

N5532A Sensor Module User's Guide

for the Agilent N5530S Measuring Receiver System



Agilent Technologies

Manufacturing Part Number: N5532-90003

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Contents

1 General Information

This user guide contains information about installation, operation, product specifications, calibration data, maintenance and repair, and storage conditions of the N5532A Sensor Module.

WARNING ***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.**

CAUTION *Caution* denotes a hazard. It calls attention to a procedure that, if not correctly performed 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.

Description

The N5532A is intended to be used with the N5530S Measuring Receiver System. It is essentially a power sensor with the power splitter at the input. See [Figure 1-1. on page 9](#). In use, the sensor module's two output cables are connected to an EPM (or EPM-P) Power Meter and the Performance Spectrum Analyzer (PSA) RF Input. The sensor module is calibrated such that the power meter indicates the power supplied by the source under test.

The N5532A Sensor Module is offered in three frequency configurations:

- Option 504 covers 100 kHz to 4.2 GHz
- Option 518 covers 10 MHz to 18 GHz
- Option 526 covers 30 MHz to 26.5 GHz

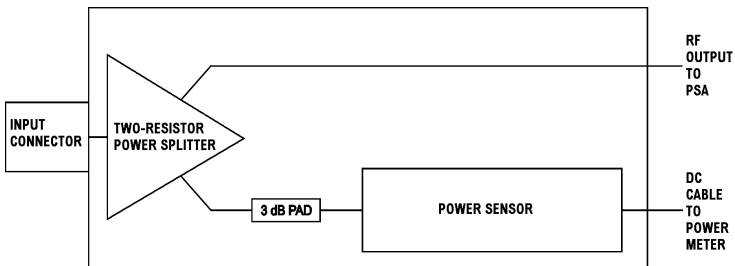
The sensor module accurately measures power levels from -20 dBm to +30 dBm (10 μ W to 1 W). Calibration Factor (Cal Factor) information is unique to each sensor module and is supplied on a floppy disc included with each N5532A. Please refer to [“Installing the Calibration Factors” on page 14](#) for more information on using the Cal Factor Data.

NOTE

The N5532A Sensor Module is compatible **ONLY** with the newer E4418/19 or E4416/17 Series power meters. They are **NOT** compatible with the earlier 430-Series or 70100 power meters.

N5532A Block Diagram

Figure 1-1. N5532A Sensor Module



Instruments Covered by Manual

These instruments have a two-part serial number: the prefix (two letters and the first four numbers), and the suffix (the last four numbers). The two letters identify the country in which the unit was manufactured. The four numbers of the prefix are a code identifying the date of the last major design change incorporated in your Agilent Technologies product. The four-digit suffix is a sequential number and coupled with the prefix, provides a unique identification for each unit produced. The contents of this manual apply directly to all serial numbers unless otherwise indicated.

2 Installation

Initial Inspection

Inspect the shipping container for damage. If the shipping container or packaging material is damaged, it should be kept until the contents of the shipment have been checked mechanically and electrically. If there is mechanical damage notify the nearest Agilent Technologies office as shown in [Table 4-1 on page 25](#). Keep the damaged shipping materials (if any) for inspection by the carrier and an Agilent Technologies representative.

Operating Precautions

Maximum torque at the connector should NOT exceed 12 in-lb (135 Ncm) for the Type-N connector or 8 in-lb (90 Ncm) for the 3.5-mm connector to avoid damage to the connector.

Connect the sensor module by turning only the hex nut portion of the connector. Damage can occur if torque is applied to the sensor module body.

The connector plastic insulator bead deteriorates when contacted by acetone, trichloroethylene, carbon tetrachloride, benzene, etc.

