

Anritsu Advancing beyond

W1 Connector™ W1 Adapter W1 Termination

Complete coaxial connector system with mode-free performance to 110 GHz
DC to 110 GHz



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Introduction

The W1 Connector™ family is a complete coaxial connector system that contains male and female hermetic and non-hermetic connectors, male and female broadband terminations and in-series adapters. Based on the 1.00 mm coaxial connector front side interface as specified by IEEE Std 287, the W1 Connector is well suited for high frequency applications ranging from components to systems and instrumentation.

Features

- Excellent RF Performance to 110 GHz
- 50 Ω Impedance
- Low VSWR
- Standard 1 mm Interface
- Accurate Testing Capability
- Broadband Load for Instrument and Device Under Test

Definitions

	All specifications and characteristics apply under the following conditions, unless otherwise stated:
Temperature Range	Over the 23 °C ± 5 °C temperature range.
Typical Performance	Typical specifications are not tested and are not warranted. They are generally representative of characteristic performance.
Uncertainty	A coverage factor of x1 is applied to the measurement uncertainties to facilitate comparison with other industry handheld analyzers.
Calibration Cycle	Calibration is within the recommended 12 month period (residual specifications also require calibration kit calibration cycle adherence.)
	All specifications subject to change without notice. For the most current data sheet, please visit the Anritsu web site: www.anritsu.com

W1 Connectors

W1-102F and W1-102M Connector Launchers

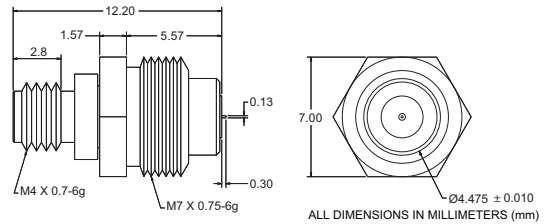
The W1 Connector launcher family includes both male and female W1 Connector configurations. The W1 Connector™ has an air dielectric interface similar to the K Connector™ and V Connector™. The center conductor is supported by Anritsu's proprietary low-loss high temperature support bead on one end and a glass bead on the other end. The center conductor of the glass bead extends out of the connector back side and allows the user to make a direct pin overlap connection to the microwave circuit. The threads on the back side of the W1 Connector allow the user to install the W1 Connector by screwing it into the housing wall. Since Anritsu's proprietary low loss high temperature plastic bead is used, the user can solder the connector into the housing to achieve a hermetic connection. For details, please refer to the W1 Connector installation procedures. Integrating the glass bead into the connector allows Anritsu to control the critical matching steps of the interface between the bead pin and the center conductor and bead pin to a microstrip or coplanar waveguide (CPW).

W1-105F and W1-105M Connector Launchers

The W1 Connector launcher family includes both male and female screw-in type connectors. The W1 Connector has an air dielectric front-side interface similar to the K Connector and V Connector. The center conductor is supported by Anritsu's proprietary low-loss high temperature support bead on one end, and a Teflon bead on the other end to provide exceptional concentricity and rigidity to the pin on the back side. The use of a high temperature support bead allows the connector to be subjected to extended temperature ranges up to 200 °C for a short time period. A connector was subjected to 200 °C for forty-eight hours and results showed no degradation in performance. The center conductor extends outside of the connector and allows the user to make a direct pin overlap connection to the microwave circuit.



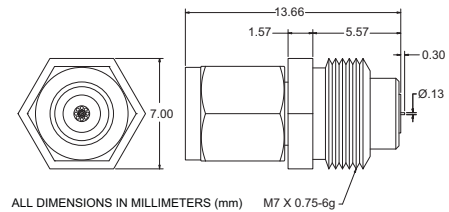
W1-102F or W1-105F, W1 Female Sparkplug Connector



W1-102F or W1-105F, W1 Female Sparkplug Connector Outline



W1-102M or W1-105M, W1 Male Sparkplug Connector



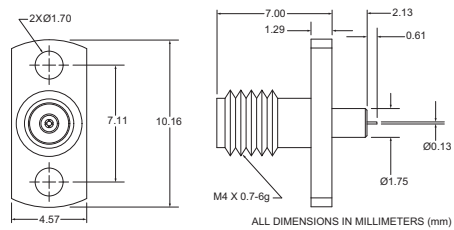
W1-102M or W1-105M, W1 Male Sparkplug Connector Outline

W1 Flange Mount Connector

W1 two-hole flange mount female connectors are also available. The center conductor of the connector is supported by a PPO® bead on the front-end and by a Teflon bead on the back end. The center conductor extends outside of the connector, allowing for a direct pin overlap connection to the microwave circuit.



