

Operating and Service Manual

**Agilent N9398C/F/G and N9399C/F
DC Block**



Agilent Technologies

Manufacturing Part Number: N9398-90001

Printed in Malaysia

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Bayan Lepas, Penang 11900 Malaysia

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General Information

DC Block Overview

The N9398C/F/G and N9399C/F are small, light-weight, coaxial DC blocks. They are designed to apply AC drive signals to a device while eliminating any DC voltage or current components.

The DC blocks cover broad frequency ranges and choice of connector types. Each model comes with different maximum operating voltage, frequency range and connector type as shown in [Table 1](#).

Table 1 *List of DC Blocks*

Model	Frequency Range	Operating Voltage (Max)	Connector Type
N9398C	50 kHz to 26.5 GHz	16 V	3.5 mm (m), (f)
N9399C	700 kHz to 26.5 GHz	50 V	3.5 mm (m), (f)
N9398F	50 kHz to 50 GHz	16 V	2.4 mm (m), (f)
N9399F	700 kHz to 50 GHz	50 V	2.4 mm (m), (f)
N9398G	700 kHz to 67 GHz	16 V	1.85 mm (m), (f)

Features

- Ruggedness, reliability, and small size make these DC blocks useful both on the bench and in systems applications.
- Low return loss and low insertion loss make these DC blocks well suited for isolating DC leakage between two electrical components.
- Each DC Block is tested with a vector network analyzer for return loss and insertion loss.

Specifications

Specifications

Specifications refer to the performance standards or limits against which the DC blocks are tested.

Typical characteristics are included for additional information only and they are not specifications. These are denoted as "typical", "nominal" or "approximate" and are printed in italics.

Table 2 RF Specifications for N9398C and N9399C DC Blocks

Agilent Model Number	N9398C	N9399C
Frequency Range	50 kHz to 26.5 GHz	700 kHz to 26.5 GHz
Insertion Loss	<0.9 dB	<1.2 dB
Return Loss	>10 dB (50 kHz to 300 kHz) >17 dB (300 kHz to 26.5 GHz)	>10 dB (50 kHz to 2 MHz) >17 dB (2 MHz to 26.5 GHz)
Maximum DC Working Voltage	16V	50V
Rise Time	<i>3 ps (typical)</i>	
Group Delay	<i>120 ps (typical)</i>	
Dimension		
Length	1.381 in. (35.10 mm)	
Diameter	0.361 in. (9.18 mm)	
Connectors	3.5 mm	

Table 3 RF Specifications for N9398F and N9399F DC Blocks

Agilent Model Number	N9398F	N9399F
Frequency Range	50 kHz to 50 GHz	700 kHz to 50 GHz
Insertion Loss	<0.9 dB (50 kHz to 26.5 GHz) <1.0 dB (26.5 GHz to 50 GHz)	<1.2 dB
Return Loss	>10 dB (50 kHz to 300 kHz) >15 dB (300 kHz to 50 GHz)	>10 dB (700 kHz to 2 MHz) >15 dB (2 MHz to 50 GHz)
Maximum DC Working Voltage	16V	50V
Rise Time	2 ps (typical)	
Group Delay	75 ps (typical)	
Dimension		
Length	1.069 in. (27.15 mm)	
Diameter	0.313 in. (7.94 mm)	
Connectors	2.4 mm	

Table 4 RF Specifications for N9398G DC Block

Agilent Model Number	N9398G
Frequency Range	700 kHz to 67 GHz
Insertion Loss	<0.9 dB (700 kHz to 26.5 GHz) <1.0 dB (26.5 GHz to 67 GHz)
Return Loss	>10 dB (700 kHz to 2 MHz) >15 dB (2 MHz to 67 GHz)
Maximum DC Working Voltage	16V
Rise Time	2 ps (typical)
Group Delay	75 ps (typical)
Dimension	
Length	1.067 in. (27.10 mm)
Diameter	0.313 in. (7.94 mm)
Connectors	1.85 mm

Environmental Specifications

The N9398C/F/G and N9399C/F DC blocks are designed to fully comply with Agilent Technologies' product environmental specifications as shown in [Table 5](#).

