

R&S® ZN-Z1xx CALIBRATION KITS

Specifications



海洋儀器

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Data Sheet
Version 01.01

ROHDE & SCHWARZ

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Definitions

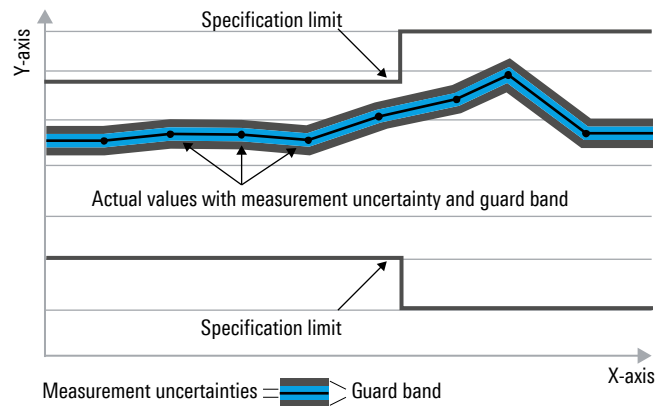
General

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.



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.

Typical data as well as nominal and measured values are not warranted by Rohde & Schwarz.

Specifications

Mechanical data

Connector type	R&S®ZN-Z170 models .02/.12/.22	type N, 50 Ω, male
	R&S®ZN-Z170 models .03/.13/.23	type N, 50 Ω, female
	R&S®ZN-Z135 models .02/.12/.22	3.5 mm, male
	R&S®ZN-Z135 models .03/.13/.23	3.5 mm, female
	R&S®ZN-Z129/-Z129E models .02/.12/.22	2.92 mm, male
	R&S®ZN-Z129/-Z129E models .03/.13/.23	2.92 mm, female
Gauge	R&S®ZN-Z170 models .02/.12/.22	5.28 mm to 5.36 mm
	R&S®ZN-Z170 models .03/.13/.23	5.18 mm to 5.26 mm
	R&S®ZN-Z135/-Z129	0 mm to 0.08 mm
	R&S®ZN-Z129E	0 mm to 0.05 mm
Inner conductor material	R&S®ZN-Z170/-Z135/-Z129/-Z129E	Au-plated age-hardened CuBe alloy
Outer conductor material	R&S®ZN-Z170/-Z135/-Z129	passivated stainless steel
	R&S®ZN-Z129E	Au-plated age-hardened CuBe alloy
Body material	R&S®ZN-Z170/-Z135/-Z129	black anodized aluminum
	R&S®ZN-Z129E	blue anodized aluminum

Electrical data

R&S®ZN-Z170 models .03/.13/.23 (type N, 50 Ω, female)

Frequency range		DC to 18 GHz
Through standard		
Return loss	DC to 6 GHz	> 40 dB (typ.)
	6 GHz to 9 GHz	> 36 dB (typ.)
	9 GHz to 18 GHz	> 32 dB (typ.)
Insertion loss		0.0291 dB · \sqrt{f} / GHz (nom.)
Electrical length		45.60 mm (nom.)
Open standard		
Deviation from nominal phase ¹	DC to 6 GHz	< 2.0°
	6 GHz to 9 GHz	< 3.0°
	9 GHz to 18 GHz	< 4.0°
Fringing capacitance	C ₀	37.1000 fF (nom.)
	C ₁	1.20000 fF/GHz (nom.)
	C ₂	-0.03000 fF/GHz ² (nom.)
	C ₃	0.00000 fF/GHz ³ (nom.)
Offset length		12.00 mm (nom.)
Loss		0.0056 dB · \sqrt{f} / GHz (nom.)
Short standard		
Deviation from nominal phase ²	DC to 6 GHz	< 1.5°
	6 GHz to 9 GHz	< 2.0°
	9 GHz to 18 GHz	< 3.5°
Inductance	L ₀	95.0000 pH (nom.)
	L ₁	-9.90000 pH/GHz (nom.)
	L ₂	0.98000 pH/GHz ² (nom.)
	L ₃	-0.02900 pH/GHz ³ (nom.)
Offset length		12.00 mm (nom.)
Loss		0.0056 dB · \sqrt{f} / GHz (nom.)
Match standard		
DC resistance		50.0 Ω ± 0.5 Ω
Return loss	DC to 6 GHz	> 42 dB
	6 GHz to 9 GHz	> 36 dB
	9 GHz to 18 GHz	> 32 dB

¹ The nominal phase is defined by the offset delay, the offset loss and the fringing capacitance.

