

Keysight 11612A Bias Network

Includes Option 001
Serial Numbers: This manual applies directly to Keysight 11612A Bias Networks with serial number prefix 2301A and higher.

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WARNING

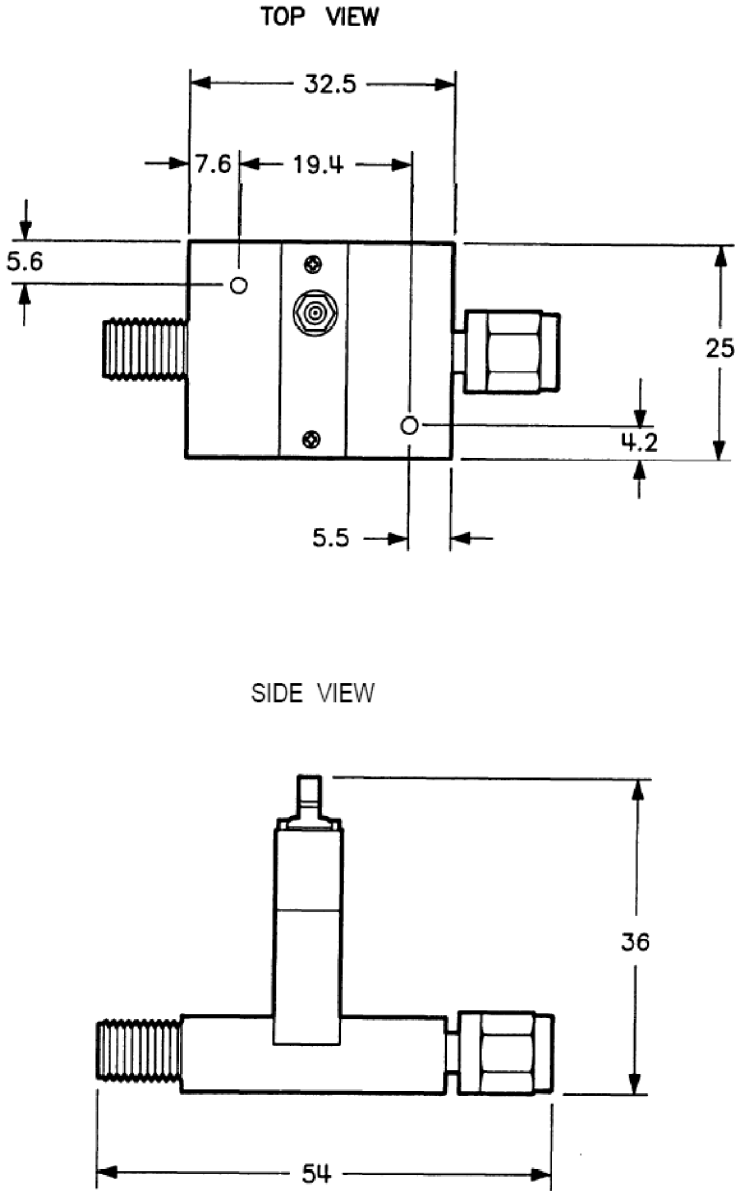
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11612A Bias Network

NOTE

In the following graphic, all dimensions are in millimeters.

Figure 1 11612A Dimensions



General Information

The 11612A bias network provides a means of supplying dc bias to the center conductor of a coaxial line of a component or device while blocking the dc bias to the RF input port.

This manual contains information required to install, operate, and test the 11612A bias network.

Option 001

In addition to the capabilities of the standard bias network, the 11612A option 001 high current bias network can achieve higher bias levels above 0.4 GHz. These bias levels are useful in applications such as transistor testing.

Bias Networks Covered by Manual

Each bias network has a five digit serial number. The contents of this manual apply to bias networks having a serial number equal to or higher than the serial number listed on the title page of this manual.

Incoming Inspection

If the bias network or its case appear to be damaged, set aside the device and all packaging materials and contact Keysight. Refer to **“Contacting Keysight” on page 11**.

