative or either)
	functionality	A pulse is generated for each event triggering signal acquisition.
	output voltage	0 V to 5 V (nom.) at high impedance; 0 V to 2.5 V (nom.) at 50 $\Omega$
	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 up to four signal analysis in the frequency domain.	
Spectrum	sources	channel 1 to channel 8
	setup parameters	center frequency, frequency span, resolution bandwidth (automatic or manual), gate position, gate width, vertical scaling, vertical position
	scaling	dBm, dBV, dB $\mu$ V, V (RMS)
	span	1 Hz to 1.8 GHz <sup>6</sup>
	resolution bandwidth (RBW)	(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	The values in the peak list are also shown in the diagram to allow easy correlation.	

<sup>6</sup> 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 power density above)	14 dB (meas.)
Dynamic range	measured for a 1 GHz input carrier with level -3 dBm at input of oscilloscope, using spectrum analysis with center frequency 1 GHz, span 2 MHz, RBW 400 Hz at +20 MHz from 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 a 250 MHz input carrier with 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 a 250 MHz input carrier with 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 a 250 MHz input carrier with 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 acquired waveforms (input 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	24
Cursor measurements	available cursors	up to four cursor sets on screen, each set with two horizontal and two vertical cursors
	target waveforms	acquired waveforms (input channels), math waveforms, reference waveforms, XY diagrams
	operating modes	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 8
	number of reference waveforms	up to 8
	sources	channel 1 to 8, math waveforms 1 to 8, reference waveforms 1 to 8
Functions	operators	add, subtract, multiply, divide, absolute value, square, square root, integrate, differentiate, $\log_{10}$ , $\log_e$ , $\log_2$ , reciprocal, invert, lowpass, highpass, rescale ( $a \cdot x + b$ )
	filters	lowpass, highpass
	filter types	Gaussian, rectangular
	gate	delimits the display region used for waveform math

## Digital voltmeter

Accuracy		related to channel settings of voltmeter source
Measurements		DC, DC RMS, AC RMS
Sources	R&S®MXO 54	C1, C2, C3, C4
	R&S®MXO 58	C1, C2, C3, C4, C5, C6, C7, C8
Number of measurements		up to 4
Resolution		up to 6 digits
Bandwidth		up to 20 MHz

## Display characteristics

Diagram types	Yt, zoom, spectrum
Display configuration (waveform layout)	The display area can be split into separate diagram areas by dragging and dropping signal icons. Each diagram can hold any number of signals. Diagrams can be stacked on top of each other and later accessed via dynamic tabs (Tab 1, etc.)
Signal icons	Each active waveform is represented by a 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 set the most common parameters directly 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 bar	Displays trigger, horizontal and acquisition system settings; allows quick access to these settings.
Main menu	Provides access to all instrument settings in a compact menu structure.
Axis label	The x-axis and y-axis are labeled with values and physical unit.
Diagram label	Diagrams can be individually labeled with a descriptive, user-defined name.
Diagram layout	The grid, crosshair, axis labeling and diagram labeling can be switched on and off separately.
Persistence	50 ms to 50 s, or infinite
Zoom	vertical and horizontal; touch interface simplifies resize and drag operations on zoom window
Signal colors (waveform coding)	predefined or user-defined color tables for persistence display

## History and segmented memory

Acquisition memory	automatic	automatic setting of segment size and sample rate	
	manual	user-defined setting of segment size and sample rate	
Memory segmentation	function	memory segments for the acquisition	
	number of segments	record length	segments <sup>7</sup> (up to)
		1 kpoints	1 048 575
		2 kpoints	524 287
		5 kpoints	262 143
		10 kpoints	131 071
		20 kpoints	65 535
		50 kpoints	32 767
		100 kpoints	16 383
		200 kpoints	9 361
		500 kpoints	4 095
		1 Mpoints	2 113
		2 Mpoints	1 056
		5 Mpoints	427
		10 Mpoints	213
		20 Mpoints	106
		50 Mpoints	41
		100 Mpoints	20
		200 Mpoints	9
500 Mpoints	3		
1 Gpoints	1		
Segmentation is available 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 is an always-on function and 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	

<sup>7</sup> With R&S®MXO5-B110 memory option. The maximum number of segments depends on the number of active channels and the bit resolution of the acquired data and, therefore, on the acquisition system settings such as decimation mode, use of waveform arithmetics or high definition (HD) mode. The maximum number of segments without the R&S®MXO5-B110 memory option is limited to 10 000.

