

# SWR Bridges ZRA, ZRB2, ZRC, VCA-Z1

## Measurement of reflection coefficient of RF circuits and components

- ZRA 40 kHz to 150 MHz
- ZRB2 5 MHz to 3 GHz
- ZRC 40 kHz to 4 GHz
- VCA-Z1 5 MHz to 850 MHz



SWR Bridge ZRB2 with calibration standards (Photo 40527)

## Brief description

SWR bridges are used for measuring the reflection coefficient of RF circuits and components. The output signal from the signal generator, eg the tracking generator of Spectrum Analyzer

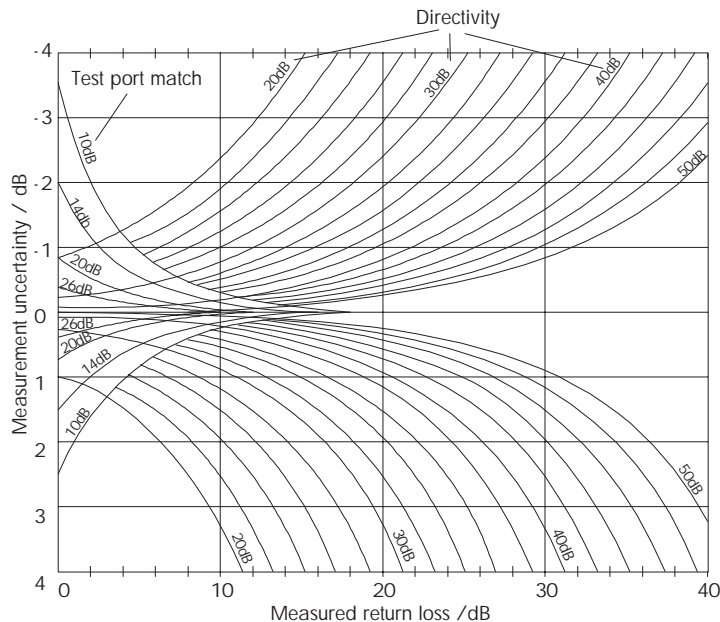
FSE or Scalar Network Analyzer ZWOB is applied to the device under test via the SWR bridge. Depending on the reflection coefficient of the device under test, part of the signal is reflected to the bridge and then routed to the receiver, eg to the test input of

FSE or measuring head of ZWOB, where it is detected and displayed.

## Measurement accuracy

The accuracy of the bridge is limited by its directivity as well as by the SWR of the bridge at the test port. The measurement of small reflection coefficients is affected by the finite directivity. Reflection coefficients that are smaller than the directivity cannot be measured directly. In measurements of large reflection coefficients, the accuracy depends primarily on the matching at the test port.

The diagram shown allows a quantitative evaluation of the measurement error.



Maximum measurement error as a function of directivity and test port matching of the bridge

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## Specifications in brief, ordering information

<b>Designation</b>	<b>ZRA</b>	<b>ZRB2</b>	<b>ZRB2 (precision)</b>	<b>ZRB2</b>
Impedance	50 Ω	50 Ω	50 Ω	75 Ω
Frequency range	40 kHz to 150 MHz	5 MHz to 2.5 GHz	5 MHz to 3 GHz	5 MHz to 2 GHz
Directivity	≥45 dB (up to 1 MHz) ≥40 dB (up to 150 MHz)	≥40 dB	≥46 dB (up to 2 GHz) ≥40 dB (up to 2.5 GHz) ≥34 dB (up to 3 GHz)	≥40 dB
Test port matching	≥20 dB (up to 200 kHz) ≥30 dB (0.2 to 50 MHz) ≥20 dB (up to 150 MHz)	≥23 dB	≥26 dB (up to 2.5 GHz) ≥22dB (up to 3 GHz)	≥20 dB (up to 1.5 GHz)
Insertion loss <sup>1)</sup>	7.5 dB + 6 dB	7 dB + 6 dB	7 dB + 6 dB	8 dB + 6 dB
Power-handling capacity	0.5 W	0.5 W	0.5 W	0.5 W
Test port connector	N female	N female N male	N female N male	N female N male
Accessories supplied	---	---	---	---
Rated temperature	0 to +50°C	0 to +50°C	0 to +50°C	0 to +50°C
Storage temperature	-40 to +70°C	-40 to +70°C	-40 to +70°C	-40 to +70°C
Connectors <sup>2)</sup>	N female	N female	N female	N female
Weight	190 g	240 g	240 g	250 g
Dimensions <sup>3)</sup>	52 x 52 x 41	72 x 57 x 20	72 x 57 x 20	72 x 57 x 22
<b>Order numbers</b>	1052.3607.52	373.9017.52 373.9017.55	373.9017.53 373.9017.56	802.1018.73 802.1018.76
<b>Designation</b>	<b>ZRC</b>	<b>ZRC</b>	<b>VCA-Z1</b>	
Impedance	50 Ω	75 Ω	75 Ω	
Frequency range	40 kHz to 4 GHz	40 kHz to 2.5 GHz	5 MHz to 2.5 GHz	
Directivity	≥40 dB (up to 3 GHz)	≥40 dB	≥40 dB (up to 300 MHz) ≥34 dB (up to 850 MHz) ≥20 dB (f/40 kHz) (up to 400 kHz)	
Test port matching	≥12 dB + 11 dB log (f/40 kHz) (up to 400 kHz) ≥23 dB (up to 3 GHz) ≥20 dB (3 GHz to 4 GHz)	≥8 dB + 12 dB log  ≥20 dB (0.4 GHz to 2.5 GHz)		
Insertion loss <sup>1)</sup>	7 dB + 6 dB	7 dB + 6 dB	8 dB + 5 dB	
Power-handling capacity	0.5 W	0.5 W	0.5 W	
Test port connector	N female N male	N female N male	BNC male	
Accessories supplied	short/open termination/connector adapter	short/open termination/connector adapter	-	
Rated temperature	0 to +50°C	0 to +50°C	0 to +50°C	
Storage temperature	-40 to +70°C	-40 to +70°C	-40 to +70°C	
Connectors <sup>2)</sup>	N female	N female	BNC female	
Weight	340 g	340 g	250 g	
Dimensions <sup>3)</sup>	72 x 77 x 24	72 x 77 x 24	72 x 57 x 22	
<b>Order numbers</b>	1039.9492.52 1039.9492.55	1039.9492.72 1039.9492.75	1052.5900.02	

<sup>1)</sup> Input attenuation ----> test port + test port ----> output; <sup>2)</sup> input, output; <sup>3)</sup> in mm without connectors