² The nominal phase is defined by the offset delay, the offset loss and the short inductance.

R&S® ZN-Z170 models .02/.12/.22 (type N, 50 Ω, male)

Frequency range		DC to 18 GHz
Through standard		
Return loss	DC to 6 GHz	> 40 dB (typ.)
	6 GHz to 9 GHz	> 36 dB (typ.)
	9 GHz to 18 GHz	> 32 dB (typ.)
Insertion loss		$0.0407 \text{ dB} \cdot \sqrt{f} / \text{GHz}$ (nom.)
Electrical length		63.80 mm (nom.)
Open standard		
Deviation from nominal phase ³	DC to 6 GHz	< 2.0°
	6 GHz to 9 GHz	< 3.0°
	9 GHz to 18 GHz	< 4.0°
Fringing capacitance	C ₀	-14.2 fF (nom.)
	C ₁	0.4 fF/GHz (nom.)
	C ₂	-0.016 fF/GHz ² (nom.)
	C ₃	0.001 fF/GHz ³ (nom.)
Offset length		22.00 mm (nom.)
Loss		$0.0102 \text{ dB} \cdot \sqrt{f} / \text{GHz}$ (nom.)
Short standard		
Deviation from nominal phase ⁴	DC to 6 GHz	< 1.5°
	6 GHz to 9 GHz	< 2.0°
	9 GHz to 18 GHz	< 3.5°
Inductance	L ₀	-27 pH (nom.)
	L ₁	7.2 pH/GHz (nom.)
	L ₂	-0.8 pH/GHz ² (nom.)
	L ₃	0.026 pH/GHz ³ (nom.)
Offset length		22.00 mm (nom.)
Loss		$0.0102 \text{ dB} \cdot \sqrt{f} / \text{GHz}$ (nom.)
Match standard		
DC resistance		50.0 Ω ± 0.5 Ω
Return loss	DC to 6 GHz	> 42 dB
	6 GHz to 9 GHz	> 36 dB
	9 GHz to 18 GHz	> 32 dB

R&S® ZN-Z135 models .03/.13/.23 (3.5 mm, female)

Frequency range		DC to 26.5 GHz
Through standard		
Return loss	DC to 4 GHz	> 34 dB (typ.)
	4 GHz to 8 GHz	> 32 dB (typ.)
	8 GHz to 26.5 GHz	> 30 dB (typ.)
Insertion loss		$0.0183 \text{ dB} \cdot \sqrt{f} / \text{GHz}$ (nom.)
Electrical length		25.20 mm (nom.)
Open standard		
Deviation from nominal phase ³	DC to 4 GHz	< 1.0°
	4 GHz to 8 GHz	< 2.0°
	8 GHz to 26.5 GHz	< 4.0°
Fringing capacitance	C ₀	-17.500 fF (nom.)
	C ₁	-2.0000 fF/GHz (nom.)
	C ₂	0.1400 fF/GHz ² (nom.)
	C ₃	-0.0027 fF/GHz ³ (nom.)
Offset length		10.00 mm (nom.)
Loss		$0.0127 \text{ dB} \cdot \sqrt{f} / \text{GHz}$ (nom.)
Short standard		
Deviation from nominal phase ⁴	DC to 4 GHz	< 1.0°
	4 GHz to 8 GHz	< 2.0°
	8 GHz to 26.5 GHz	< 3.0°
Inductance	L ₀	-44.000 pH (nom.)
	L ₁	3.7000 pH/GHz (nom.)
	L ₂	-0.2500 pH/GHz ² (nom.)
	L ₃	0.0050 pH/GHz ³ (nom.)
Offset length		10.00 mm (nom.)
Loss		$0.0137 \text{ dB} \cdot \sqrt{f} / \text{GHz}$ (nom.)