W1-103F, W1 Female Flange Connector



W1-103F, W1 Female Flange Connector Outline

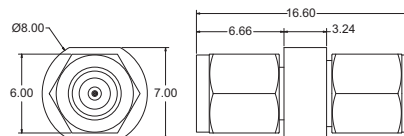
W1 In-Series Adapters

The 33 series precision W1 adapters enable accurate measurements with the Anritsu W1 Connector (1.0 mm connector) at a broad frequency range of up to 110 GHz. The 33 series W1-W1 adapters are available in three connector configurations: Male-Male, Male-Female, and Female-Female. W1 adapters have an air dielectric interface and a center conductor that is supported by a low loss PPO® plastic bead. When used as connector savers with test ports in test systems, these adapters protect the test port by reducing the number of connections.

33WW50, Precision W1 Male to W1 Male Adapter



33WW50, Precision W1 Male to W1 Male Adapter



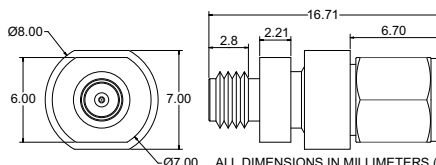
ALL DIMENSIONS IN MILLIMETERS (mm)

33WW50, Precision W1 Male to W1 Male Adapter Outline

33WWF50, Precision W1 Male to W1 Female Adapter



33WWF50, Precision W1 Male to W1 Female Adapter



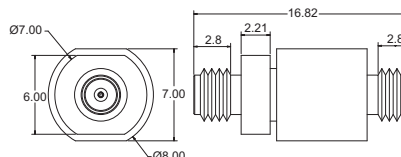
ALL DIMENSIONS IN MILLIMETERS (mm)

33WWF50, Precision W1 Male to W1 Female Adapter Outline

33WFW50, Precision W1 Female to W1 Female Adapter



33WFW50, Precision W1 Female to W1 Female Adapter



ALL DIMENSIONS IN MILLIMETERS (mm)

33WFW50, Precision W1 Female to W1 Female Adapter Outline

W1 Precision Terminations

W1 precision metrology-grade terminations are used in measurement systems that need to achieve the smallest possible reflections. Designed in both male and female configurations, these terminations can be used as a precision load for test instruments or devices under test from DC to 110 GHz.



28W50, W1 Male Termination



28WF50, W1 Female Termination

W1 Cable Connector, W1 Waveguide Adapters, and W1-V Adapters

Both male and female cable connectors are available. W1 cable connectors use the center conductor of a UT-42 cable and are ideal for connecting two modules together or connecting the device under test to the test port head of a test instrument. Precision W1 waveguide adapters transform standard WR10 and WR8 waveguide interfaces to precision coaxial W1 Connector interfaces, thus enabling convenient millimeter wave coaxial measurements. W1-V adapters provide an interface between the W1 Connector and the V Connector and allows connections between two different connector types. Please contact Anritsu for more details on these products.

Tools

The following tools for making proper W1 connections are available.



01-504, W1-6 mm Torque Wrench



01-505, W1-6 mm or 7 mm Open end Wrench



01-506, W1-7 mm Torque Wrench

W1 Connector Specifications

W1 Connectors

Impedance	50 Ω
Frequency	DC to 110 GHz
Insertion Loss	0.70 dB typical
Return Loss	-16 dB to 110 GHz typical
Insulation Resistance	>1200 MΩ
Center Conductor Contact Resistance	6 mΩ typical
Maximum Power	CW 6 W
Backside Pin Protrusion	0.32 mm typical for W1-102F, W1-102M, W1-105F, W1-105M, 0.61 mm typical for W1-103F
Torque Coupling Nut	4 in-lb maximum
Torque	W1 Connector installation 5 in-lb maximum
Hermeticity (W1-102F, W1-102M)	1 x 10 ⁻⁸ std cc He/sec at atmosphere differential

W1 Adapter Specifications Electrical specifications given below are performance standards or limits against which the adapters are tested.