Preparation For Use

Interconnections

The 11612A bias network is connected in line with the device to be biased. The bias is applied through the SMB snap-on connector. Refer to **Figure 3 on page 6**. A BNC to SMB adapter cable (part number 5062-4550) is also included in the 11612A bias network assembly.

Operating Environment

Operate the bias network within the following limits:

Temperature	0 to +55 °C
Humidity	up to 95%
Altitude	up to 7,625 meters (25,000 feet), mean sea level

Specifications

Specifications describe the device's warranted performance.

11612A Specifications

Frequency Range	0.045 to 26.5 GHz
Return Loss (both ports) – Minimum	--
0.045 to 8 GHz	20 dB
8 to 18 GHz	18 dB
18 to 26.5 GHz	14 dB
Insertion Loss – Maximum	--
0.045 to 12.4 GHz	0.8 dB
12.4 to 26.5 GHz	1.3 dB
Maximum Bias Current	500 mA
Maximum Bias Voltage	$\pm 40 V_{dc}$

11612A Option 001 Specifications

Frequency Range ^a	0.4 to 26.5 GHz
Return Loss (both ports) – Minimum	--
0.045 to 1 GHz	14 dB
1 to 18 GHz	18 dB
18 to 26.5 GHz	14 dB
Insertion Loss – Maximum	--
0.4 to 12.4 GHz	1.0 dB
12.4 to 26.5 GHz	1.5 dB
Maximum Bias Current	2 amps dc; up to 32 amps in pulsed mode. Refer to Figure 5 on page 10 and Figure 5-1 on page 11 .
Maximum Bias Voltage	$\pm 100 V_{dc}$
Duty Cycle – Maximum	Refer to the duty cycle curves in Figure 5 on page 10 and Figure 5-1 on page 11 .
Pulse Width – Maximum	Refer to the duty cycle curves in Figure 5 on page 10 and Figure 5-1 on page 11 .

a. Operation below 0.4 GHz is possible but not specified.

CAUTION

It is critical that you properly set the power levels before connecting the bias network to the power supply. Failure to do so may result in irreparable damage to the bias coil. Bias coils damaged by overheating are not covered under warranty.

Supplemental Characteristics

Supplemental characteristics are non-warranted performance parameters. They are included to provide useful operating information.

11612A Supplemental Characteristics

Pin Depth ^a	0.000 to 0.127 mm (0.0000 to 0.0050 inches)
Maximum RF Input Power	+24 dBm
Impedance	50 ohms, nominal
dc Resistance from Bias Port to Output Port (typical)	--
At 23 °C	0.5 ohms
At 23 °C, full rated current	0.7 ohms
RF Connectors	--
RF Input	3.5 mm ^b female
RF Output	3.5 mm male
Bias Connector (non-hermetic)	SMB male
Net Weight	0.075 kg (0.165 lb)
Dimensions (nominal, not including connectors)	30 mm x 33 mm x 25 mm (1.2 in x 1.3 in x 1.0 in)

a. The electrical performance of the bias network is independent of its pin depth within the range stated above.

b. 3.5 mm connectors mate with SMA connectors.

11612A Option 001 Supplemental Characteristics

Pin Depth ^a	0.000 to 0.127 mm (0.0000 to 0.0050 inches)
Maximum RF Input Power	+24 dBm
Impedance	50 ohms, nominal
dc Resistance from Bias Port to Output Port (typical)	--
At 23 °C	0.1 ohms
At 23 °C, full rated current	0.12 ohms
RF Connectors	--
RF Input	3.5 mm ^b female
RF Output	3.5 mm male
Bias Connector (non-hermetic)	SMB male
Net Weight	0.075 kg (0.165 lb)
Dimensions (nominal, not including connectors)	30 mm x 33 mm x 25 mm (1.2 in x 1.3 in x 1.0 in)

a. The electrical performance of the bias network is independent of its pin depth within the range stated above.

b. 3.5 mm connectors mate with SMA connectors.