³ The nominal phase is defined by the offset delay, the offset loss and the fringing capacitance.

⁴ The nominal phase is defined by the offset delay, the offset loss and the short inductance.

Match standard		
DC resistance		50.0 $\Omega \pm 0.5 \Omega$
Return loss	DC to 5 GHz	> 42 dB
	5 GHz to 15 GHz	> 36 dB
	15 GHz to 26.5 GHz	> 32 dB

R&S®ZN-Z135 models .02/.12/.22 (3.5 mm, male)

Frequency range		DC to 26.5 GHz
Through standard		
Return loss	DC to 4 GHz	> 34 dB (typ.)
	4 GHz to 8 GHz	> 32 dB (typ.)
	8 GHz to 26.5 GHz	> 30 dB (typ.)
Insertion loss		0.0183 dB · $\sqrt{f / \text{GHz}}$ (nom.)
Electrical length		25.20 mm (nom.)
Open standard		
Deviation from nominal phase ⁵	DC to 4 GHz	< 1.0°
	4 GHz to 8 GHz	< 2.0°
	8 GHz to 26.5 GHz	< 4.0°
Fringing capacitance	C ₀	-17.000 fF (nom.)
	C ₁	-2.0000 fF/GHz (nom.)
	C ₂	0.1470 fF/GHz ² (nom.)
	C ₃	-0.0030 fF/GHz ³ (nom.)
Offset length		10.00 mm (nom.)
Loss		0.0127 dB · $\sqrt{f / \text{GHz}}$ (nom.)
Short standard		
Deviation from nominal phase ⁶	DC to 4 GHz	< 1.0°
	4 GHz to 8 GHz	< 2.0°
	8 GHz to 26.5 GHz	< 3.0°
Inductance	L ₀	-39.000 pH (nom.)
	L ₁	2.2000 pH/GHz (nom.)
	L ₂	-0.1500 pH/GHz ² (nom.)
	L ₃	0.0030 pH/GHz ³ (nom.)
Offset length		10.00 mm (nom.)
Loss		0.0137 dB · $\sqrt{f / \text{GHz}}$ (nom.)
Match standard		
DC resistance		50.0 $\Omega \pm 0.5 \Omega$
Return loss	DC to 5 GHz	> 42 dB
	5 GHz to 15 GHz	> 36 dB
	15 GHz to 26.5 GHz	> 32 dB

R&S®ZN-Z129 models .03/.13/.23 (2.92 mm, female)

Frequency range		DC to 40 GHz
Through standard		
Return loss	DC to 4 GHz	> 32 dB (typ.)
	4 GHz to 26.5 GHz	> 30 dB (typ.)
	26.5 GHz to 40 GHz	> 28 dB (typ.)
Insertion loss		0.0154 dB · $\sqrt{f / \text{GHz}}$ (nom.)
Electrical length		19.70 mm (nom.)
Open standard		
Deviation from nominal phase ⁵	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 3.5°
	10 GHz to 26.5 GHz	< 4.5°
	26.5 GHz to 40 GHz	< 5.0°
Fringing capacitance	C ₀	-4.30000 fF (nom.)
	C ₁	0.43100 fF/GHz (nom.)
	C ₂	-0.01150 fF/GHz ² (nom.)
	C ₃	0.00012 fF/GHz ³ (nom.)
Offset length		8.50 mm (nom.)
Loss		0.0118 dB · $\sqrt{f / \text{GHz}}$ (nom.)

⁵ The nominal phase is defined by the offset delay, the offset loss and the fringing capacitance.

⁶ The nominal phase is defined by the offset delay, the offset loss and the short inductance.