## 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
	WebDAV	support for the web distributed authoring and versioning (WebDAV) protocol, which provides secure access through an application proxy
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

<b>Front</b>		
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®MXO5-B6 option)		BNC; for details, see R&S®MXO5-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 kHz $\pm 1\%$ (meas.)
USB interfaces		3 x USB 3.1 Gen 1 ports, type A plug

<b>Rear</b>		
Trigger out		BNC; for details, see Trigger system
USB interface		1 x USB 3.1 Gen 1 port, type B plug
Reference input	connector	BNC
	impedance	50 $\Omega$ (nom.)
	input frequency	10 MHz ( $\pm 20$ ppm)
	sensitivity	$\geq -10\text{ dBm}$ into 50 $\Omega$ , $\leq 10\text{ dBm}$ at 10 MHz
Reference output	connector	BNC
	impedance	50 $\Omega$ (nom.)
	output signal	10 MHz (specified with timebase accuracy), 8 dBm (nom.)
Security slot		for standard Kensington style lock
VESA mount	via R&S®MXO5-Z7 VESA adapter	VESA compatibility mounting interface, 100 mm x 100 mm pattern size, according FDMI MIS-D, up to 14 kg with M4x10 screws

<b>Right side</b>		
Ground jack		connected to ground
USB interfaces		2 x USB 3.1 Gen 1 ports, type A plug
LAN interface		RJ-45 connector, supports 10/100/1000BASE-T
External monitor interface		HDMI™ 2.0 and DisplayPort++ 1.3, output of oscilloscope display

## General data

<b>Display</b>	type	15.6" LC TFT color display with capacitive touchscreen
	resolution	1920 × 1080 pixel (Full HD)

<b>Temperature</b>		
Temperature range	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 resistance	damp heat	+25 °C/+50 °C at 85 % relative humidity cyclic, in line with IEC 60068-2-30

<b>Altitude</b>		
Operating		up to 3000 m above sea level
Nonoperating		up to 4600 m above sea level

<b>Mechanical resistance</b>		
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	8 Hz to 500 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, half sine, duration 11 ms, in line with MIL-PRF-28800F, section 4.5.5.4.1

<b>Electromagnetic compatibility (EMC)</b>		
RF emissions		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 <sup>8</sup>

<b>Certifications</b>		VDE, cCSA <sub>US</sub> , KC
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<b>Calibration interval</b>		1 year
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<sup>8</sup> Test criterion is displayed noise level within ±1 div for an input sensitivity of 5 mV/div.

<b>Power supply</b>		
AC supply		100 V to 240 V $\pm$ 10 % at 50 Hz to 60 Hz and 400 Hz $\pm$ 5 %, max. 4 A to 2.5 A, in line with MIL-PRF 28800F, section 3.5
Power consumption	standby mode	1.6 W
	all channels on, without probes	180 W (typ.)
	max.	360 W
Safety		in line with IEC 61010-1, IEC 61010-2-030, CAN/CSA-C22.2 no. 61010-1, UL 61010-1, CAN/CSA C22.2 no. 61010-2-030

<b>Mechanical data</b>		
Dimensions	W x H x D	445 mm x 314 mm x 153 mm (17.51 in x 12.36 in x 6.02 in)
Weight	without options, nominal	9.0 kg (19.85 lb)
Rackmount height	with R&S®ZZA-MXO5 rackmount kit	8 HU

# Options

## R&S®MXO5-B1 mixed signal option

Mixed signal capability is a standard functionality of the R&S®MXO 5 Series oscilloscopes. The R&S®MXO5-B1 mixed signal option provides 16 digital channels with two R&S®RT-ZL04 probes.

## R&S®MXO5-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

<b>Function generator</b>	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 $\Omega$ )	
	f $\leq$ 10 MHz	$\leq -60$ dBc (meas.)
	f $>$ 10 MHz	$\leq -40$ 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	$\geq 16.5$ ns, 0.1 ns resolution
	rise/fall time	9 ns (meas.)
	overshoot	$\leq 2$ % (meas.)
Ramp (triangle, sawtooth)	jitter (cycle-to-cycle) ( $\geq 0.2$ V ( $V_{pp}$ ))	$\leq 40$ ps (RMS) (meas.)
	frequency range	1 mHz to 1 MHz
	variable symmetry	0 % to 100 %, 0.1 % resolution
DC	level range	
	into 50 $\Omega$	$\pm 2.5$ V
	into open circuit	$\pm 5$ V
Noise	resolution	1 mV
	amplitude	
	DC	0 V to 5 V ( $V_{pp}$ ) (into 50 $\Omega$ ), 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
Sine cardinal (sinc)	bandwidth	
	$\geq 100$ 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

<b>Arbitrary waveform generator</b>	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
<b>Modulation</b>		
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

<b>Frequency sweep</b>	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

<b>Two-channel operation</b>	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.)

