1. GENERAL INFORMATION

This Operating and Service Manual contains information about initial inspection, operation, performance tests, adjustments, troubleshooting and repair of the HP Model 11722A Sensor Module.

2. Specifications

Instrument specifications are listed in Table 1. These specifications are the performance standards or limits against which the instrument can be tested. The supplemental characteristics listed in Table 2 are not specifications but are typical characteristics included as additional information for the user.

3. Instruments Covered by Manual

This instrument has a two-part serial number. The first four digits and the letter comprise the serial-number prefix. The prefix is the same for all identical instruments; it changes only when a change is made to the instrument. The last five digits form a sequential suffix which is unique to each instrument. The contents of this manual apply directly to instruments having the serial prefix listed under Serial Numbers on the title page.

An instrument manufactured after the printing of this manual may have a serial prefix that is not listed on the title page. This unlisted serial prefix indicates that the manual for this instrument is supplied with a Manual Changes supplement that documents the differences.

In addition to change information, the supplement may contain information for correcting errors in the manual. To keep this manual as current and accurate as possible, Hewlett-Packard recommends that you periodically request the latest Manual Changes supplement. The supplement is identified with the manual print date and part number that appear on the title page. Complimentary copies of the supplement are available on request from your nearest Hewlett-Packard office.

For information concerning a serial prefix not listed on the title page or in the Manual Changes supplement, contact your nearest Hewlett-Packard office.

4. Description

The HP Model 11722A Sensor Module is essentially an RF power sensor with an RF switch at its input. The RF input to the Sensor Module can be remotely switched between its power sensor and a through path RF cable. The power sensor is used to measure the average power from an external RF source.

In use, the Sensor Module input is connected to an RF source. The Sensor Module's two output cables are connected to a compatible power measuring instrument such as the HP 8901B Modulation Analyzer or HP 8902A Measuring Receiver. The power sensor input is a 50Ω load to the RF source. The power measuring instrument indicates the power dissipated in this load.

Table 1. Specifications

Characteristic	Performance Limits	Conditions
Power Range	−20 to +30 dBm (10 μW to 1W)	
Frequency Range	100 kHz to 2.6 GHz	
Linearity	−4% to +2%	+20 to +30 dBm
Input SWR		Sensor Module connected to an HP 8901B or HP 8902A
Reflection Coefficient		
RF Power	<1.15	
Tuned RF Level*	<1.33	RF range 1 and 2
	<1.5	RF range 3
	<1.33	RF range 3 with Special Function 1.9 (10 dB RF and RF amplifier inserted)

*The ranges referred to are the RF ranges of the 8902A.

Table 2. Supplemental Characteristics

Supplemental characteristics are typical, but non-warranted performance parameters. They are only intended to provide information which can be useful in determining instrument application.	
RF INPUT	
Maximum Average Power:	1W
Maximum Peak Power:	100 W_{peak} or 300W · μs per pulse
Input Impedance:	50Ω nominal
PHYSICAL CHARACTERISTICS	
Module Dimensions:	
Depth (overall)	203 mm (8 in.)
Height (overall):	51 mm (2 in.)
Width (overall):	62 mm (2.5 in.)
Weight:	0.8 kg (1.75 lb.)
Cable lengths:	
RF cable:	1730 mm (68.2 in.)
Sensor cable:	1707 mm (67.2 in.)

The Sensor Module accurately measures power levels from −20 to +30 dBm (10 μW to 1W), at frequencies from 100 kHz to 2.6 GHz.

Calibration factor (Cal Factor) data is provided on a label attached to the Sensor Module's bottom cover. Worst-case uncertainties of the Cal Factor data are listed in Table 3.

Table 3. Uncertainty of Calibration Factor Data

Frequency (MHz)	Root Sum of the Squares (%)	Worst Case Uncertainty (%)
0.1	0.7	1.6
0.3	0.7	1.6
1	0.8	1.7
3	0.8	1.7
10	0.9	2.0
30	0.9	2.0
50	0.0 (ref.)	0.0 (ref.)
100	1.1	2.2
300	1.1	2.2
1000	1.1	2.2
2600	1.2	2.3

5. Recommended Test Equipment

Table 4 lists the test equipment recommended to check, adjust, and troubleshoot the Sensor Module. The Critical Specifications column describes the essential requirements for each piece of test equipment. If substitute equipment is used, it must meet or exceed the critical specifications.

6. INSTALLATION

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. This consideration is expecially 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 flimsy. 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 through-path interconnect cable.

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