Short standard		
Deviation from nominal phase ⁷	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 2.0°
	10 GHz to 26.5 GHz	< 3.5°
	26.5 GHz to 40 GHz	< 4.5°
Inductance	L ₀	0.0000 pH (nom.)
	L ₁	0.0000 pH/GHz (nom.)
	L ₂	0.0000 pH/GHz ² (nom.)
	L ₃	0.0000 pH/GHz ³ (nom.)
Offset length		8.50 mm (nom.)
Loss		0.0118 dB · √f / GHz (nom.)
Match standard		
DC resistance		50.0 Ω ± 0.5 Ω
Return loss	DC to 4 GHz	> 40 dB
	4 GHz to 10 GHz	> 33 dB
	10 GHz to 26.5 GHz	> 28 dB
	26.5 GHz to 40 GHz	> 25 dB

R&S[®] ZN-Z129 models .02/.12/.22 (2.92 mm, male)

Frequency range		DC to 40 GHz
Through standard		
Return loss	DC to 4 GHz	> 32 dB (typ.)
	4 GHz to 26.5 GHz	> 30 dB (typ.)
	26.5 GHz to 40 GHz	> 28 dB (typ.)
Insertion loss		0.0195 dB · √f / GHz (nom.)
Electrical length		24.90 mm (nom.)
Open standard		
Deviation from nominal phase ⁸	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 3.5°
	10 GHz to 26.5 GHz	< 4.5°
	26.5 GHz to 40 GHz	< 5.0°
Fringing capacitance	C ₀	-7.38000 fF (nom.)
	C ₁	1.18000 fF/GHz (nom.)
	C ₂	-0.04480 fF/GHz ² (nom.)
	C ₃	0.00054 fF/GHz ³ (nom.)
Offset length		8.50 mm (nom.)
Loss		0.0118 dB · √f / GHz (nom.)
Short standard		
Deviation from nominal phase ⁷	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 2.0°
	10 GHz to 26.5 GHz	< 3.5°
	26.5 GHz to 40 GHz	< 4.5°
Inductance	L ₀	0.0000 pH (nom.)
	L ₁	0.0000 pH/GHz (nom.)
	L ₂	0.0000 pH/GHz ² (nom.)
	L ₃	0.0000 pH/GHz ³ (nom.)
Offset length		8.50 mm (nom.)
Loss		0.0118 dB · √f / GHz (nom.)
Match standard		
DC resistance		50.0 Ω ± 0.5 Ω
Return loss	DC to 4 GHz	> 40 dB
	4 GHz to 10 GHz	> 33 dB
	10 GHz to 26.5 GHz	> 28 dB
	26.5 GHz to 40 GHz	> 25 dB

⁷ The nominal phase is defined by the offset delay, the offset loss and the short inductance.

⁸ The nominal phase is defined by the offset delay, the offset loss and the fringing capacitance.

R&S® ZN-Z129E models .03/13/23 (2.92 mm, female)

Frequency range		DC to 43.5 GHz
Through standard		
Return loss	DC to 4 GHz	> 30 dB (typ.)
	4 GHz to 26.5 GHz	> 26 dB (typ.)
	26.5 GHz to 40 GHz	> 21 dB (typ.)
	40 GHz to 43.5 GHz	> 19 dB (typ.)
Insertion loss		$0.023 \text{ dB} \cdot \sqrt{f / \text{GHz}}$ (nom.)
Electrical length		34.86 mm (nom.)
Open standard		
Deviation from nominal phase ⁹	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 2.5°
	10 GHz to 26.5 GHz	< 4.5°
	26.5 GHz to 43.5 GHz	< 5.0°
Fringing capacitance	C ₀	-4.987272 fF (nom.)
	C ₁	0.608892 fF/GHz (nom.)
	C ₂	-0.023912 fF/GHz ² (nom.)
	C ₃	0.000302 fF/GHz ³ (nom.)
Offset length		9.46 mm (nom.)
Loss		$0.01 \text{ dB} \cdot \sqrt{f / \text{GHz}}$ (nom.)
Short standard		
Deviation from nominal phase ¹⁰	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 2.0°
	10 GHz to 26.5 GHz	< 3.5°
	26.5 GHz to 43.5 GHz	< 4.5°
Inductance	L ₀	-173.680138 pH (nom.)
	L ₁	-2.116093 pH/GHz (nom.)
	L ₂	0.084785 pH/GHz ² (nom.)
	L ₃	-0.002288 pH/GHz ³ (nom.)
Offset length		10.47 mm (nom.)
Loss		$0.01 \text{ dB} \cdot \sqrt{f / \text{GHz}}$ (nom.)
Match standard		
DC resistance		50.0 Ω ± 0.5 Ω
Return loss	DC to 4 GHz	> 39 dB
	4 GHz to 10 GHz	> 33 dB
	10 GHz to 26.5 GHz	> 28 dB
	26.5 GHz to 40 GHz	> 24 dB
	40 GHz to 43.5 GHz	> 22 dB

