

TM 11-6625-1576-15

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

**ORGANIZATIONAL, DS, GS, AND DEPOT
MAINTENANCE MANUAL**

DISTORTION ANALYZER

**HEWLETT-PACKARD MODELS
333A AND 334A**

**HEADQUARTERS, DEPARTMENT OF THE ARMY
MAY 1967**

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TM11-6625-1576-15

TECHNICAL MANUAL)
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 NO. 11-6625-1576-5)

HEADQUARTERS
 DEPARTMENT OF THE ARMY
 Washington, D.C., 19 May 1967

Organizational, DS, GS, and Depot Maintenance

DISTORTION ANALYZER, HEWLETT-PACKARD MODELS 333A AND 334A

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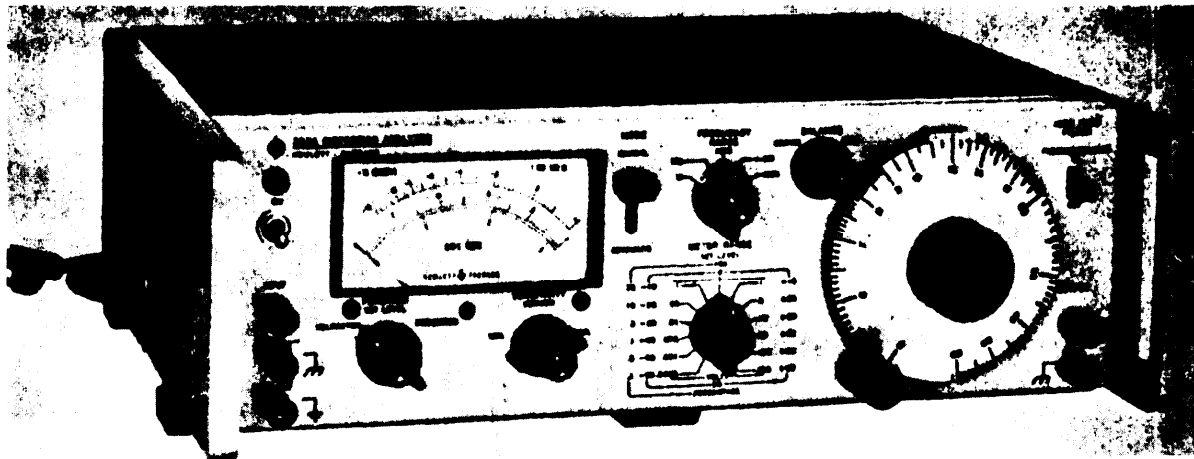


Figure 1-1. Model 333A Distortion Analyzer

Table 1-1. Specifications

MODEL 333A			
DISTORTION MEASUREMENT RANGE: Any fundamental frequency, 5 cps to 600 Kc. Distortion levels of 0.1%-100% are measured full scale in 7 ranges.			
DISTORTION MEASUREMENT ACCURACY: Harmonic frequency measurement accuracy:			
Fundamental Input Less Than 30 v			
RANGE	±3%	±6%	±12%
100%-0.3% F. S.	10 cps- 1 Mc	10 cps- 3 Mc	
0.1% F. S.	30 cps- 300 Kc	20 cps- 500 Kc	10 cps- 1 Mc
Fundamental Input Greater Than 30 v			
RANGE	±3%	±6%	±12%
100%-0.3% F. S.	10 cps- 300 Kc	10 cps- 500 Kc	10 cps- 3 Mc
0.1% F. S.	30 cps- 300 Kc	20 cps- 500 Kc	10 cps- 1 Mc
Elimination Characteristics: Fundamental Rejection >80 db Second Harmonic Accuracy for a fundamental of:			
5 to 20 cps: better than +1 db			
20 cps to 20 Kc : better than ±0.6 db			
20 Kc to 100 Kc : better than -1 db			
100 Kc to 300 Kc : better than -2 db			
300 Kc to 600 Kc : better than -3 db			
Distortion Introduced by Instrument: <0.03% from 5 cps to 200 Kc <0.06% from 200 Kc to 600 Kc			
Meter indication is proportional to the average value of a waveform.			
FREQUENCY CALIBRATION ACCURACY: Better than ±3% from 5 cps to 200 Kc Better than +8% from 200 Kc to 600 Kc			
INPUT IMPEDANCE: Distortion Mode: 1 megohm shunted by less than 60 pf (10 megohms shunted by 10 pf with -hp-10001A divider probe). Voltmeter Mode: 1 megohm shunted by 30 pf, 1 to 300 v rms; 1 megohm shunted by 60 pf, 300 μv to 0.3 v rms.			
INPUT LEVEL FOR DISTORTION MEASUREMENTS: 0.3 v rms for 100% set level (up to 300 v may be attenuated to set level reference).			
DC ISOLATION: Signal ground may be ±400 vdc from external chassis.			
VOLTMETER RANGE: 300 μv to 300 v rms full scale (13 ranges) 10 db per range.			
VOLTMETER FREQUENCY RANGE: 5 cps to 3 Mc (300 μv range: 20 cps-500 Kc).			
VOLTMETER ACCURACY:			
RANGE	±2%	±5%	
300 μf	30 cps-300 Kc	20 cps-500 Kc	
1 mv-30 v	10 cps-1 Mc	5 cps-3 Mc	
100 v-300 v	10 cps-300 Kc	5 cps-500 Kc	
NOISE MEASUREMENTS: Voltmeter residual noise on the 300 μv range: <25 μv rms terminated in 600 Ω; <30 μv rms terminated with a shielded 100 K resistor.			
OUTPUT: Approximately 0.1 v rms output for full scale meter deflection. Output Impedance: 2 K			