<b>Outputs</b>		
Connectors		BNC; on the front of the instrument
Function		on/off, inverted
Output impedance		50 $\Omega$ (nom.)
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 $\leq -12$ 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 $\leq -4$ V (meas.)
Amplitude range <sup>9</sup>	sine, square/pulse, ramp, exponential rise/fall, arbitrary waveforms, sine cardinal (sinc), Gaussian, Lorentz, cardiac	
	into 50 $\Omega$	5 mV to 5 V ( $V_{pp}$ )
	into open circuit	10 mV to 10 V ( $V_{pp}$ )
	resolution	1 mV
	accuracy	$\pm 1$ % at 1 kHz
DC offset range	sine, square/pulse, ramp, exponential rise/fall, arbitrary waveforms	
	into 50 $\Omega$	$\pm 2.5$ V ( $V_{pp} > 100$ mV), $\pm 1.25$ V ( $V_{pp} \leq 100$ mV)
	into open circuit	$\pm 5.0$ V ( $V_{pp} > 200$ mV), $\pm 2.5$ V ( $V_{pp} \leq 200$ mV)
	sine cardinal (sinc): DC offset range is signal amplitude dependent	
	into 50 $\Omega$	-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)
	Gaussian, Lorentz: DC offset range is signal amplitude dependent	
	into 50 $\Omega$	-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 $\Omega$	-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	

<sup>9</sup> Amplitude is the sum of the AC amplitude and the noise amplitude.

## R&S®MXO5-K31 power analysis

<b>Power analysis (requires R&amp;S®MXO5-K31 option)</b>		
General description	The R&S®MXO5-K31 power analysis option extends the R&S®MXO 5 firmware with measurement functionality focused on switched mode power supplies (SMPS) and DC/DC converters. Up to six sets of power analysis measurements are possible.	
Input	quality	evaluation of power quality at an AC input; measures real power, apparent power, reactive power, power factor and phase angle of power, frequency, crest factor, RMS of voltage and current
	harmonics	measures up to the 334th harmonic of the incoming line frequency; precompliance checking for IEC 61000-3-2 (A, B, C, D), RTCA DO-160, MIL-STD-1399, max. limit checks
Deskew	automated	automated compensation of the propagation delay
Zero offset	automated	automatic compensation of input offset

## R&S®MXO5-K36 frequency response analysis

<b>Frequency response analysis (requires R&amp;S®MXO5-B6 option)</b>		
Stimulus	frequency mode	single sweep or repeated sweep
	frequency range	10 mHz 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®MXO5-K510 low speed serial buses

<b>I<sup>2</sup>C decoding</b>		
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 (read/write), data, ACK/NACK, stop, error
	address and data format	hex, decimal, octal, binary, ASCII

<b>SPI decoding</b>		
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 bit 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

<b>UART/RS-232/RS-422/RS-485 decoding</b>		
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
	end of packet	timeout, none
Trigger	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 word 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®MXO5-K520 automotive protocols

<b>CAN FD/XL decoding</b>		
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	30 % to 90 % 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, error condition (any combination of CRC error, bit stuffing error, form error and ACK error)
	identifier setup	identifier type (standard or extended); condition =, ≠, ≥, ≤, in range, out of range
	FD bits	FDF, BRS and ESI (0, 1, X)
	XL setup	SDT, VCID, AF; condition =, ≠, ≥, ≤, in range, out of range
	data setup	data pattern up to 8 byte (hex, decimal, octal, binary or ASCII); 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

<b>LIN decoding</b>		
Protocol configuration	version	1.3, 2.x or SAE J602; mixed traffic is supported
	bit rate	1 kbps to 20 Mbps
Trigger	source	any input channel or logical channel
	trigger event setup	start of frame (sync break), identifier, identifier + data, wake-up frame, error condition (any combination of checksum error, parity error and sync field error)
	identifier setup	range from 0d to 63d; condition =, ≠, ≥, ≤, in range, out of range
	data setup	data pattern up to 8 byte (hex, decimal, octal, binary or ASCII); condition =, ≠
Decode	source	any input channel, logical channel
	display type	decoded bus, tabulated list
	color coding	frame, frame identifier, data payload, checksum, error condition
	data format	hex, decimal, octal, binary, ASCII