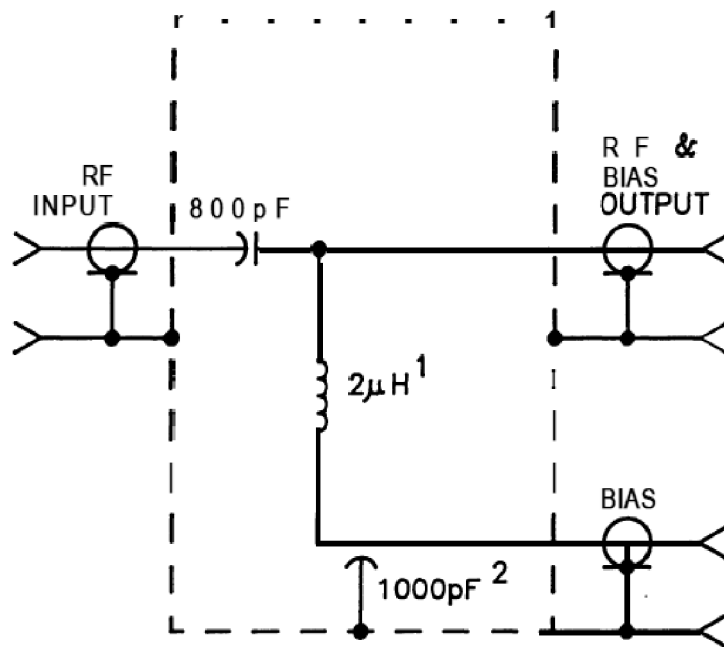
CAUTION

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Operation

Figure 2 shows a schematic diagram of the bias network. The circuit is a “tee” in which the capacitor in the left arm acts as a dc block/high pass filter. The vertical arm, with its series inductance and shunt capacitance, acts as a low pass filter.

Figure 2 Bias Network Schematic Diagram

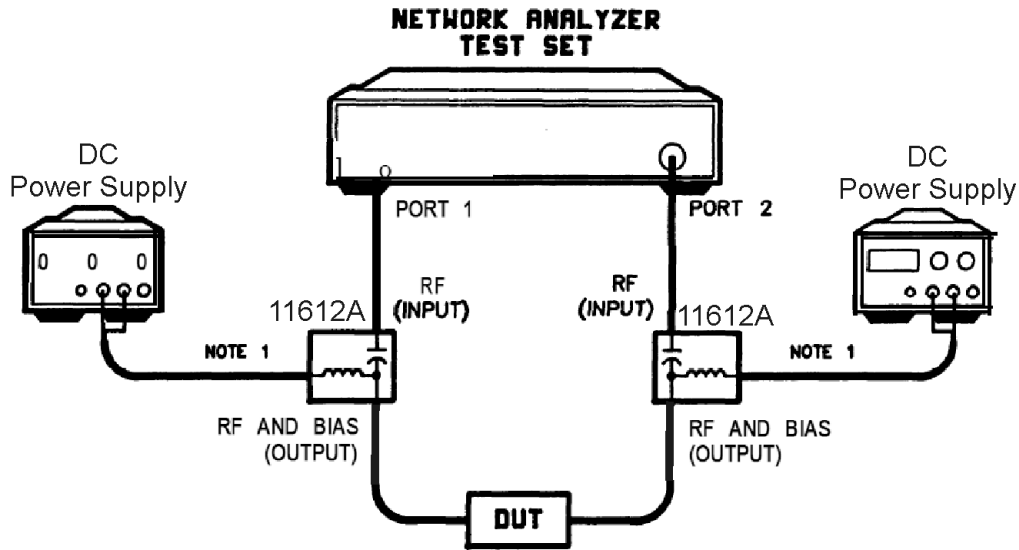


1. Option 001 is approximately 100 nH.
2. Option 001 is approximately 100 pF.

11612_001_001

Figure 3 shows the 11612A bias network connected in a typical measurement setup. Although other applications are possible, the general method of setup and operation is the same.

