SIGNAL ANALYZERS
Ultra low distortion
Model 4333A

Description
General
Hewlett-Packard Model 4333A Distortion Analyzer measures total harmonic distortion down to 0.01% full scale at 41 spot frequencies between 10 Hz and 100 kHz; harmonics are indicated up to 600 kHz. Automatic fundamental nulling reduces critical manual nulling operations where only coarse tuning of the frequency vernier (±8% of spot frequency) to less than 3% of set level reference is required.
A 1 kHz high-pass filter which may be activated by a front panel switch is available for reducing the effects of hum components below 400 Hz.
A high-sensitivity voltmeter mode offers 13 ranges in 10 dB steps; range is from 100 μV to 100 V rms full scale. The bandwidth is 10 Hz to 600 kHz for the 300 μV to 100 V ranges and 10 Hz to 200 kHz for the 100 V range. Meter indication is proportional to the average value of the sine wave and calibrated in rms volts/%; dB scale is calibrated dBV.

Specifications, Model 4333A
Distortion measurement range: distortion levels of 0.01% to 100% are measured full scale in nine positions of meter range.
Frequency range for distortion measurement: frequency and multiplier controls 41 spot frequencies (not including overlapping points) for choosing between 10 Hz through 100 kHz in a 1, 1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10 sequence. Any set frequency is variable more than ±8% with frequency vernier.
Distortion measurement accuracy

<table>
<thead>
<tr>
<th>Range/Accuracy</th>
<th>±3%</th>
<th>±6%</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% - 0.03%</td>
<td>10 Hz - 400 kHz</td>
<td>10 Hz - 600 kHz</td>
</tr>
<tr>
<td>0.01%</td>
<td>10 Hz - 100 kHz</td>
<td>10 Hz - 200 kHz</td>
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</tbody>
</table>

Elimination characteristics
Fundamental rejection:
>100 dB, 10 Hz to 10 kHz (multiplier × 10, × 100, × 1 K)
>95 dB, 10 kHz to 100 kHz (multiplier × 1 K)
Second harmonic accuracy: better than ±0.6 dB, 10 Hz to 10 kHz

Distortion introduced by instrument:
≥−95 dB (0.0018%) from 10 Hz to 10 kHz (multiplier × 10, × 100, × 1 K)
≥−90 dB (0.0032%) from 10 kHz to 30 kHz (multiplier × 10 K)
≥−85 dB (0.0056%) from 40 kHz to 100 kHz (multiplier × 10 K)

Input Impedance: 100 kΩ ±5% shunted by <80 pF
Single ended, low side chassis ground
Input level for distortion measurement: for 100% (0 dB) set level 1.0 V rms to 130 V rms. Minimum input for auto nulling is 1.0 V rms.
Voltmeter range: 100 μV to 100 V rms full scale (13 ranges) 10 dB per range.

Frequency range for voltage measurement:
10 Hz to 600 kHz: (300 μV - 100 V range)
10 Hz to 200 kHz: (100 μV range)

Voltmeter accuracy:

<table>
<thead>
<tr>
<th>Range/Accuracy</th>
<th>±2%</th>
<th>±5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 μV</td>
<td>20 Hz to 50 kHz</td>
<td>10 Hz to 200 kHz</td>
</tr>
<tr>
<td>300 μV to 100 V</td>
<td>20 Hz to 300 kHz</td>
<td>10 Hz to 600 kHz</td>
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</tbody>
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Voltmeter residual noise (600Ω termination):
300 μV range: <25 μV rms
100 μV range: <10 mV rms
Monitor output: 0.1 V rms ±0.01 V rms open circuit for full scale meter indication. 2 kΩ ±10% output impedance.
High-pass filter: 3 dB point at 400 Hz with 18 dB per octave rolloff. Normally used only with fundamental frequencies greater than 1 kHz.

General
Power supply: 100, 120, 200, 240 V ±10%, 48 to 66 Hz, approximately 11 VA. Rear terminals are provided for external battery supply. Positive and negative voltages between 22 V and 40 V are required. Current drain from each supply is less than 200 mA.
Weight: net, 7.5 kg (16½ lb). Shipping, 9.9 kg (22 lb).
Dimensions: 42.6 cm wide (16.75 in.) × 13.3 cm high (5.25 in.) × 34.9 cm deep (13.75 in.)

Options
907: Front Handle Kit
908: Rack Flange Kit
909: Rack Flange & Front Handle Combination Kit

4333A Distortion Analyzer $1980