# Ordering information

Designation	Type	Order No.
<b>R&amp;S®MXO 5 Series, base models</b>		
Oscilloscope, 350 MHz, 4 channels	R&S®MXO 54	1802.1008K04
Oscilloscope, 100 MHz, 8 channels	R&S®MXO 58	1802.1008K08
Base unit (including standard accessories: 700 MHz passive probe (10:1) per channel, accessories bag, quick start guide, power cord)		
<b>Choose your bandwidth upgrade</b>		
Upgrade of R&S®MXO 54 to 500 MHz bandwidth	R&S®MXO5-B245	1802.0676.02
Upgrade of R&S®MXO 54 to 1 GHz bandwidth	R&S®MXO5-B2410	1802.0682.02
Upgrade of R&S®MXO 54 to 2 GHz bandwidth	R&S®MXO5-B2420	1802.0699.02
Upgrade of R&S®MXO 58 to 200 MHz bandwidth	R&S®MXO5-B282	1802.0701.02
Upgrade of R&S®MXO 58 to 350 MHz bandwidth	R&S®MXO5-B283	1802.0718.02
Upgrade of R&S®MXO 58 to 500 MHz bandwidth	R&S®MXO5-B285	1802.0724.02
Upgrade of R&S®MXO 58 to 1 GHz bandwidth	R&S®MXO5-B2810	1802.0730.02
Upgrade of R&S®MXO 58 to 2 GHz bandwidth	R&S®MXO5-B2820	1802.0747.02
<b>Choose your options</b>		
Mixed signal option, for R&S®MXO 5 Series with 16 digital channels	R&S®MXO5-B1	1802.0660.02
Arbitrary waveform generator, 100 MHz, 2 analog channels	R&S®MXO5-B6	1802.0753.02
Additional M.2 SSD	R&S®MXO5-B19	1803.0205.02
Memory option 1 Gpoints	R&S®MXO5-B110	1803.0211.02
Low speed serial triggering and decoding (I <sup>2</sup> C/SPI/UART/RS-232/RS-422/RS-485)	R&S®MXO5-K510	1802.1243.02
Automotive serial triggering and decoding (CAN/CAN FD/CAN XL/LIN)	R&S®MXO5-K520	1802.1920.02
Power analysis	R&S®MXO5-K31	1802.0799.02
Frequency response analysis	R&S®MXO5-K36	1802.1943.02
Application bundle, consists of the following options: R&S®MXO5-K510, R&S®MXO5-K520, R&S®MXO5-K31, R&S®MXO5-K36, R&S®MXO5-B6	R&S®MXO5-PK1	1803.0257.02
<b>Choose your additional probes</b>		
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: passive		
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		
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

Designation	Type	Order No.
<b>Current probes</b>		
20 kHz, AC/DC, 0.01 V/A and 0.001 V/A, $\pm 200$ A and $\pm 2000$ 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
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
<b>EMC near-field probe</b>		
Probe set for E and H near-field measurements, 30 MHz to 3 GHz	R&S®HZ-15	1147.2736.02
<b>Logic probe <sup>10</sup></b>		
400 MHz logic probe, 8 channels	R&S®RT-ZL04	1333.0721.02
<b>Probe accessories</b>		
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 for the logic probes	R&S®RT-ZA19	1335.7875.02
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
Bipod probe positioner	R&S®RT-ZA29	1801.4803.02
<b>Choose your accessories</b>		
Rackmount kit, for R&S®MXO 5 Series with 8 HU	R&S®ZZA-MXO5	1802.3181.02
Front cover	R&S®MXO5-Z1	1803.0240.02
Soft case (W x H x D: 550 mm x 300 mm x 340 mm)	R&S®MXO5-Z3	1803.0228.02
Transit case (W x H x D: 613 mm x 478 mm x 337 mm)	R&S®MXO5-Z4	1803.0234.02
VESA adapter	R&S®MXO5-Z7	1803.0457.02
VESA mount (compatible with standard 100 mm x 100 mm pattern)	Choose industry standard mounts according to FDMI MIS-D, up to 14 kg with M4x10 screws	

<sup>10</sup> The R&S®MXO5-B1 mixed signal option contains two R&S®RT-ZL04 logic probes.

<b>Warranty</b>		
Base unit		1 year
All other items <sup>11</sup>		1 year
<b>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 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 <sup>12</sup>. 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 <sup>12</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 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 <sup>12</sup> and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

The terms HDMI and HDMI High-Definition Multimedia Interface, and the HDMI Logo are trademarks or registered trademarks of HDMI Licensing, LLC in the United States and other countries.

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

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





## Service at Rohde & Schwarz You're in great hands

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

## 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 90 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](http://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](http://www.training.rohde-schwarz.com)

## Rohde & Schwarz customer support

[www.rohde-schwarz.com/support](http://www.rohde-schwarz.com/support)