Figure 3 Typical Measurement Setup



11612_001_003

NOTE

Transistors and negative resistance devices may oscillate if the bias port of the 11612A bias network is not properly terminated. Keysight recommends that bias from the bias supply be routed through the 11635A bias decoupling network before being applied to the bias port of the 11612A. An adapter cable (part number 5062-4550) is included to connect the bias network and the bias decoupling network.

Instructions for Pulsed Operation (Option 001)

The following procedure sets the correct power levels for the bias network when you're using it for pulsed measurements. This procedure applies only to the 11612A option 001 high current bias network and should not be used with the standard 11612A.

CAUTION

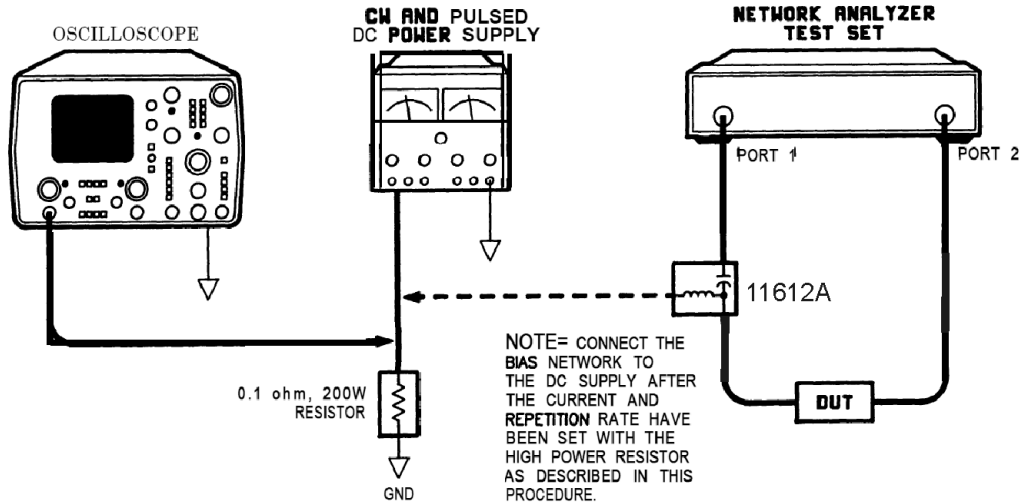
It is critical that you properly set the power levels before connecting the bias network to the power supply. Failure to do so may result in irreparable damage to the bias coil. Bias coils damaged by overheating are not covered under warranty.

Setting the Bias Current and Repetition Rate

The following procedure uses a 0.1 ohm wire wound high power resistor to simulate the bias network so the correct bias level and repetition rate can be set before the bias network is connected.

1. Connect the equipment as shown in [Figure 4 on page 7](#); do not connect the bias network yet.

Figure 4 11612A Option 001 Bias Level Setup



11612_001_004

2. Measure the voltage across the resistor with an oscilloscope.
3. Set the current and repetition rate to the appropriate values (taken from the curve in [Figure 5-1 on page 11](#).)
4. When the bias current and repetition rate are within the allowed limits, remove the resistor and insert the bias network.

Storage and Shipment

Store and ship the bias network within the following limits:

Temperature	-40 to +75 °C
Humidity	up to 95%
Altitude	up to 7,625 meters (25,000 feet), mean sea level

Returning a Device to Keysight

If your device requires service, contact Keysight Technologies for information on where to send it. See [“Contacting Keysight” on page 11](#). Include the following information:

- your company name and address
- a technical contact person within your company, and the person's complete telephone number

- the part number and serial number of each device
- the type of service required
- a **detailed** description of the problem and how the device was being used when the problem occurred

Performance Tests

The procedures in this section test the electrical performance of the 11612A using the specifications listed in this document as performance standards.

Record the results of the performance tests in the Performance Test Record, located at the end of the procedures.