R&S® ZN-Z129E models .02/12/22 (2.92 mm, male)

Frequency range		DC to 43.5 GHz
Through standard		
Return loss	DC to 4 GHz	> 30 dB (typ.)
	4 GHz to 26.5 GHz	> 26 dB (typ.)
	26.5 GHz to 40 GHz	> 21 dB (typ.)
	40 GHz to 43.5 GHz	> 19 dB (typ.)
Insertion loss		$0.023 \text{ dB} \cdot \sqrt{f / \text{GHz}}$ (nom.)
Electrical length		34.86 mm (nom.)
Open standard		
Deviation from nominal phase ⁹	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 2.5°
	10 GHz to 26.5 GHz	< 4.5°
	26.5 GHz to 43.5 GHz	< 5.0°
Fringing capacitance	C ₀	-3.296486 fF (nom.)
	C ₁	0.422717 fF/GHz (nom.)
	C ₂	-0.015067 fF/GHz ² (nom.)
	C ₃	0.000195 fF/GHz ³ (nom.)
Offset length		9.47 mm (nom.)
Loss		$0.01 \text{ dB} \cdot \sqrt{f / \text{GHz}}$ (nom.)

⁹ The nominal phase is defined by the offset delay, the offset loss and the fringing capacitance.

¹⁰ The nominal phase is defined by the offset delay, the offset loss and the short inductance.

Short standard		
Deviation from nominal phase ¹⁰	DC to 4 GHz	< 1.5°
	4 GHz to 10 GHz	< 2.0°
	10 GHz to 26.5 GHz	< 3.5°
	26.5 GHz to 43.5 GHz	< 4.5°
Inductance	L ₀	-103.442884 pH (nom.)
	L ₁	0.060224 pH/GHz (nom.)
	L ₂	-0.008632 pH/GHz ² (nom.)
	L ₃	0.000023 pH/GHz ³ (nom.)
Offset length		9.98 mm (nom.)
Loss		0.01 dB · √f / GHz (nom.)
Match standard		
DC resistance		50.0 Ω ± 0.5 Ω
Return loss	DC to 4 GHz	> 39 dB
	4 GHz to 10 GHz	> 33 dB
	10 GHz to 26.5 GHz	> 28 dB
	26.5 GHz to 40 GHz	> 24 dB
	40 GHz to 43.5 GHz	> 22 dB

Effective system data

The specified effective system data are established after performing a suitable system error calibration, e.g. UOSM, at an R&S®ZNA, R&S®ZVA, R&S®ZNB or R&S®ZVT vector network analyzer, using the model data of the calibration kit, which are stored on the vector network analyzer. This data is valid between +18 °C and +28 °C, at a measurement bandwidth of 10 Hz and a nominal power of 0 dBm at the calibration ports. The calibration kit is fully functional down to 0 Hz, with effective system data as specified below.