WARNING **BEFORE CONNECTING THE SENSOR MODULE TO OTHER INSTRUMENTS, ensure that all instruments are connected to the protective (earth) ground. Any interruption of the protective earth grounding will cause a potential shock hazard that could result in personal injury and cause damage to the sensor module.**

CAUTION To prevent physical damage to the sensor module or device-under-test (DUT), pay careful attention to the mechanical setup. The mechanical design of the sensor module minimizes SWR. However, the weight and length of the module, combined with the stiffness of the interconnect cables, enables the exertion of considerable leverage at the module's input connector. To prevent physical damage to the sensor module, the DUT, and the mating connectors, and to assure best electrical performance, observe the following precautions:

1. Do not permit the interconnect cables of the sensor module to extend out where anyone passing by could accidentally push and exert leverage on the cables. This consideration is especially important when the DUT is a light-weight instrument that sits freely on a table.
2. When possible, lay the sensor module on a supportive surface with the serial number label facing up. This consideration is especially important when rigid RF adapters are used to directly interconnect the sensor module to the DUT. RF adapters lengthen the leverage arm of the sensor module and are often fragile. When level-accuracy requirements permit, use flexible cables to interconnect the sensor module to the DUT.
3. Do not bend or coil the interconnect cables (more than necessary) to a diameter circumscribing less than 150 mm (6 in.). This precaution often applies when the instruments are rack-mounted and interconnected to rear-panel connectors. Repeated flexing of coiled, interconnect cables can degrade SWR and increase RFI of the RF output cable.

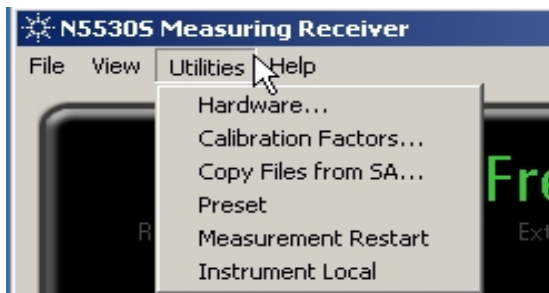
4. Do not attempt to tighten the type-N-connector by twisting the body of the sensor module.
-

Installing the Calibration Factors

There are two methods of installing the sensor module calibration factors (cal factors) in the N5530S Measuring Receiver System.

The first method loads and saves the cal factors using the PC. The second method uses the PSA to load the data.

Figure 2-1. Utilities Menu



Both methods are accessed through the Utilities drop-down menu (See [Figure 2-1.](#), “Utilities Menu.”.)

Using the PC to Load and Save the Cal Factors

1. Insert the N5532A Sensor Module Data Disk in the PC A:\ drive.
-

NOTE If your PC does not have a floppy disc drive, use the PSA to save your cal data to your PC. Then use this procedure to load the sensor cal factors into the system.

2. Select **Calibration Factors** to bring up the **Calibration View Edit** dialog box.
 3. Press **Load Cal File** in the **Calibration View Edit** dialog box. The **Open Calibration File** dialog box appears.
 4. Navigate to the PC A:\ drive if necessary and select the `CFData.XML` file.
-

NOTE If you obtained the cal data from the PSA, go to the directory you specified in [Step 2](#) of the next section to load the data.

5. Press **Open**.
 6. Press **OK** to apply the Cal Factors to the system.
-

Using the PSA to Save the Cal Factors to the PC

1. Insert the N5532A Sensor Module Data Disk into the PSA A:\ drive.
2. Select **Copy Files from SA** under the **Utilities** menu option of the N5530S User Interface. Browse to the location you wish to place the SA floppy disc files.
3. Click **OK** to copy the calibration factor files to the specified location. Three files appear: CALTABLE.XSL (enables viewing with web browser), CFDATA.XML (actual Cal Factor Data), and CFCERT.DOC (Cal Factor Certification)¹.
4. To load this data into the system, follow steps 2 through 6 in the section entitled, [“Using the PC to Load and Save the Cal Factors”](#) on page 15.

1. Provides traceability to National Institute of Standards and Technology or NIST

3 Specifications

The specifications listed in [Table 3-1, “N5532A Specifications,”](#) are the performance standards or limits against which the sensor module may be tested. These specifications are valid ONLY after proper calibration of the power meter.

