

# **Agilent Technologies 11612V Option K68 and K69**

## **User's Guide**



**Agilent Technologies**

**Manufacturing Part Number: 11612-90070**

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## Warranty Statement

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## Safety Notes

The following safety notes are used throughout this document. Familiarize yourself with each of these notes and its meaning before performing any of the procedures in this document.

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<b>WARNING</b>	<b>Warning denotes a hazard. It calls attention to a procedure which, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a warning note until the indicated conditions are fully understood and met.</b>
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<b>CAUTION</b>	Caution denotes a hazard. It calls attention to a procedure that, if not correctly performed or adhered to, could result in damage to or destruction of the instrument. Do not proceed beyond a caution sign until the indicated conditions are fully understood and met.
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## Definitions

- *Specifications* describe the performance of parameters covered by the product warranty (temperature –0 to 55 °C, unless otherwise noted.)
- *Typical* describes additional product performance information that is not covered by the product warranty. It is performance beyond specification that 80% of the units exhibit with a 95% confidence level over the temperature range 20 to 30 °C. Typical performance does not include measurement uncertainty.
- *Nominal* values indicate expected performance or describe product performance that is useful in the application of the product, but is not covered by the product warranty.
- *Characteristic Performance* describes performance parameter that the product is expected to meet before it leaves the factory, but is not verified in the field and is not covered by the product warranty. A characteristic includes the same guard bands as a specification.



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# Contents

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# **11612V K68/69**

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## Description

The Agilent 11612V bias networks provide the capability to supply DC bias directly to a device under test along with RF signals, without the need to use patch or adapter connectors. This enables convenient and accurate measurements of current, DC voltages, and S-parameters. Each bias network provides a force connection to allow input of a current or voltage signal, and a sense connection to allow monitoring of voltage or current, as well as a connection for the application of an active ground. RF Input connectors accept signals from an RF Network Analyzer, and RF+DC bias signals are routed together from the RF/DC Output to a test fixture or wafer probes. The force, sense, and ground are triaxial connectors. The RF connectors are 1.85 mm (f).

The bias networks are intended to be used with an Agilent Network Analyzer System with the force and sense cables from the SMUs of the DC Source/Monitor (DC subsystem) connected to the force and sense connectors on the bias networks. The ground cable from the GDNU is connected to the ground connector on one of the bias networks (usually port 2). The ground connector on the other bias network is left open. The RF cables from the network analyzer test set ports are connected to the RF IN ports of the bias networks. The RF/DC OUT ports of the bias networks are connected by conformable cables to the Probe Station or Test fixture. The Agilent 11612V Option K68 is intended for use at Port 1 of the network analyzer, and Agilent 11612V Option K68 at Port 2.

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## Verifying the Shipment

After the test set has been unpacked, keep the original packaging materials so they can be used if you need to transport the instrument. Inspect the test set and all accessories for any signs of damage that may have occurred during shipment. If your test set or any accessories appear to be damaged or missing refer to [“Contacting Agilent” on page 9](#).



## Specifications

**WARNING** If any of the maximum ratings are exceeded, damage may occur to the bias network assembly.

Performance parameters (subject to change) are typical over a temperature range of +20 to +30 °C.

