



All dimensions are in mm; tolerances according to ISO 2768 m-H

**Interface**

According to IEC 61169-54

**Contents and Documentation**

This kit is delivered with

- **Standard Definitions Card**  
Printed Standard Definitions that can be used on nearly all Vector Network Analyzers
- **Certificate of Testing**
- **Lanyard**
- **Hard Shell Case**
- **Protection Caps**
- **User Manual**

**Material and plating**

**Connector parts**

Center conductor  
Outer conductor  
Coupling nut  
Body  
Dielectric  
Substrate

**Material**

Brass  
Stainless steel  
Brass  
Aluminum  
PTFE  
Al<sub>2</sub>O<sub>3</sub>

**Plating**

Gold, min. 1.27 µm, over nickel  
Passivated  
White bronze(e.g. Optalloy®)  
black anodized

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**Electrical data**

Frequency range	DC to 12 GHz
<b>Thru</b>	
Return loss	$\geq 36$ dB, DC to 4 GHz $\geq 30$ dB, 4 GHz to 6 GHz $\geq 20$ dB, 6 GHz to 12 GHz
<b>Open</b>	
Error from nominal phase <sup>1</sup>	$\leq 2.5^\circ$ , DC to 6 GHz $\leq 3.0^\circ$ , 6 GHz to 12 GHz
<b>Short</b>	
Error from nominal phase <sup>2</sup>	$\leq 2.5^\circ$ , DC to 6 GHz $\leq 3.0^\circ$ , 6 GHz to 12 GHz
<b>Load</b>	
Return loss	$\geq 40$ dB, DC to 4 GHz $\geq 35$ dB, 4 GHz to 6 GHz $\geq 25$ dB, 6 GHz to 12 GHz
DC-Resistance	$50 \Omega \pm 0.5 \Omega$
Power handling (at 25 °C, sea level)	$\leq 1.0$ W, derate by 0.01 W/K

<sup>1</sup> The nominal phase is defined by the Offset Delay, the Offset Loss and the Fringing Capacitances

<sup>2</sup> The nominal phase is defined by the Offset Delay, the Offset Loss and the Short Inductance

**Mechanical data**

Mating cycles	$\geq 100$
Maximum torque	5 Nm
Recommended torque	2 Nm
Gauge	2.75 mm to 2.90 mm

**General standard definitions**

For proper operation the vector network analyzer (VNA) needs a model describing the electrical behaviour of this calibration standard. The different models, units, and terms used will depend on the VNA type and they will have to be entered into the VNA. All values are based on typical geometry and plating.

**Thru**

Offset $Z_0$ / Impedance / $Z_0$	50 $\Omega$
Offset Delay	234.829 ps
Length (electrical) / Offset Length	70.40 mm
Offset Loss	2.50 G $\Omega$ /s
Loss	0.0510 dB/ $\sqrt{\text{GHz}}$
Line Loss	0.0007 dB/mm

**Open**

Offset $Z_0$ / Impedance / $Z_0$	50 $\Omega$
Offset Delay	80.823 ps
Length (electrical) / Offset Length	24.23 mm
Offset Loss	0.70 G $\Omega$ /s
Loss	0.0098 dB/ $\sqrt{\text{GHz}}$
Fringing Capacitances	$C_0 = -7.54000 \times 10^{-15}$ F / -7.54000 fF $C_1 = -5810.00 \times 10^{-27}$ F/Hz / -5.81000 fF /GHz $C_2 = 987.000 \times 10^{-36}$ F/Hz <sup>2</sup> / 0.98700 fF /GHz <sup>2</sup> $C_3 = -45.5000 \times 10^{-45}$ F/Hz <sup>3</sup> / -0.04550 fF /GHz <sup>3</sup>

**Short**

Offset $Z_o$ / Impedance / $Z_o$	50 $\Omega$		
Offset Delay	80.823 ps		
Length (electrical) / Offset Length	24.23 mm		
Offset Loss	0.70 G $\Omega$ /s		
Loss	0.0098 dB/ $\sqrt{\text{GHz}}$		
Short Inductance	$L_0 = -15.900 \times 10^{-12} \text{ H}$	/	-15.900 pH
	$L_1 = 9995.0 \times 10^{-24} \text{ H/Hz}$	/	9.9950 pH/GHz
	$L_2 = -2440.0 \times 10^{-33} \text{ H/Hz}^2$	/	-2.4400 pH/GHz <sup>2</sup>
	$L_3 = 71.000 \times 10^{-42} \text{ H/Hz}^3$	/	0.0710 pH/GHz <sup>3</sup>

**Load**

Offset $Z_o$ / Impedance / $Z_o$	50 $\Omega$
Offset Delay	0.0000 ps
Length (electrical) / Offset Length	0.000 mm
Offset Loss	0.00 G $\Omega$ /s
Loss	0.0000 dB/ $\sqrt{\text{GHz}}$

**Environmental data**

Operating temperature range <sup>3</sup>	+20 °C to +26 °C
Rated temperature range of use <sup>4</sup>	0 °C to +50 °C
Storage temperature range	-40 °C to +85 °C
RoHS	compliant

<sup>3</sup> Temperature range over which these specifications are valid.

<sup>4</sup> This range is underneath and above the operating temperature range, within the calibration kit is fully functional and could be used without damage

**Declaration of documentation**

Standard delivery for this kit includes Test Results. The documentation issued reports which quantities were tested individually, traceable to national / international standards. Model based standard definitions of the calibration standards are reported in Agilent / Keysight, Rohde & Schwarz and Anritsu compatible VNA format.

**Inspection interval**

Recommendation 12 months

**Packing**

Weight 398 g/pce

While the information has been carefully compiled to the best of our knowledge, nothing is intended as representation or warranty on our part and no statement herein shall be construed as recommendation to infringe existing patents. In the effort to improve our products, we reserve the right to make changes judged to be necessary.

For the installation of the electrotechnical equipment, particular electrotechnical expertise is required.



Draft	Date	Approved	Date	Rev.	Engineering change number	Name	Date
Marcel Panicke	07.06.16	Lars Ramtke	30.05.23	g00	23-0004	Marion Striegler	25.05.23

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