

HARMONIC WAVE ANALYZER

Model 300A



A New Wave Analyzer
Featuring

VARIABLE SELECTIVITY

SIMPLIFIED OPERATION

IMPROVED STABILITY

WIDE VOLTAGE RANGE

LINEAR METER SCALE

USES: The many new features of the Model 300A Harmonic Wave Analyzer make it an excellent instrument for both laboratory and production work where accurate and rapid measurement of individual components of a complex wave is required.

The maximum selectivity is sufficient for measurement of harmonics of frequencies as low as 30 cycles. Furthermore, the selectivity can be varied over a wide range by means of a unique selective amplifier developed in the Hewlett-Packard laboratories. With this variable selectivity feature, measurements at higher frequencies can be made more rapidly, yet with no sacrifice in accuracy.

Variable selectivity makes this analyzer useful for many applications where a constant selectivity would be unsuitable. For example, variable selectivity is required in measuring distortion of sound recorded on film, disk, or

other cases where there may be a small amount of frequency modulation. It may be used in integrating the noise spectrum for acoustic measurements or for other purposes where a wider pass band gives a more representative integration. In many other ways the usefulness of the Model 300A is increased, because the selectivity can be varied at will.

The wide voltage range of the Model 300A covers the values encountered in nearly every application. The meter, which is fully protected against overloads, is linear, and the various scales have ample overlap for accurate readings. A built-in calibrating system is provided to standardize the voltage measurements.

The accuracy, stability, flexibility, and ease of operation of this new wave analyzer assure time-saving performance for any application requiring a frequency-selective voltmeter.

DESCRIPTION: The Model 300A is a frequency-selective voltmeter of the heterodyne type. It consists of a variable local oscillator which modulates the unknown voltage to produce a constant frequency which is equal to the difference between the local oscillator frequency and the unknown frequency that is being measured. This constant difference frequency is passed through a selective amplifier, the output voltage of which is then proportional to the magnitude of the unknown voltage. A meter is placed in the output of the selective amplifier to measure the magnitude of the voltage.

The local oscillator is of the resistance-tuned type which provides stability, accuracy of calibration, and freedom from magnetic fields. A balanced modulator is used to eliminate the local oscillator frequency and to insure low cross-modulation products. The selective amplifier consists of four tuned circuits in which the effective Q is

controlled by feedback. This amplifier has the unique characteristic that the selectivity may be varied over a wide range without appreciably affecting the gain of the amplifier.

On the front panel are the main frequency selecting dial, an incremental frequency dial for fine adjustment, variable selectivity control, meter, range selectors, and input control.

At the bottom of the main panel are the balancing and calibrating controls and a calibrating meter which is used to check the sensitivity against the line voltage. These controls are mounted in a small, recessed compartment which may be closed during normal operation.

The instrument has been designed throughout for ease of operation and for accuracy which will be maintained over long periods of time.

SPECIFICATIONS

- FREQUENCY RANGE:** The frequency range is from 30 to 16,000 cps. The frequency calibration is within 3%.
- VOLTAGE RANGE:** There are four input voltage ranges having maximum values of 0.5 volts, 5 volts, 50 volts, and 500 volts. In addition, a meter multiplier divides each voltage range into full scale meter readings of 500, 250, 100, 50, 25, 10, 5, 2.5, and 1. Thus full scale meter readings can be obtained on from 1 mv to 500 v. The meter is linear and is fully protected against overloads.
- SELECTIVITY:** The selectivity can be varied by means of a control on the front panel. At the maximum selectivity setting, the response is down 3 db. at 3 cycles, 10 db. at 8 cycles, 40 db. at 30 cycles, and 60 db. at 50 cycles from maximum response. This selectivity can be varied continuously until at the minimum selectivity the band width required for a given attenuation is six times that at the maximum selectivity setting. Thus, at minimum selectivity the response is down 3 db. at 18 cycles, 10 db. at 48 cycles, 40 db. at 180 cps, and 60 db. at 300 cycles from maximum response. The variable selectivity control is calibrated in the half band width at which the response is down 40 db.
- VOLTAGE ACCURACY:** The over-all voltage accuracy is $\pm 5\%$, provided adjacent harmonics are within limits determined by the selectivity. The characteristics of the metering circuit are such that measurement of a particular component may be made with 5% accuracy, provided unwanted voltages are attenuated to less than 1/3 of the voltage being measured. Thus, with maximum selectivity a 1% second harmonic of a 40 cycle voltage may be measured with 5% accuracy. The residual modulation products are suppressed by at least 65 db. Hum is at least 75 db. below maximum input voltage on any of the four input ranges.
- INPUT IMPEDANCE:** The input impedance is 200,000 ohms. The input circuit includes a potentiometer which is set to maximum for voltage measurements.
- POWER SUPPLY:** The instrument contains a voltage regulated power supply which operates from 110 volts, 60 cycles.
- MOUNTING:** The Model 300A is mounted in an attractive oak cabinet to harmonize with the panel which is finished in wrinkle grey with machine engraved designations. A relay rack model is also available and is designated as the Model 300AR.

Model	Mounting	Length	Height	Depth	Shipping Weight
300A	Cabinet	21"	24 $\frac{1}{2}$ "	13"	180#
300AR	Relay Rack	19"	22 $\frac{3}{4}$ "	12"	170#

Prices and delivery information are available on request.
These data are subject to change without notice.

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HEWLETT-PACKARD COMPANY

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