R&S®ZN-Z170 (type N, female and male)

	DC to 6 GHz	6 GHz to 9 GHz	9 GHz to 18 GHz
Directivity in dB	> 42	> 36	> 32
Match in dB	> 33	> 29	> 25
Tracking in dB	< 0.07	< 0.10	< 0.15

R&S®ZN-Z135 (3.5 mm, female and male)

	DC to 4 GHz	4 GHz to 8 GHz	8 GHz to 26.5 GHz
Directivity in dB	> 42	> 36	> 32
Match in dB	> 37	> 31	> 26
Tracking in dB	< 0.07	< 0.11	< 0.16

R&S®ZN-Z129 (2.92 mm, female and male)

	10 MHz to 4 GHz	4 GHz to 10 GHz	10 GHz to 26.5 GHz	26.5 GHz to 40 GHz
Directivity in dB	> 40	> 33	> 28	> 25
Match in dB	> 34	> 28	> 24	> 22
Tracking in dB	< 0.07	< 0.11	< 0.15	< 0.21

R&S®ZN-Z129E (2.92 mm, female and male)

	10 MHz to 4 GHz	4 GHz to 10 GHz	10 GHz to 26.5 GHz	26.5 GHz to 40 GHz	40 GHz to 43.5 GHz
Directivity in dB	> 39	> 33	> 28	> 24	> 22
Match in dB	> 33	> 29	> 24	> 21	> 20
Tracking in dB	< 0.07	< 0.11	< 0.15	< 0.24	< 0.25

General data

Temperature	operating temperature range	+18 °C to +28 °C
	permissible temperature range	+5 °C to +40 °C
	storage temperature range	-40 °C to +70 °C
Standards	R&S®ZN-Z170	in line with IEC 61169-16
	R&S®ZN-Z135	in line with IEC 61169-23
	R&S®ZN-Z129	in line with IEC 61169-35
	R&S®ZN-Z129E	in line with IEEE Std 287
Recommended calibration interval		1 year
Dimensions (W × H × D)	R&S®ZN-Z170 models .02/.12/.22	74.7 mm × 18 mm × 111 mm (2.94 in × 0.71 in × 4.37 in)
	R&S®ZN-Z170 models .03/.13/.23	69 mm × 18 mm × 107 mm (2.72 in × 0.71 in × 4.21 in)
	R&S®ZN-Z135 models .02/.12/.22	52 mm × 10 mm × 57 mm (2.05 in × 0.39 in × 2.24 in)
	R&S®ZN-Z135 models .03/.13/.23	51 mm × 10 mm × 55 mm (2.00 in × 0.39 in × 2.17 in)
	R&S®ZN-Z129 models .02/.12/.22	55 mm × 10 mm × 58 mm (2.16 in × 0.39 in × 2.28 in)
	R&S®ZN-Z129 models .03/.13/.23	54 mm × 10 mm × 57 mm (2.13 in × 0.39 in × 2.24 in)
	R&S®ZN-Z129E models .02/.12/.22	40 mm × 14 mm × 70 mm (1.58 in × 0.55 in × 2.76 in)
	R&S®ZN-Z129E models .03/.13/.23	38 mm × 14 mm × 68 mm (1.49 in × 0.55 in × 2.68 in)
Weight	R&S®ZN-Z170 model .02/.12/.22	263 g (0.58 lb)
	R&S®ZN-Z170 model .03/.13/.23	235 g (0.52 lb)
	R&S®ZN-Z135 model .02/.12/.22	38.3 g (0.084 lb)
	R&S®ZN-Z135 model .03/.13/.23	34.9 g (0.077 lb)
	R&S®ZN-Z129 model .02/.12/.22	36.9 g (0.81 lb)
	R&S®ZN-Z129 model .03/.13/.23	55 g (0.12 lb)
	R&S®ZN-Z129E	55 g (0.12 lb)
	shipping weight (all models)	1 kg (2.2 lb)