Table 3-1 N5532A Specifications

Description	Specification	Comments
Frequency Range Option 504 Option 518 Option 526	100 kHz to 4.2 GHz 10 MHz to 18 GHz 30 MHz to 26.5 GHz	
Power Range	+30 dBm (1 watt) to -20 dBm (10 μ W)	

Table 3-1 N5532A Specifications

Description	Specification	Comments
Maximum Safe Power	+30 dBm	Average Total Power
Sensor Module Linearity <i>Opt. 504</i> +30 to +20 dBm < +20 dBm	+2% to - 4% negligible	
Sensor Module Linearity <i>Opt. 518</i> +30 to +20 dBm < +20 dBm	+2% to - 4% negligible	
Sensor Module Linearity <i>Opt. 526</i> +30 to +20 dBm < +20 dBm	+2% to - 4% negligible	

Table 3-1 N5532A Specifications

Description	Specification	Comments
Input SWR^a <i>Opt. 504</i> 100 kHz to 2 GHz 2 GHz to 4.2 GHz	< 1.10:1 < 1.28:1	
Input SWR^a <i>Opt. 518</i> 10 MHz to 2 GHz 2 GHz to 18 GHz	< 1.10:1 < 1.28:1	
Input SWR^a <i>Opt. 526</i> 30 MHz to 2 GHz 2 GHz to 18 GHz 18 GHz to 26.5 GHz	< 1.10:1 < 1.28:1 < 1.40:1	

a. When connected to PSA with at least 30 dB attenuation

Table 3-2 N5532A Supplemental Information

Description	Supplemental Information	Comments
Input Impedance	50 ohms	
Input Connector Option 504 Option 518 Option 526	Type N (male) Type N (male) APC 3.5 mm (male)	
RF Output Insertion Loss <i>Opt. 504</i>	7 dB @ 3 Hz to 8 dB @ 4.2 GHz	Typical
RF Output Insertion Loss <i>Opt. 518</i>	7 dB @ 3 Hz to 11 dB @ 18 GHz	Typical
RF Output Insertion Loss <i>Opt. 526</i>	7 dB @ 3 Hz to 13 dB @ 26.5 GHz	Typical

Table 3-2 N5532A Supplemental Information

Description	Supplemental Information	Comments
Military Specification	Type tested to an equivalent of MIL-PRF-28800F class 3 environmental specifications	
Altitude Operating Storage	< 4600 meters (15,000 feet) <7600 meters (25,000 feet)	
Temp. Range Operating Storage	0 to +55 °C – 40 to 70 °C	
Calibration Cycle	1 year	
Weight	0.72 kgm (1.5 lb)	

Table 3-2 N5532A Supplemental Information

Description	Supplemental Information	Comments
Shipping Weight	1.28 kgm (2.8 lb)	
Dimensions		
Height	51.2 mm (2 in)	
Width	62.4 mm (2.5 in)	
Length ^a	210 mm (8.3 in)	
Length ^b	1170 mm (46 in)	

a. From input connector to end of plastic casing.

b. From input connector to end of cable.

4 Maintenance and Repair

Cleaning Solutions

A solution of pure isopropyl or ethyl alcohol can be used to clean the connector, (keeping in mind its flammable nature).

Connector Cleaning

Clean the connector face using a cotton swab dipped in isopropyl alcohol. If the swab is too big use a round wooden toothpick wrapped in a lint free cotton cloth dipped in isopropyl alcohol.

Repair

The N5532A Sensor Module must be returned to Agilent for repair. Please contact your closest Agilent office to arrange a repair.

Contacting Agilent Technologies

Agilent Technologies has offices around the world to provide you with complete support for your accessories. To obtain servicing information or to order replacements, contact the nearest Agilent Technologies office listed in [Table 4-1 on page 25](#). In any correspondence or telephone conversations, refer to your accessory by its product number and full serial number.

Table 4-1 Contacting Agilent Technologies

Online assistance: www.agilent.com/find/assist

United States

(tel) 1 800 452 4844

Latin America

(tel) (305) 269 7500

(fax) (305) 269 7599

Canada

(tel) 1 877 894 4414

(fax) (905) 282-6495

Japan

(tel) (81) 426 56 7832

(fax) (81) 426 56 7840

Europe

(tel) (31 20) 547 2323

(fax) (31 20) 547 2390

Australia

(tel) 1 800 629 485

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New Zealand

(tel) 0 800 738 378

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(tel) (852) 3197 7777

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