Return Loss of Input and Output Ports

1. Connect the equipment for a standard reflection measurement.
2. Calibrate the system with an open and a short.
3. Connect the appropriate RF port of the 11612A to the network analyzer test port. Terminate the opposite port with a 50 ohm load.

NOTE

The return loss of the terminating load should be at least 20 dB better than the desired measurement value.

4. Measure the return loss. Refer to the specifications listed in this document.

Insertion Loss

1. Connect the equipment for a standard insertion loss measurement.
2. Calibrate the system with a through line.
3. Replace the through line with the 11612A.
4. Measure the insertion loss. Refer to the specifications listed in this document.

Table 4-1 Performance Test Record

ELECTRICAL SPECIFICATIONS

Serial Number: _____

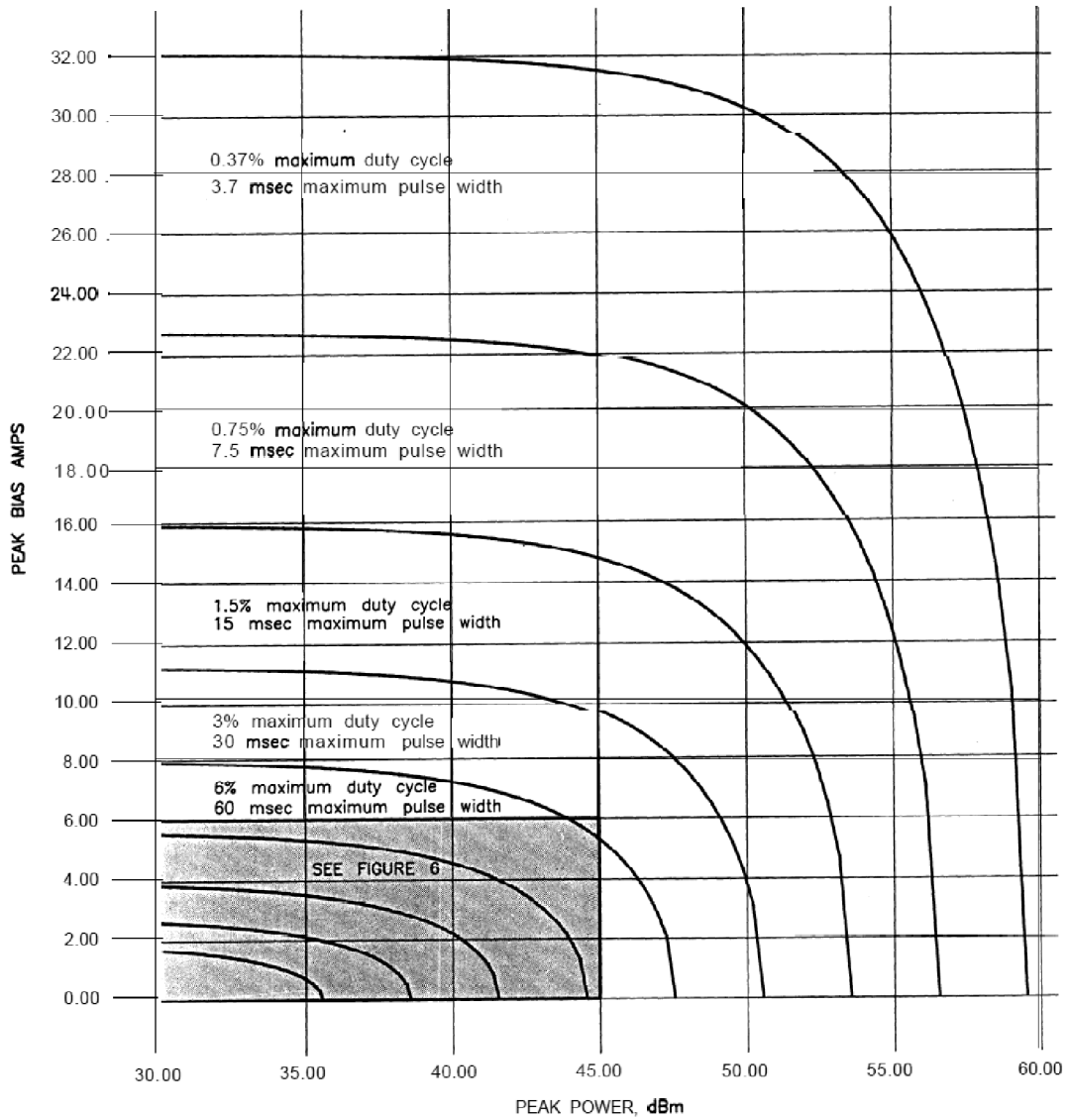
Tested by: _____

Date: _____

