



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

**Interface**

According to IEC 61169-4, EN 122190, DIN 47223

**Contents and Documentation**

This kit is delivered with

- **Standard Definitions Card**  
Printed Standard Definitions that can be used on nearly all Vector Network Analyzers
- **Test Results Documentation**
- **Lanyard**
- **Hard Shell Case**
- **Protection Caps**

**Material and plating**

**Connector parts**

Center conductor  
Outer conductor  
Body  
Coupling nut  
Dielectric  
Substrate

**Material**

Brass  
Brass  
Brass  
Brass  
PP  
Al<sub>2</sub>O<sub>3</sub>

**Plating**

Gold, min. 1.27 µm, over nickel  
Flash white bronze over silver(e.g. Optargen®)  
powder coated  
Flash white bronze over silver(e.g. Optargen®)

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**Electrical data**

Frequency range DC to 4 GHz

**Open**

Return loss  $\leq 0.15$  dB, DC to 4 GHz  
Error from nominal phase<sup>1</sup>  $\leq 3.0^\circ$ , DC to 4 GHz

**Short**

Return loss  $\leq 0.15$  dB, DC to 4 GHz  
Error from nominal phase<sup>2</sup>  $\leq 3.0^\circ$ , DC to 4 GHz

**Load**

Return loss  $\geq 40$  dB, DC to 2.5 GHz  
 $\geq 38$  dB, 2.5 GHz to 4 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  $\geq 500$   
Maximum torque 30 Nm  
Recommended torque 2.26 Nm  
Gauge 1.47 mm to 1.77 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.

**Open**

Offset  $Z_o$  / Impedance /  $Z_o$  50  $\Omega$   
Offset Delay 56.372 ps  
Length (electrical) / Offset Length 16.90 mm  
Offset Loss 0.50 G $\Omega$ /s  
Loss 0.0049 dB/ $\sqrt{\text{GHz}}$   
Fringing Capacitances  $C_0 = 168.000 \times 10^{-15}$  F / 168.000 fF  
 $C_1 = 2600.00 \times 10^{-27}$  F/Hz / 2.60000 fF /GHz  
 $C_2 = 50.0000 \times 10^{-36}$  F/Hz<sup>2</sup> / 0.05000 fF /GHz<sup>2</sup>  
 $C_3 = 0.80000 \times 10^{-45}$  F/Hz<sup>3</sup> / 0.00080 fF /GHz<sup>3</sup>

**Short**

Offset $Z_o$ / Impedance / $Z_o$	50 $\Omega$		
Offset Delay	65.712 ps		
Length (electrical) / Offset Length	19.70 mm		
Offset Loss	0.50 G $\Omega$ /s		
Loss	0.0057 dB/ $\sqrt{\text{GHz}}$		
Short Inductance	$L_0 = 0.0000 \times 10^{-12}$ H	/	0.0000 pH
	$L_1 = 0.0000 \times 10^{-24}$ H/Hz	/	0.0000 pH/GHz
	$L_2 = 0.0000 \times 10^{-33}$ H/Hz <sup>2</sup>	/	0.0000 pH/GHz <sup>2</sup>
	$L_3 = 0.0000 \times 10^{-42}$ H/Hz <sup>3</sup>	/	0.0000 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>	0 °C to +50 °C
Storage temperature range	- 55 °C to +90 °C
RoHS	compliant

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

**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
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**Packing**

Standard	1 pce in bag
Weight	332 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.

Draft	Date	Approved	Date	Rev.	Engineering change number	Name	Date
Kerstin Herzog	10.07.06	Markus Müller	08.05.20	k00	20-1038	Marion Striegler	11.05.20

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