

NETWORK ANALYZERS

Gain/Phase Meter

Model 3575A



- dBV, dB ratio and degrees from 1 Hz to 13 MHz



HP 3575A Option 001 dual panel meters

Description

The HP 3575A Gain-Phase Meter is a versatile two-channel analyzer which can measure and display the absolute amplitude level or amplitude ratio of signals present at the inputs. In addition, the HP 3575A can measure the phase relationship of the two signals. This analyzer is a broadband detector, which is easy to use because no frequency tuning is required.

Since a dedicated tracking source is not required to operate with the HP 3575A, a wide selection of stimuli is possible. This flexibility coupled with a variety of possible amplitude, gain and phase outputs (LED display, analog outputs, and optional BCD) gives you a wide choice of cost/results tradeoffs. For example, you may wish to manually plot your network response data on a Bode diagram in which case a low cost sinewave oscillator stimulus may be used. For easier, quicker results you may select the HP 7090A plotter and let the instruments plot your response. You may use a calculator or computer to control a programmable stimulus source and the HP 3575A to provide automatic measurements. Here you have a wide range of computation and output possibilities.

Phase

The phase relationship of two signals is indicated over a range of ± 192 degrees with 0.1 degree resolution. A unique logic circuit (patent) design allows the HP 3575A to make stable phase measurements in the presence of noise. This feature minimizes the error to less than two degrees for a signal-to-noise ratio of 30 dB. One of three band limiting filters may be selected to get further noise rejection.

The HP 3575A is also capable of measuring the phase relationship of a variety of waveforms, such as square waves and triangle waves. Even harmonic and in-phase odd harmonic components of these signals cause no phase measurement error. For out-of-phase odd harmonic signal-to-harmonic ratios of 40 dB, measurement errors are less than 0.6 degree as shown in Figure 1.

Amplitude

The amplitude of either channel or the ratio of the two can be measured over an 80 dB dynamic range and 100 dB measurement range. Resolution is 0.1 dB. Results are displayed in dBV for channel amplitude and dB for ratio measurements. Digit blanking and channel overload annunciators will turn on if the maximum allowable signal level at either channel input is exceeded.

Readout

The standard three-digit LED display may be selected by the operator to indicate the amplitude of channel A or B, gain or phase. A second three-digit LED display is optionally available for simultaneous display of amplitude and phase readings. Lighted annunciators identify the measurement function, units and remote status.

Programmable

Two programmable options both offer full control of front panel functions and BCD output of information (amplitude, ratio or phase) contained in both digital displays. The two options give the user a choice of negative true or positive true outputs.

Applications

The HP 3575A can solve network analysis problems in the 1 Hz to 13 MHz frequency range where complex measurements (gain or phase or both) are required. A few of the many measurements it can make are gain and phase response of feedback systems, envelope delay and return loss of transmission lines, complex impedance of components, and insertion loss of mixers and frequency doublers. Bode plots and Nichols charts are useful graphical tools for analyzing many of these response data.

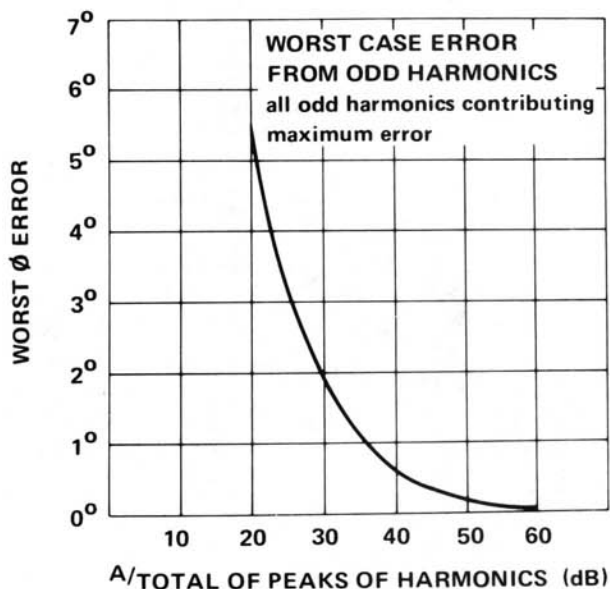
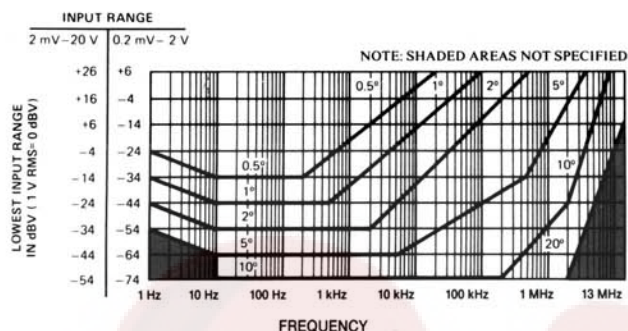


Figure 1. Worst case error from odd harmonics.