**Table 1 Performance Parameters**

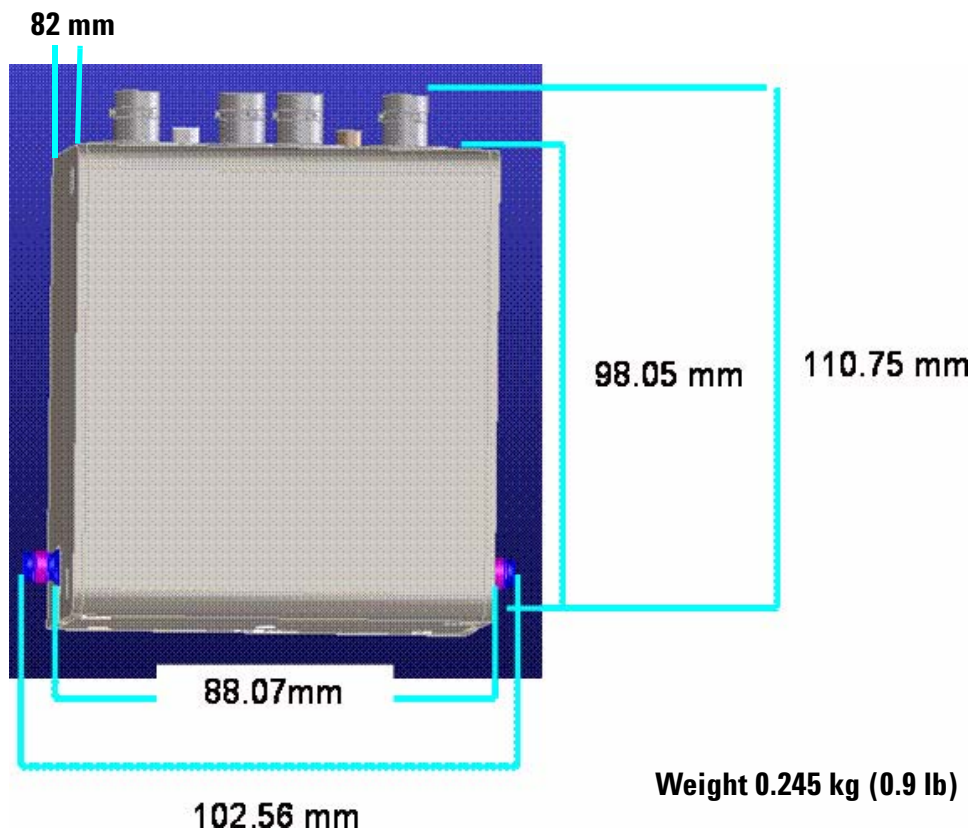
Description	Typical (dB)
<b>S11 Port 1 (RF Input) and S22 Port 2 (RF &amp; DC Output) Return Loss</b>	
10 MHz to 45 MHz	> 5
45 MHz to 20 GHz	> 9
20 GHz to 40 GHz	> 8.5
40 GHz to 67 GHz	> 8
<b>S21 Insertion Loss</b>	
10 MHz to 45 MHz	< 2
45 MHz to 10 GHz	< 3
10 GHz to 60 GHz	< 5
60 GHz to 67 GHz	< 5.5
<b>RF Max Input Level to RF Input Port Damage Level</b>	
11612VK68/69	30 dBm (1 Watt)
<b>Maximum DC Bias</b>	
11612VK68/69	40 Vdc, 500 ma

## Environmental Requirements

**Table 2 Operating Environment**

Temperature	
Operation	0 °C to 55 °C (32 °F to 131 °F)
Storage	-40 °C to +70 °C (-40 °F to +158 °F)

