

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This section contains general information concerning the -hp- Model 3435A Multimeter. Included is an instrument description, specifications, information about instrument and manual identification, option and accessory information, and safety considerations.

1-3. DESCRIPTION.

1-4. The -hp- Model 3435A is a 3½ digit, five function, autoranging multimeter. The functions are AC and DC Voltage, AC and DC Current and Ohms. All five functions have manually selectable ranges. AC and DC Voltage and Ohms functions may also be automatically ranged by depressing the AUTO pushbutton. Throughout the remain-

der of this manual, the -hp- Model 3435A Multimeter will be referred to as Multimeter.

1-5. SPECIFICATIONS.

1-6. Specifications for the Multimeter are listed in Table 1-1. These specifications are the performance standards or limits to which the Multimeter can be tested. Any changes in these specifications due to manufacturing changes, design or traceability to the National Bureau of Standards will be covered by an errata or change sheet. These specifications supersede any prior published specifications. Supplemental information in Table 1-2 is provided to describe general operating characteristics.

1-7. INSTRUMENT AND MANUAL IDENTIFICATION.

Table 1-1. Specifications.

AC VOLTMETER

AC Converter: Avg. Responding rms calibrated.

Ranges	Max Display
200 mV	199.9 mV
2 V	1.999 V
20 V	19.99 V
200 V	199.9 V
1200 V	1199 V

Maximum Input: 1700 V (dc + peak ac), 10^7 volt - Hz max.

Ranging: Automatic or manual.

Sensitivity: 100 μ V on 200 mV range.

Accuracy: 1 year, 15° to 30°C @ 95% RH.

Minimum Reading: 20 digits.

30 Hz - 50 Hz	$\pm 1.5\%$ of reading ± 3 digits
50 Hz - 20 kHz	$\pm 0.3\%$ of reading ± 3 digits
20 kHz - 100 kHz	$\pm 1.5\%$ of reading ± 10 digits

Temperature Coefficient: 0° - 15°C and 30° - 55°C
 $\pm (0.04\%$ of reading + 0.2 digits) / °C.

Input Impedance: Resistance: 5 meg Ω .
Shunt Capacitance: < 50 pF.

Input Type: Floating.

Response Time: 1.6 seconds to within 3 digits of final value on one range. Add 1.2 seconds for each range change.

DC VOLTMETER

Ranges	Max Display
± 200 mV	± 199.9 mV
± 2 V	± 1.999 V
± 20 V	± 19.99 V
± 200 V	± 199.9 V
± 1200 V	± 1199 V

Maximum Input: 1200 V (dc + peak ac).

Ranging: Automatic or manual.

Sensitivity: 100 μ V on 200 mV range.

Polarity: Automatically sensed and displayed.

Accuracy: 1 Year 15° to 30°C @ 95% RH.

Range	Specifications
200 mV	$\pm (0.1\%$ of reading + 2 digits)
2 V to 1200 V	$\pm (0.1\%$ of reading + 1 digit)

Temperature Coefficient: 0° - 15°C and 30° - 55°C
 $\pm (.018\%$ reading + 0.1 digit) / °C

Input Resistance: 10 meg $\Omega \pm 1\%$.

Input Type: Floating.

Normal Mode Rejection: 40 dB at 50 Hz and 60 Hz
 $\pm .1$ Hz.

Effective Common Mode Rejection: With 1 k Ω unbalance is > 120 dB at 50/60 Hz $\pm 0.1\%$.

Response Time: < 0.7 seconds to within 1 digit on one range. Add 1 second for each range change.

Table 1-1. Specifications (Cont'd).

AC CURRENT

Ranges	Max Display
200 μ A	199.9 μ A
2 mA	1.999 mA
20 mA	19.99 mA
200 mA	199.9 mA
2000 mA	1999 mA

Maximum Input: 2A from < 250 V source.

Protection: 2A/250 V fuse (normal blow).

Ranging: Manual only.

Sensitivity: 100 nA on 200 μ A range.

Accuracy: With display of \geq 20 digits.
1 year 15 to 30 °C 95% RH.

Specifications

Range	30 Hz	50 Hz	10 kHz
2000 mA	\pm 2% of reading \pm 4 digits	\pm 1.2% of reading \pm 4 digits	
200 mA	\pm 1.7% of reading \pm 4 digits	\pm 0.9% of reading \pm 4 digits	
200 μ A			

Temperature Coefficient: 0 - 15 °C and 30 - 55 °C
 \pm (0.05% of reading + 0.2 digits) / °C.

Voltage Burden:

200 μ A to 20 mA	< 220 mV rms
200 mA range	< 240 mV rms
2000 mA range	< 400 mV rms

Input Type: Floating.

Response Time: 1.6 seconds on any range to within 3 digits.

DC CURRENT

Ranges	Max Display
\pm 200 μ A	\pm 199.9 μ A
\pm 2 mA	\pm 1.999 mA
\pm 20 mA	\pm 19.99 mA
\pm 200 mA	\pm 199.9 mA
\pm 2000 mA	\pm 1999 mA

Maximum Input: 2A from < 250 V source.

Protection: 2A/250 V fuse (normal blow).

Ranging: Manual only.

Sensitivity: 10 nA on 200 μ A range.

Polarity: Automatically sensed and displayed.

Accuracy: 1 year, 15 to 30 °C @ 95% RH.

Range	Specifications
200 μ A to 200 mA	\pm (0.3% of reading + 2 digits)
2000 mA	\pm (0.6% of reading + 2 digits)

Temperature Coefficient: 0 - 15 °C and 30 - 55 °C
 \pm (.028% of reading + 0.1 digits) / °C.