Specifications

Phase Accuracy*



*Conditions: Temperature: 25°C ± 10°C; Frequency range switch on lowest applicable range; Analog Output accuracy (rear panel).

Input signal range: 200 μV rms to 20 V rms.

Harmonic Rejection

Even harmonics: no error.

Odd harmonics: (in phase) no error.

Odd harmonics: (out of phase) 0.57° worst case error when total odd harmonic distortion is 40 dB below the fundamental.

Noise tolerance: 2° error for a 10 kHz, 1 V sine wave on one channel. One volt sine wave added to Gaussian noise (limited to a 1 MHz bandwidth and 30 dB S/N ratio) on the other channel. The 100 Hz to 1 MHz frequency range was used.

Display

Range: ±180° with 12° of overrange.

Resolution: 0.1°.

Panel meter accuracy: ±3 counts (0.3 degrees/dB/dBV). The panel meter error must be added to the phase and amplitude errors to obtain the display error.

Inputs

Impedance: 1 MΩ 30 pF.

Protection: ±40 V dc, 20 V rms.

Response Time to Achieve 95% of Final Reading

Frequency Range	Time
1 Hz to 1 kHz	20 s
10 Hz to 100 kHz	2 s
100 Hz to 1 MHz	0.2 s
1 kHz to 13 MHz	20 ms

Rear terminal inputs are available as a special (HP 3575A-C09). Digital (Opt. 002). 0, +5 V; ground true. Twelve lines to fully program all functions.

Outputs

Analog

Phase: 10 mV/degree.

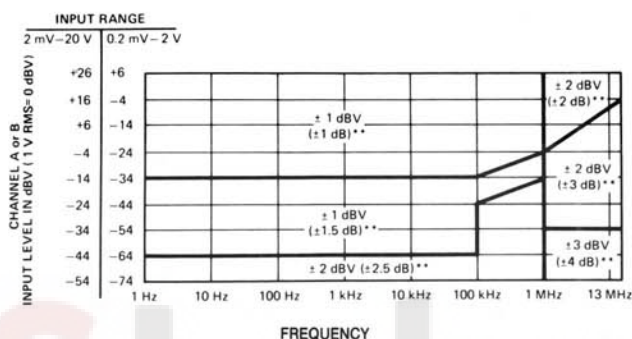
Amplitude: 10 mV/dB or dBV.

Output impedance: 1 kΩ

Digital (Opt 002): 0, +5 V; ground true. 31 output lines (1-2-4-8 BCD).

Digital readout: 3½ digits with sign and annunciators. Two readings per second, fixed.

Amplitude Accuracy*



*Conditions: Temperature: 25°C ± 10°C; accuracy applies to dB V and ratio measurements with the same frequency on both channels; for ratio measurements, the lowest level channel determines accuracy; analog output accuracy (rear panel).

**Ratio (B/A) tolerances

Amplitude functions: A dBV, B dBV or B/A dB.

Amplitude reference: (A dBV, B dBV) 1 V rms = 0 dBV.

Display

Range: A dBV, B dBV: -74 dBV to +26 dBV (in two ranges). B/A dB: -100 to +100 dB. (Both input signals must be within the range of 0.2 mV rms to 20 V rms)

Resolution: 0.1 dBV, 0.1 dB.

General

Power: 115 V/230 V ±10%, 48 Hz to 440 Hz, 40 VA.

Weight: net, 8.3 kg (18.4 lb). Shipping, 11.3 kg (25.8 lb).

Size: 88 H x 425 W x 337 mm D (3.47" x 16.75" x 13.25").

Accessories furnished: extender boards, line cable and 50-pin connector (Opt 002 and 003 only).

Recommended Accessories: HP 7090A Measurement Plotting System.

Options

001 Dual panel meters: HP's 3575A Opt 001 is equipped with two digital readouts and two analog outputs for simultaneous amplitude and phase readings. This option has no additional measurement capability over the standard instrument.

Dual analog outputs: rear panel BNC connectors provide dc output voltages that correspond to the respective panel meter readings.

001: Dual Readout add \$630

002/003 Programmable: HP 3575A Opt 002 and Opt 003 are equipped with dual panel meters and dual analog outputs (same as Opt 001) plus BCD outputs and complete remote control capability. Opt 002 has negative true output levels and Opt 003 has positive true output levels. BCD information from the HP 3575A (Opt 002) can be read by the HP 9800 series HP Desktop Computers with appropriate interfacing.

002: Programmable (negative true output levels) add \$1100

003: Programmable (positive true output levels) add \$1100

908: Rack Flange Kit add \$35

910: Extra Product Manual add \$50

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\$5,400