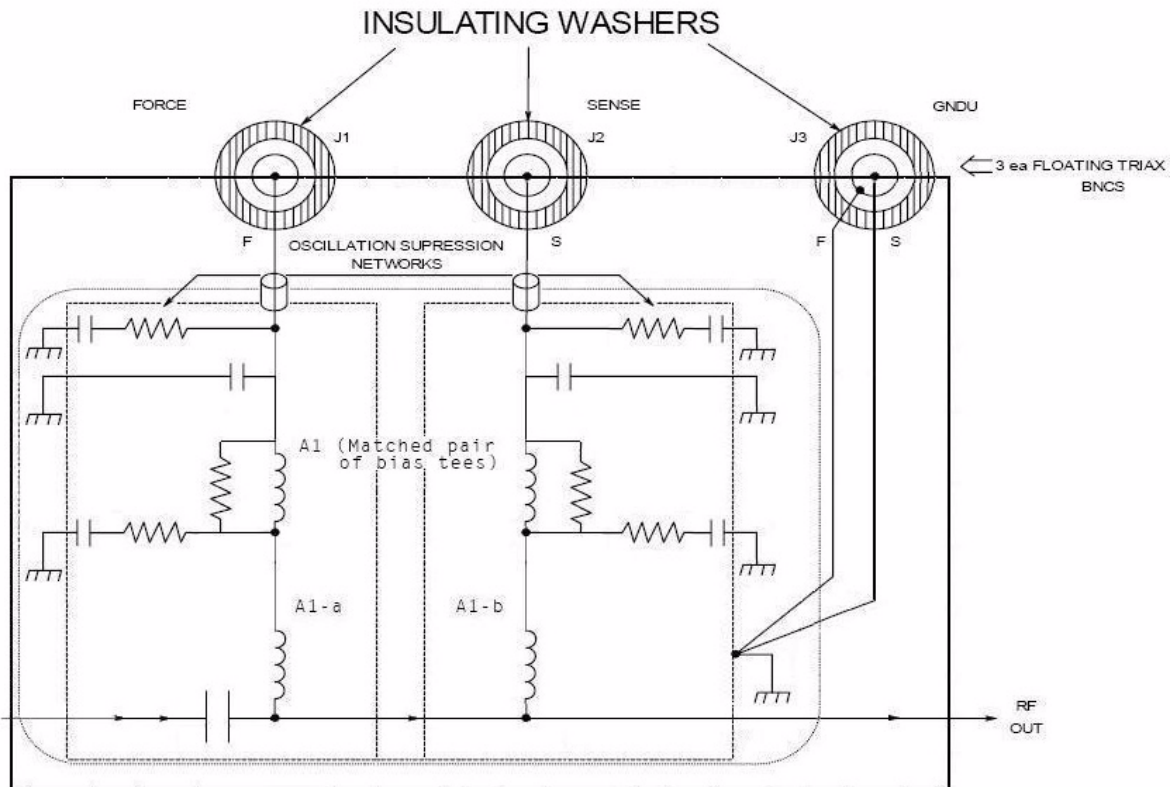
**Figure 1 Dimensions**



## Bias Network

Internally, each bias network includes two bias-tees, one for force and one for sense. The force bias-tee includes a capacitor that functions as a DC block and highpass filter. The sense bias-tee provides a through path for DC voltage. Oscillation suppression networks are located on each DC path to help prevent bias oscillation of the DUT. Figure 2 is a schematic diagram of the bias network.

**Figure 2** Diagram of the 11612V Option K68 and K69 Bias Network



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## Safety and Regulatory Information

### Introduction

Review this product and related documentation to familiarize yourself with safety markings and instructions before you operate the instrument. The documentation contains information and warnings that must be followed by the user to ensure safe operation and to maintain the product in a safe condition.

### Before Applying Power

Verify that the premises electrical supply is within the range of the instrument. The instrument has an autoranging power supply.

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**WARNING** To prevent electrical shock, disconnect the **Agilent Technologies 11612V Option K68 and K69** from mains electrical supply before cleaning. Use a dry cloth or one slightly dampened with water to clean the external case parts. Do not attempt to clean internally.

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### Connector Care and Cleaning

If alcohol is used to clean the connectors, the power cord to the instrument must be removed. All cleaning should take place in a well ventilated area. Allow adequate time for the fumes to disperse and moist alcohol to evaporate prior to energizing the instrument.

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**WARNING** Keep isopropyl alcohol away from heat, sparks, and flame. Store in a tightly closed container. It is extremely flammable. In case of fire, use alcohol foam, dry chemical, or carbon dioxide; water may be ineffective.

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### Declaration of Conformity

A declaration of conformity is on file for the PNA models, and a copy is available upon request, or a copy is available on the Agilent Technologies web site at <http://regulations.corporate.agilent.com/DoC/search.htm>

### Shipping Instructions

You must always call the Agilent Technologies Instrument Support Center to initiate service before retuning your instrument to a service office. See “[Contacting Agilent](#)” on [page 9](#). Always transport or ship the instrument using the original packaging if possible. If not, comparable packaging must be used. Attach a complete description of the failure symptoms.

## General Safety Considerations

### Cautions

Cautions applicable to this instrument.

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**CAUTION** This product is designed for use in Installation Category II and Pollution Degree 2 per IEC 61010 Second Edition and 664 respectively.

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### Servicing

Warnings applicable to this instrument.

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**WARNING** These servicing instructions are for use by qualified personnel only.

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**WARNING** No operator serviceable parts inside. Refer servicing to qualified personnel.

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**WARNING** If this product is not used as specified, the protection provided by the equipment could be impaired. This product must be used in a normal condition (in which all means for protection are intact) only.