Table 5 *N9398C/F/G and N9399C/F DC Blocks Environmental Specifications*

Temperature:	
Operating	-25°C to +80°C (N9398C/F/G), -50°C to +100°C (N9399C/F)
Storage	-65°C to +115°C (N9398C/F & N9399C/F), -55°C to +100°C (N9398G)
Cycling	-65°C to +115°C (N9398C/F & N9399C/F), -55°C to +100°C (N9398G), 10 cycles @ 20°C per minute, 20 minutes dwell time per MIL-STD-833F, Method 1010.8, Condition C (modified)
<hr/>	
Humidity:	
Operating	50% to 95% RH at 40°C, 24 hour cycle, repeated 5 times
<hr/>	
Shock:	
Half-sine, smoothed	1000 G @ 0.5 ms, 3 shock pulses per orientation, 18 total per MIL-STD-833F, Method 2002.4, Condition B (modified)
<hr/>	
Vibration:	
Broadband random	50 to 2000 Hz, 7.0 G rms, 15 minutes, per MIL-STD-833F, Method 2026-1 (modified)
<hr/>	
Altitude:	
Storage	<15,300 meters (50,000 feet)

Installation

- Initial Inspection**
1. Inspect the shipping container for damage. If the shipping container or cushioning material is damaged, it should be kept until the contents of the shipment have been checked for completeness and the instrument has been checked both mechanically and electrically.
 - Check for mechanical damage such as scratches or dents.
 - Procedures for checking electrical performance are given under “Operator’s Check” or “Performance Tests”.
 2. If the contents are incomplete, if there is mechanical damage or defect, or if the instrument does not pass the electrical performance test, contact the nearest Agilent Technologies Sales and Service office. Refer to the Service and Support information in the front matter of this manual. Agilent Technologies will arrange for repair or replacement of the damaged or defective equipment. Keep the shipping materials for the carrier’s inspection.
 3. If you are returning the instrument under warranty or for service, repackaging the instrument requires original shipping containers and materials or their equivalents. Agilent Technologies can provide packaging materials identical to the original materials. Refer to Service and Support information in the front matter of this manual for the Agilent Technologies nearest you. Attach a tag indicating the type of service required, return address, model number, and serial number. Mark the container **FRAGILE** to insure careful handling. In any correspondence, refer to the instrument by model number and serial number.

Operating Instruction

Operator's Check

The operator's check is supplied to allow the operator to make a quick check on the DC blocks prior to use or if a failure is suspected.

Description

All four s-parameters of the DC block are measured using a network analyzer that is already calibrated with the necessary settings.

Quick-Check Procedure

Use correct cables and adapters on the test ports of the network analyzer. This depends on the type of DC block being checked. The equipment setup is as illustrated in [Figure 1](#).

1. Calibrate a network analyzer using an appropriate settings and setup if necessary.
2. Measure the S21 or/and S12 of the DC block. Compare with the specification to verify its electrical performance.
3. Measure the S11 and S22 of the DC block. Compare with the specification to verify its electrical performance.

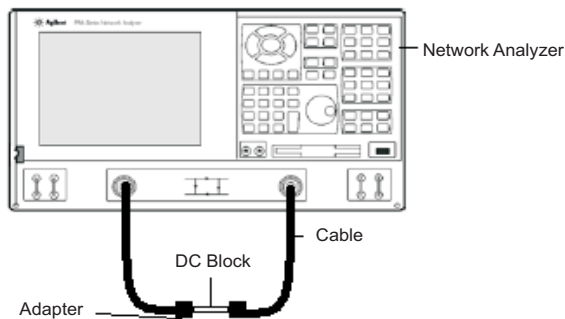


Figure 1 Equipment Setup Using Network Analyzer

Making Connections

The DC blocks would not bear any force or weight contributed by other devices connected to them. The DC blocks are bidirectional, that is, the signal may be inserted from either end.

N9398F/N9399F The N9398F and N9399F 2.4-mm connectors mate with other 2.4-mm connectors of the opposite sex.

N9398G

The N9398G 1.85-mm connectors mate with other 1.85-mm connectors of the opposite sex.

