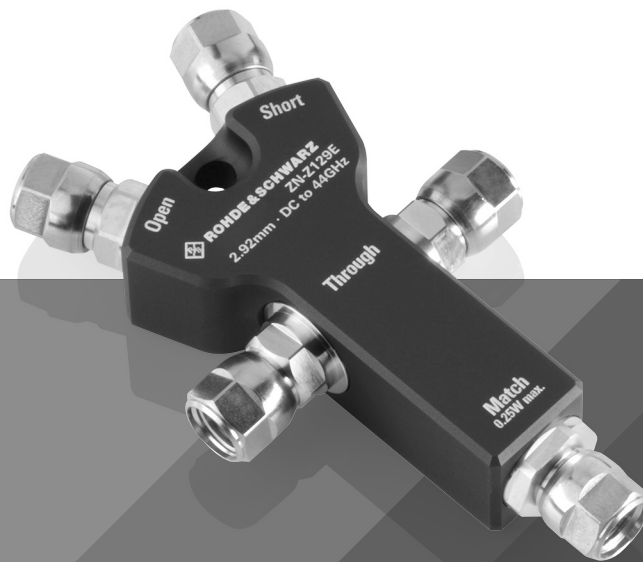


R&S® ZN-Z129E CALIBRATION KIT

Specifications



Data Sheet
Version 01.00

ROHDE & SCHWARZ

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Definitions

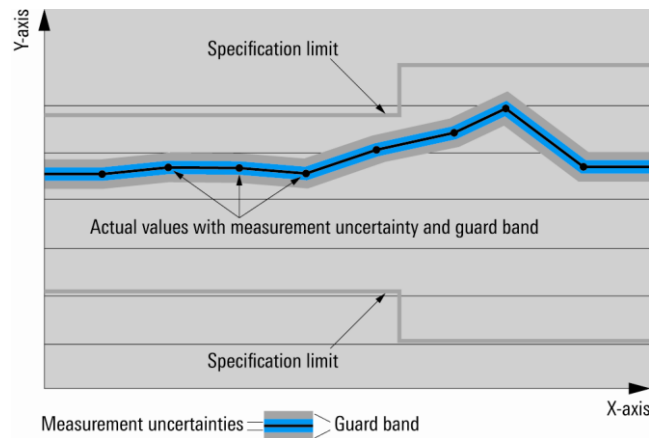
General

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	model .02	2.92 mm, male
	model .03	2.92 mm, female
Gauge	model .02	0 mm to 0.05 mm
	model .03	0 mm to 0.05 mm
Inner conductor material		Au-plated age-hardened CuBe alloy
Outer conductor material		Au-plated age-hardened CuBe alloy
Body		blue anodized aluminum

Electrical data of R&S®ZN-Z129E

Model .03 (2.92 mm, female)

Frequency range		DC to 44 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 44 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 ¹	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 44 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 ²	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 44 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 44 GHz	> 22 dB
Maximum input power		0.25 W

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.

Model .02 (2.92 mm, male)

Frequency range		DC to 44 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 44 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 ³	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 40 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.)
Short standard		
Deviation from nominal phase ⁴	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	-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		$0.01 \text{ dB} \cdot \sqrt{f} / \text{GHz}$ (nom.)
Match standard		
DC resistance		$50.0 \Omega \pm 0.5 \Omega$
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 44 GHz	> 22 dB
Maximum input power		0.25 W

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.

Effective system data of R&S®ZN-Z129E (2.92 mm, female and male)

The specified effective system data is established after performing a UOSM system error calibration on an R&S®ZNA43 vector network analyzer using the calibration kit's characteristic data. This data is valid between +18 °C and +28 °C at a measurement bandwidth of 10 Hz and a nominal power of -10 dBm at the calibration ports. The calibration kit is fully functional down to 0 Hz, with effective system data as specified below.

Directivity	10 MHz to 4 GHz	39 dB (meas.)
	4 GHz to 10 GHz	33 dB (meas.)
	10 GHz to 26.5 GHz	28 dB (meas.)
	26.5 GHz to 40 GHz	24 dB (meas.)
	40 GHz to 43.5 GHz	22 dB (meas.)
Source match	10 MHz to 4 GHz	33 dB (meas.)
	4 GHz to 10 GHz	29 dB (meas.)
	10 GHz to 26.5 GHz	24 dB (meas.)
	26.5 GHz to 40 GHz	21 dB (meas.)
	40 GHz to 43.5 GHz	20 dB (meas.)
Reflection tracking	10 MHz to 4 GHz	0.03 dB (meas.)
	4 GHz to 10 GHz	0.04 dB (meas.)
	10 GHz to 26.5 GHz	0.06 dB (meas.)
	26.5 GHz to 40 GHz	0.07 dB (meas.)
	40 GHz to 43.5 GHz	0.07 dB (meas.)
Load match	10 MHz to 4 GHz	38 dB (meas.)
	4 GHz to 10 GHz	32 dB (meas.)
	10 GHz to 26.5 GHz	27 dB (meas.)
	26.5 GHz to 40 GHz	23 dB (meas.)
	40 GHz to 43.5 GHz	21 dB (meas.)
Transmission tracking	10 MHz to 4 GHz	0.1 dB (meas.)
	4 GHz to 10 GHz	0.2 dB (meas.)
	10 GHz to 26.5 GHz	0.3 dB (meas.)
	26.5 GHz to 40 GHz	0.5 dB (meas.)
	40 GHz to 43.5 GHz	0.6 dB (meas.)

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		in line with IEEE Std 287
Recommended calibration interval		1 year
Dimensions (W × H × D)	model .02	40 mm × 14 mm × 70 mm (1.58 in × 0.55 in × 2.76 in)
	model .03	38 mm × 14 mm × 68 mm (1.49 in × 0.55 in × 2.68 in)
Weight	model .02	55 g (0.12 lb)
	model .03	55 g (0.12 lb)
Shipping weight		1 kg (2.2 lb)

Ordering information

Designation	Type	Order No.
Calibration kit, 2.92 mm, male	R&S®ZN-Z129E	1328.8170.02
Calibration kit, 2.92 mm, female	R&S®ZN-Z129E	1328.8170.03

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 ⁵. 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 ⁵ 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 ⁵ and accredited calibration at the recommended intervals as well as any accredited calibration carried out during repairs or option upgrades.

⁵ Excluding defects caused by incorrect operation or handling and force majeure. Wear-and-tear parts are not included.

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