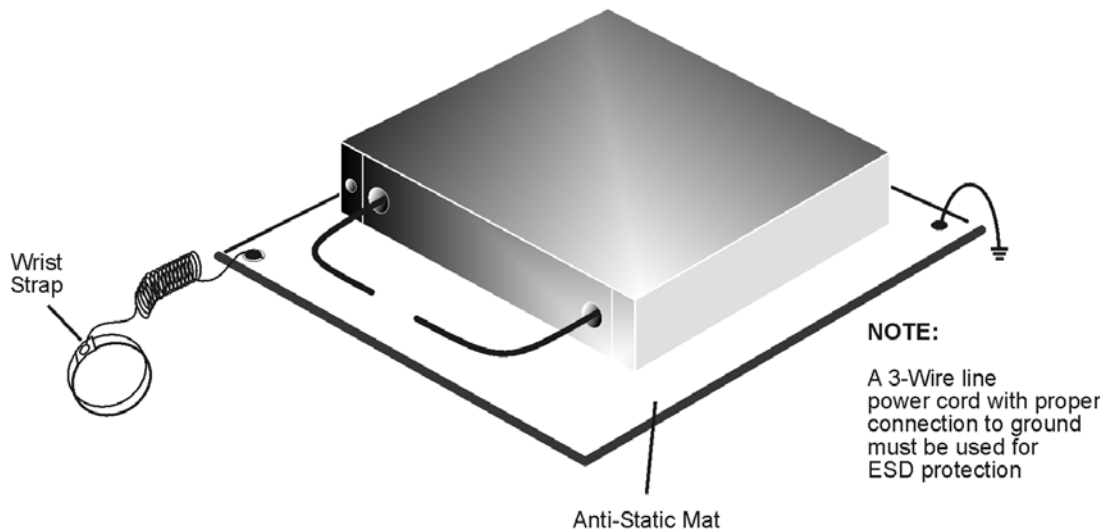
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## Electrostatic Discharge Protection

Protection against electrostatic discharge (ESD) is essential while removing assemblies from or connecting cables to the network analyzer. Static electricity can build up on your body and can easily damage sensitive internal circuit elements when discharged. Static discharges too small to be felt can cause permanent damage. To prevent damage to the instrument:

- *always* have a grounded, conductive table mat (9300-0797) in front of your test equipment.
- *always* wear a grounded wrist strap (9300-1367) with grounding cord (9300-0980), connected to a grounded conductive table mat, having a 1 M $\Omega$  resistor in series with it, when handling components and assemblies or when making connections.
- *always* wear a heel strap (9300-1126) when working in an area with a conductive floor. If you are uncertain about the conductivity of your floor, wear a heel strap.
- *always* ground yourself before you clean, inspect, or make a connection to a static-sensitive device or test port. You can, for example, grasp the grounded outer shell of the test port or cable connector briefly.
- *always* ground the center conductor of a test cable before making a connection to the analyzer test port or other static-sensitive device. This can be done as follows:
  1. Connect a short (from your calibration kit) to one end of the cable to short the center conductor to the outer conductor.
  2. While wearing a grounded wrist strap, grasp the outer shell of the cable connector.
  3. Connect the other end of the cable to the test port and remove the short from the cable.

**Figure 3 ESD Protection Setup**



ku310b

## Regulatory Information

This section contains information that is required by various government regulatory agencies.

### Instrument Markings



The instruction documentation symbol. The product is marked with this symbol when it is necessary for the user to refer to the instructions in the documentation.



This symbol indicates separate collection for electrical and electronic equipment, mandated under EU law as of August 13, 2005. All electric and electronic equipment are required to be separated from normal waste for disposal (Reference WEEE Directive, 2002/96/EC).



Direct Current.



China RoHS regulations include requirements related to packaging, and require compliance to China standard GB18455-2001.



This symbol indicates compliance with the China RoHS regulations for paper/fiberboard packaging.

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## Contacting Agilent

Assistance with test and measurement needs, and information on finding a local Agilent office are available on the Internet at:

*<http://www.agilent.com/find/assist>*

You can also purchase accessories or documentation items on the Internet at:

*<http://www.agilent.com/find>*

If you do not have access to the Internet, contact your field engineer.

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### NOTE

In any correspondence or telephone conversation, refer to the product by its model number and full serial number. With this information, the Agilent representative can determine whether your unit is still within its warranty period

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