33WW50

Connectors	W1(m) to W1(m)
Frequency Range	DC to 110 GHz
Return Loss	DC to 40 GHz 22 dB > 40 to 65 GHz 18 dB > 65 to 110 GHz 16 dB
Insertion Loss	0.5 dB max.

33WWF50

Connectors	W1(m) to W1(f)
Frequency Range	DC to 110 GHz
Return Loss	DC to 40 GHz 22 dB > 40 to 65 GHz 18 dB > 65 to 110 GHz 16 dB
Insertion Loss	0.5 dB max.

33WFW50

Connectors	W1(f) to W1(f)
Frequency Range	DC to 110 GHz
Return Loss	DC to 40 GHz 22 dB > 40 to 65 GHz 18 dB > 65 to 110 GHz 16 dB
Insertion Loss	0.5 dB max.

W1 Precision Termination Specifications

28W50

Frequency Range	DC to 110 GHz
Test Port Connector	W1(m)
Input Impedance	50 Ω
Return Loss	DC to 20 GHz 30 dB > 20 to 65 GHz 27 dB > 65 to 90 GHz 17 dB > 90 to 110 GHz 12 dB
Dimensions (Length x Diameter)	2.5 x 0.8 cm

28WF50

Frequency Range	DC to 110 GHz
Test Port Connector	W1(f)
Input Impedance	50 Ω
Return Loss	DC to 20 GHz 30 dB > 20 to 65 GHz 27 dB > 65 to 90 GHz 16 dB > 90 to 110 GHz 12 dB
Dimensions (Length x Diameter)	2.2 x 0.8 cm

Materials

W1-102F, W1-102M

Outer Conductor	Beryllium-copper, gold plated over nickel per Mil-G-45204C
Coupling Nut for W1-102M	Passivated stainless steel
Glass Bead Center Pin	Kovar, gold plated over nickel per Mil-G-45204C
Glass Bead Outer Conductor	Kovar, gold plated over nickel per Mil-G-45204C
Glass Bead Dielectric	Corning 7070 glass
Plastic Support Bead Dielectric	Proprietary

W1-105F, W1-105M

Outer Conductor	Beryllium-copper, gold plated over nickel per Mil-G-45204C
Center Conductor	Beryllium-copper, gold plated over nickel per Mil-G-45204C
Coupling Nut for W1-105M	Passivated stainless steel
Plastic Support Bead Dielectric	Proprietary

W1-103F

Outer Conductor	Passivated stainless steel
Center Conductor	Beryllium-copper, gold plated over nickel per Mil-G-45204C
Coupling Nut for W1-103F	Passivated stainless steel
Plastic Support Bead Dielectric	Polyphenylene Oxide Noryl

33WW50, 33WWF50, 33WFWF50

Outer Conductor:	Beryllium-copper, gold plated over nickel per Mil-G-45204C
Coupling Nut	Passivated stainless steel
Center Conductor	Beryllium-copper, gold plated over nickel per Mil-G-45204C
Plastic Support Bead Dielectric	Proprietary

Environmental Information (Tests per MIL-STD-202G)

Operating Temperature Range	0 °C to +85 °C (W1-102F, W1-102M, W1-105F, W1-105M, W1-103F, 33WW50, 33WWF50, 33WFWF50)
Storage Temperature Range	-54 °C to +125 °C (W1-102F, W1-102M, W1-105F, W1-105M) -54 °C to +85 °C (W1-103F, 33WW50, 33WWF50, 33WFWF50)
Temperature Shock	25 °C to -40 °C and 25 °C to +125 °C, method 107G, condition B
Humidity	95 % at 40 °C, 96 hours, Test 103B, condition B, non-operating only
Shock	100 g _n peak sawtooth, method 213, test condition 1
Vibration	Sine wave: 10 Hz to 2000 Hz, 0.06" DA, method 204, test condition D Random: 50 Hz to 2000 Hz, 11.6 grams power spectral density 0.1 grams ² /Hz, method 214, test condition I, letter D
Salt Spray	5 % concentration for 48 hours, method 101D, condition B
Dielectric Withstanding Voltage	500 VAC RMS, 60 seconds, method 301

Regulatory Compliance

W1-102F, W1-102M, W1-105F, W1-105M, W1-103F, 33WW50, 33WWF50, 33WFWF50	RoHS Directive: 2011/65/EU + Amendment 2015/863
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Training at Anritsu

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