

Specifications describe the instrument's warranted performance. Supplemental characteristics are intended to provide information useful in applying the instrument by giving typical, but not warranted, performance parameters.

HP 8970B Noise Figure Meter Specifications

Noise Figure Measurement

Measurement range: 0 to 30 dB

Instrumentation uncertainty: ± 0.1 dB
(for a 14 to 16 dB ENR noise source in a 0 to 55°C environment).

Resolution: 0.01 dB (0.001 dB over GPIB).

Gain measurement range:

Measurement range: -20 to $>+40$ dB
(for DUT and system noise figures totalling 30 dB or less).

Instrumentation uncertainty: ± 0.15 dB.

Resolution:

Gain >-9.99 dB: 0.01 dB

Gain <-9.99 dB: 0.1 dB

(over GPIB: add 1 more digit to above)

Input Specifications

Frequency range: tunable from 10 to 1600 MHz
(10 to 2047 MHz with option 020).

Tuning accuracy (for 10 to 40°C):
 $\pm(1 \text{ MHz} + 1\% \text{ of frequency}); 6 \text{ MHz maximum.}$

Frequency resolution: 1 MHz

Noise figure (for input power levels below -60 dBm):
 $<7 \text{ dB} + 0.003 \text{ dB/MHz}$ ($<7 \text{ dB} + 0.002 \text{ dB/MHz}$ with option 020).

Input SWR, 50 ohm reference impedance:
 <1.7 10 MHz to 1600 MHz; (<1.8 with option 020).
 <2.0 1600 MHz to 2047 MHz - (option 020 only)

Maximum operating input power: -10 dBm.

Maximum net external gain: >65 dB between noise source and HP 8970B RF input.

Electromagnetic Compatibility

EMI: Conducted and radiated interference is in compliance with MIL-STD-461B CE03, RE02, EN55011, CLASS A (1991) AND CISPR, Class A (1990).

Conducted and radiated susceptibility: meets the requirements of MIL-STD-461B-1980, CS01/CS02, RS03 and EN50082-1 (1991) (IEC 801-2, 801-3 and 801-4).

General

Noise source drive:

28.0 ±0.1 V for noise source ON (up to 60 mA peak); <1V for noise source OFF.

GPIB capability:

SH1, AH1, T5, TE0, L4, LE0, SR1, RL1, PP0, DC1, DT1, C0, E1.

Operating temperature: 0 to 55°C.

Storage temperature: -55 to 75°C .

Connectors: RF input: N(f), noise source drive: BNC(f).

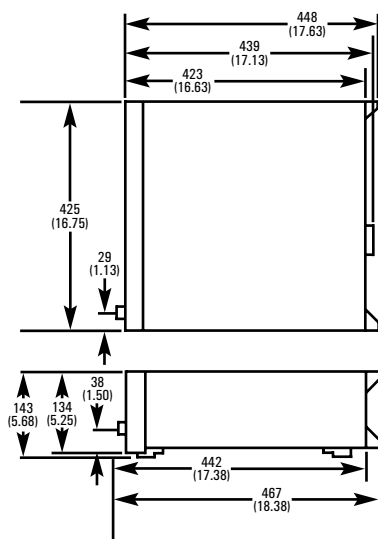
Power: 100, 120, 220, or 240V (±5%, -10%); 48-66 Hz; 150 VA maximum.

Net weight: 15.5 kg (34 lb).

Shipping weight: 18.5 kg (40 lb).

Dimensions: 143H x 425W x 467 mm (5.68 x 16.75 x 18.38 in.)

Nominal module: 5.25H x 1MW x 14D



Dimensions: HP 8970B mm (in.)

Supplemental Characteristics

Bandwidth: approximately 4 MHz

Sensitivity: -100 dBm
(no external gain required; able to measure its own noise figure).

Measurement speed: 6 to 9 measurements per second
with minimum smoothing.

Sweep speed at minimum smoothing (10 to 1600 Mhz):
140 ms per frequency point.

Jitter at minimum smoothing: Peak-to-peak Y- factor variation
<0.15 dB (typical).

Jitter with increased smoothing: Peak-to-peak* Y-factor variation <0.02 dB
(for smoothing factor of 64) (typical).

Note: Noise figure jitter is equivalent to Y factor jitter to within 10% for ENR >14 dB and F <4 dB. At minimum smoothing, jitter can limit accuracy; at high smoothing, it does not.

Maximum safe input level: ±20 Vdc; +20 dBm peak (or average) at RF.

Audible noise level: <5.5 bels at 1 meter.

* Peak-to-peak defined here as five standard deviations about the mean of a statistically valid set of readings.
This includes 99% of the readings for a normal distribution.

Functional Properties

Noise Figure display units:

Noise Figure: dB, ratio

Uncorrected Y factor: dB, ratio

Effective Input Noise Temperature: K

Displayed measurement frequency range: 10 to 99,999 MHz

Noise figure display jitter: <0.01 dB (with appropriate smoothing)

System LO control: frequency control over SIB with format "ccddddcc" where the c's are user-settable ASCII characters and "dddd" is the LO frequency in MHz. An auxiliary, user-settable message of 20 ASCII characters may also be sent over SIB.

Cold noise source data range: 0 to 9999K

Hot noise source data range:

ENR from -7 to +50 dB; spot T_{hot} from 0 to $>2.9 \times 10^7$ K.

Number of calibration points in one sweep: 181.

Storage capacity of hot noise source tables: 4 stored ENR tables with 35 frequency's each (plus 1 working ENR table).

Smoothing: exponential averaging of gain and noise figure before display according to $D = P(F-1) + M/F$ where D is the display result, P is the previous display result, M is the latest measurement, F is the averaging factor (1, 2, 4, 8, 16, 32, 64, 128, 256 or 512). Arithmetic averaging is used during swept operation.

Rear-panel outputs: X axis and Y axis from 0 to 6V. Z axis is TTL for penlift (on an X-Y plotter) blanking (on an oscilloscope).

Plotter capability: noise figure and gain versus frequency plot with grid, title and noise figure, gain, and frequency axis annotation.

Compatible digital plotters:

HP 7470A, HP 7475A. HP 7550A, HP 7440A, HP 9872B.