Voltage Burden:

Range	Max Burden at Full Scale
200 μ A to 20 mA	< 220 mV
200 mA	< 240 mV
2000 mA	< 400 mV

Input Type: Floating.

Response Time: 0.7 seconds on one range to within 1 digit.

OHMMETER

Ranges	Max Display
20 Ω	19.99 Ω
200 Ω	199.9 Ω
2 k Ω	1.999 k Ω
20 k Ω	19.99 k Ω
200 k Ω	199.9 k Ω
2 M Ω	1.999 M Ω
20 M Ω	19.99 M Ω

Input Protection: 250 V rms.

Ranging: Automatic, or manual.

Sensitivity: 10 milliohm on 20 Ω range.

Accuracy: 1 year 15 to 30 °C at 95% RH.

Range	Specification
20 Ω	\pm (0.5% of reading + 10 digits)
200 Ω to 2 M Ω	\pm (0.2% of reading + 2 digits)
20 M Ω	\pm (0.8% of reading + 2 digits)

Temperature Coefficient: 0 - 15 °C and 30 - 55 °C.

Range	Specifications
20 Ω to 2 M Ω	\pm (0.04% of reading + 0.2 digits) / °C
20 M Ω	\pm (.18% of reading + 0.2 digits) / °C

Configuration: 2 wire.

Open Circuit Voltage: < 5 V max.

Current through unknown:

Range	20 Ω	200 Ω	2k Ω	20k Ω	200k Ω	2M Ω	20M Ω
Current	5mA	5mA	500 μ A	50 μ A	5 μ A	500nA	50nA

Response Time: 0.8 seconds to within 1 digit. Add 0.8 seconds for each range change.

1-8. Hewlett-Packard uses a two-section serial number. The first section (prefix) identifies a series of instruments. The last section (suffix) identifies a particular instrument within the series. A letter between the prefix and the suffix identifies the country in which the instrument was manufactured. The manual is kept up-to-date at all times by means

Table 1-2. General Information.

GENERAL:	
Display:	7 segment RED 0.3 inch high LED's. Function and range annunciation.
Reading rate:	2.4 - 4.7/sec. depending on input level.
A-D Conversion:	Dual slope.
Integration time:	100 msec.
Ranging:	Automatic or manual in acV, dcV, and Manual only in ac and dc current.
Storage Temperature:	(- 40 to + 75) °C; (- 40 to + 65) °C with batteries.
Operating Temperature:	(0 to 55) °C.
Humidity:	0 - 95% RH at 40 °C.
Power:	AC line; 48 - 440 Hz 86-106 V Opt. 100 104-127 V Opt. 115 190-233 V Opt. 210 208-250 V Opt. 230
	Rechargeable batteries included with 3435A only.
Battery:	10 hours minimum continuous operation. Recharge Time: 16 hours operating, 12 hours non-operating. 4 hour recharge provides 8 hours of continuous use.
Total Instrument Power Dissipated:	AC only; 3 watts. With charger; 8 watts
Configuration:	3435A Std, Streamlined portable case with handle, ac line power. Rechargeable batteries, and recharger included. 3435A Opt 001, Streamlined portable case, ac line power only. 3435A Opt 002, Rack and Stack case, ac line power only. Rack mount kit not included.
Dimensions:	3435A: 23.81 cm (9 3/8") wide x 9.84 cm (3 7/8") high x 27.62 cm (10 7/8") long. 3435A Option 002: 20.96 cm (8 1/4") wide x 8.57 cm (3 3/8") high x 26.67 cm (10 1/2") long.
Weights:	3435A: 2.41 kg (5 lbs. 5 oz.) 3435A Option 001: 1.84 kg (4 lbs. 1 oz.) 3435A Option 002: 1.81 kg (4 lbs.)

of a change sheet which is supplied with the manual. If the serial number of your instrument differs from the one on the title page of this manual, refer to the change sheet supplied with the manual. All correspondence with Hewlett-Packard should include the complete serial number.

1-9. OPTIONS.

1-10. Table 1-3 lists the options available for the Multimeter.

1-11. The option label affixed to the rear of the Multimeter identifies the line voltage for which the instrument is wired. This operating voltage can be changed by following the procedure outlined in Section V (Power Requirement Modification Instructions). If the line voltage option is changed, the option label should also be corrected to reflect the new configuration.

NOTE

Option 001 Multimeters can be converted to standards by adding the battery and charge circuits. The Battery/Charger kit is -hp- Part Number 03435-80001.

1-12. ACCESSORIES.

1-13. The accessories available for use with the Multimeter are listed in Table 1-4. A test lead set, -hp- part number 8120-2521, is included.

Table 1-3. Options.

Standard	Streamlined portable case with handle. AC line or rechargeable battery operation with battery charger included.
Option 001	Streamlined portable case with handle. AC line operation only.
Option 002	Rack mount case. AC line operation only.
Option 100	86 - 106 Vac 48 - 440 Hz 3 Watts
Option 115	104 - 127 Vac 48 - 440 Hz 3 Watts
Option 210	190 - 233 Vac 48 - 440 Hz 3 Watts
Option 230	208 - 250 Vac 48 - 440 Hz 3 Watts
Option 908	Rack Mount Kit (for Option 002 case only). -hp- Part Number 5061-0054.
Option 910	An additional Operating and Service Manual.

Table 1-4. Accessories.

11002A	Test leads (dual banana to dual alligator).
11003A	Test leads dual banana to probe and alligator.
11096B	RF Probe 10 kHz to 700 MHz, use only 10 V and 100 V dc ranges.
5061-0054	Rack adapter kit including 1/2 module filler panel. Use with Opt. 02 only.
34110A	Soft vinyl carrying/operating case.
34111A	High voltage probe, 40 kV dc
34112A	Touch - Hold, input probe.
11067A	Test lead kit.