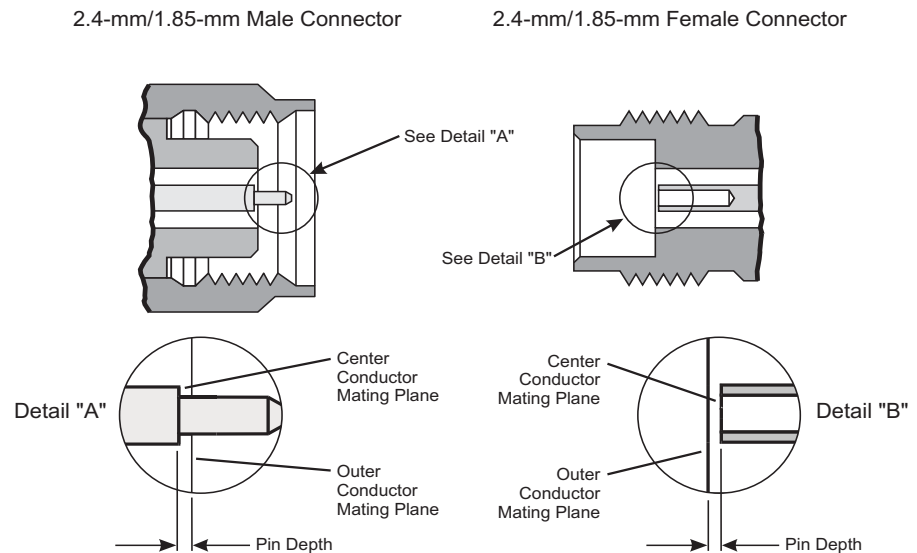


Figure 2 2.4-mm/1.85mm Connector Diagram

Making Connections

N9398C/N9399C The N9398C and N9399C have a male 3.5-mm connector on one end and a female 3.5-mm connector on the other side. These connectors mate with the opposite sex 3.5-mm or SMA connectors.

NOTE Continued mating with SMA connectors could degrade the 3.5-mm connector.

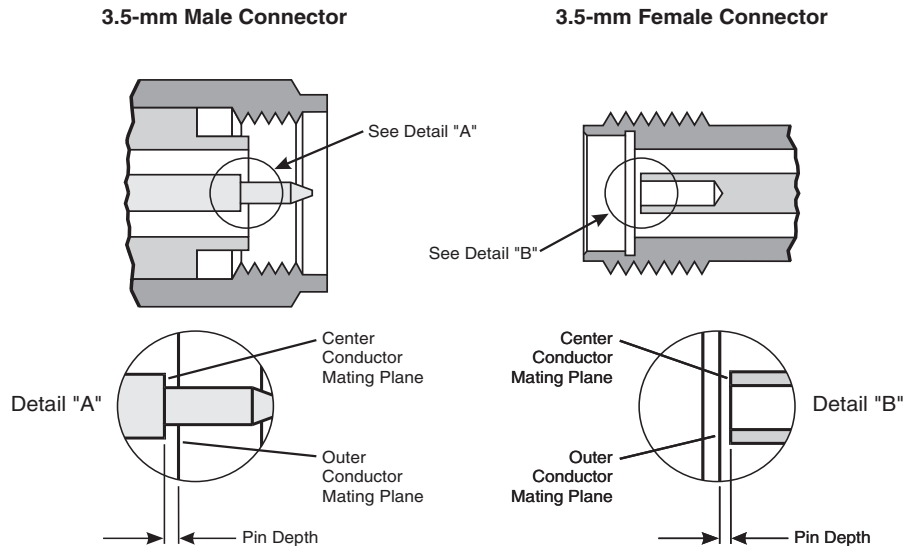


Figure 3 3.5-mm Connector Diagram

Performance Tests

The DC blocks can be tested to the accuracy of the specifications with a network analyzer or equivalent equipment of suitable accuracy. If a network analyzer is available, test the instrument using the procedure in the analyzer's operating manual.

Service Instructions

Technical Assistance

For technical assistance, you can contact your local Agilent Technologies Call Center. All major contacts are provided in the manual.

Maintenance

The connectors, particularly the connector faces, must be kept clean. For instruction on connecting and care of your connectors, refer to the Microwave Connector Care Quick Reference Card (08510-90360).

Service Instructions