Table 4-1 Performance Test Record

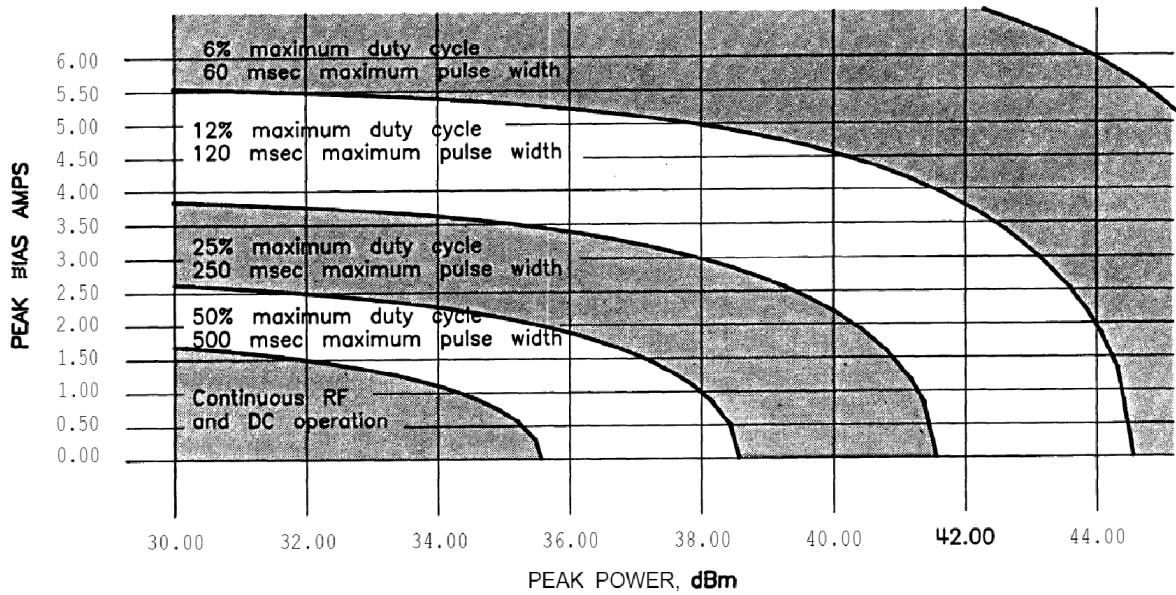
Standard 11612A	11612A Option 001	Measured Value
Return Loss		
Input Port	Input Port	
0.045 to 8 GHz	0.4 to 1 GHz	
8 to 18 GHz	1 to 18 GHz	
18 to 26.5 GHz	18 to 26.5 GHz	
Output Port	Output Port	
0.045 to 8 GHz	0.4 to 1 GHz	
8 to 18 GHz	1 to 18 GHz	
18 to 26.5 GHz	18 to 26.5 GHz	
Insertion Loss		
0.045 to 12.4 GHz	0.4 to 12.4 GHz	
12.4 to 26.5 GHz	12.4 to 26.5 GHz	

Figure 5 11612A Option 001 Duty Cycle Curves, Overall View



11612_001_005

Figure 5-1 11612A Option 001 Duty Cycle Curves, Overall View



11612_001_006

Contacting Keysight

Assistance with test and measurement needs and information on finding a local Keysight office are available on the Web at:

www.keysight.com/find/assist

NOTE

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



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