Ordering information

Designation	Type	Order No.
Calibration kit, type N, 50 Ω, male	R&S®ZN-Z170	1328.8163.02
Calibration kit, type N, 50 Ω, male, with DCV	R&S®ZN-Z170	1328.8163.12
Calibration kit, type N, 50 Ω, male, with ACA	R&S®ZN-Z170	1328.8163.22
Calibration kit, type N, 50 Ω, female	R&S®ZN-Z170	1328.8163.03
Calibration kit, type N, 50 Ω, female, with DCV	R&S®ZN-Z170	1328.8163.13
Calibration kit, type N, 50 Ω, female, with ACA	R&S®ZN-Z170	1328.8163.23
Calibration kit, 3.5 mm, male	R&S®ZN-Z135	1328.8157.02
Calibration kit, 3.5 mm, male, with DCV	R&S®ZN-Z135	1328.8157.12
Calibration kit, 3.5 mm, male, with ACA	R&S®ZN-Z135	1328.8157.22
Calibration kit, 3.5 mm, female	R&S®ZN-Z135	1328.8157.03
Calibration kit, 3.5 mm, female, with DCV	R&S®ZN-Z135	1328.8157.13
Calibration kit, 3.5 mm, female, with ACA	R&S®ZN-Z135	1328.8157.23
Calibration kit, 2.92 mm, male	R&S®ZN-Z129	1328.8140.02
Calibration kit, 2.92 mm, male, with DCV	R&S®ZN-Z129	1328.8140.12
Calibration kit, 2.92 mm, male, with ACA	R&S®ZN-Z129	1328.8140.22
Calibration kit, 2.92 mm, female	R&S®ZN-Z129	1328.8140.03
Calibration kit, 2.92 mm, female, with DCV	R&S®ZN-Z129	1328.8140.13
Calibration kit, 2.92 mm, female, with ACA	R&S®ZN-Z129	1328.8140.23
Calibration kit, 2.92 mm, male	R&S®ZN-Z129E	1328.8170.02
Calibration kit, 2.92 mm, male, with DCV	R&S®ZN-Z129E	1328.8170.12
Calibration kit, 2.92 mm, male, with ACA	R&S®ZN-Z129E	1328.8170.22
Calibration kit, 2.92 mm, female	R&S®ZN-Z129E	1328.8170.03
Calibration kit, 2.92 mm, female, with DCV	R&S®ZN-Z129E	1328.8170.13
Calibration kit, 2.92 mm, female, with ACA	R&S®ZN-Z129E	1328.8170.23

Service options		
Extended warranty, one year	R&S®WE1	Please contact your local Rohde & Schwarz sales office.
Extended warranty, two years	R&S®WE2	
Extended warranty, three years	R&S®WE3	
Extended warranty, four years	R&S®WE4	
Extended warranty with calibration coverage, one year	R&S®CW1	
Extended warranty with calibration coverage, two years	R&S®CW2	
Extended warranty with calibration coverage, three years	R&S®CW3	
Extended warranty with calibration coverage, four years	R&S®CW4	
Extended warranty with accredited calibration coverage, one year	R&S®AW1	
Extended warranty with accredited calibration coverage, two years	R&S®AW2	
Extended warranty with accredited calibration coverage, three years	R&S®AW3	
Extended warranty with accredited calibration coverage, four years	R&S®AW4	

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

Repairs carried out during the contract term are free of charge ¹¹. Necessary calibration and adjustments carried out during repairs are also covered.

Extended warranty with calibration (CW1 to CW4)

Enhance your extended warranty by adding calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated, inspected and maintained during the term of the contract. It includes all repairs ¹¹ and calibration at the recommended intervals as well as any calibration carried out during repairs or option upgrades.

Extended warranty with accredited calibration (AW1 to AW4)

Enhance your extended warranty by adding accredited calibration coverage at a package price. This package ensures that your Rohde & Schwarz product is regularly calibrated under accreditation, inspected and maintained during the term of the contract. It includes all repairs ¹¹ and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

Note:

All models of R&S®ZN-Z170, R&S®ZN-Z135 and R&S®ZN-Z129 are manufactured for Rohde & Schwarz by: Rosenberger Hochfrequenztechnik GmbH & Co. KG, Hauptstraße 1, 83413 Fridolfing, Germany

All models of R&S®ZN-Z129E are manufactured for Rohde & Schwarz by: SPINNER GmbH, Erzgießereistr. 33, 80335 München, Germany

¹¹ Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.