Table 1-1. Specifications (Cont 'd)

<p>AUTOMATIC NULLING MODE: Set Level: At least 0.2 v rms. Frequency Ranges: X1, manual null tuned to less than 3% of set level; total frequency hold-in $\pm 0.5\%$ about true manual null. X10 through X10 K, manual null tuned to less than 10% of set level; total frequency hold-in $\pm 1\%$ about true manual null.</p> <p>AUTOMATIC NULL ACCURACY: 5 cps to 100 cps: Meter reading within 0 to +3 db of manual null. 100 cps to 600 Kc: Meter reading within 0 to +1.5 db of manual null.</p> <p>HIGH-PASS FILTER: 3 db point at 400 cps with 18 db per octave roll off. 60 cps rejection >40 db. Normally used only with fundamental frequencies greater than 1 Kc.</p> <p>POWER SUPPLY: 115 or 230 $\pm 10\%$, 50 to 1000 cps, approximately 4 watts. Terminals are provided for external battery supply. Positive and negative voltages between 28 v and 50 v are required. Current drain from each voltage is 80 ma.</p>	<p>WEIGHT: Net 17-3/4 lbs. (7,98 kg), Shipping 23 lbs. (10,35 kg).</p> <p style="text-align: center;">MODEL 334A</p> <p>Same as Model 333A except as indicated below:</p> <p>AM DETECTOR: High impedance dc restoring peak detector with semi-conductor diode operates from 500 Kc to greater than 65 Mc. Broadband input. Maximum input; 40 vp-pac or 40 v peak transient.</p> <p>CARRIER FREQUENCY: 550 Kc to 1.6 Mc: Distortion introduced by detector is <0.3% for 3 to 8 volt carriers modulated 30%. 1.6 Mc to 65 Mc: Distortion introduced by detector is <1% for 3 to 8 volt rms carriers modulated 30%.</p> <p style="text-align: center;">NOTE</p> <p>Distortion measurement at carrier levels as low as 1 volt may be made with reduced accuracy.</p> <p>OPTION: 01 Indicating meter has VU characteristics conforming to FCC Requirements for AM, FM, and TV broadcasting.</p>
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SECTION I
GENERAL INFORMATION

1-A.1 Scope

This manual includes installation and operation instructions and covers operator's, organizational, direct support (DS), general support (GS), and depot maintenance. It describes Hewlett-Packard (Federal support Code 80537) Distortion Analyzer Models 333A and 334A (fig. 1-1). A basic issue items list for this equipment is not included as part of this manual.

1-A.2 Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is an *index* of current technical manuals, technical bulletins, supply manuals (types 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc) and the latest changes to and revisions of each equipment publication.

1-A.3 Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publication 378 (Navy), and AFR '71-4 (air Force).

c. Reporting of Equipment Manual Improvements. Report of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to DA Publications) and forwarded direct to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-MR-NMP-AD, Fort Monmouth, New Jersey 07703.