SECTION I
GENERAL INFORMATION

1-1. INTRODUCTION.

1-2. This section contains general information concerning the Hewlett-Packard Model 3467A Logging Multimeter. Included are an instrument description, specifications, supplemental characteristics, instrument and manual identification, option and accessory descriptions, safety considerations, and some discussion on how to obtain further information on this versatile instrument.

1-3. DESCRIPTION.

1-4. The Hewlett-Packard Model 3467A is a versatile 4 channel, 4½ digit, 4 function, printing multimeter. The 3467A (referred to as *LOGGING MULTIMETER*) can be used for manual and/or automatic measurement logging on any combination of input channels. An internal pacer-timer serves to initiate measurements and is presettable using the instruments' manual entry feature.

1-5. FUNCTIONS.

1-6. The Logging Multimeter functions include DCV, ACV, OHMS, and TEMPERATURE in both independent and math referenced modes. A unique "MIX" mode allows for temperature measurements on Channels 1 and 2, and DCV, ACV, or OHMS measurements on Channels 3 and 4. Temperature measurements utilize an external thermistor of the following type:

a. -hp- 0837-0164

b. YSI 44007

c. Fenwal UUA 35J1

d. OMEGA UUA 35J3

e. or equivalent

1-7. RANGES.

1-8. Ranging is automatic with a STEP pushbutton for up ranging and a HOLD pushbutton for range holding. A μV,Ω pushbutton is provided for DCV and kΩ zeroing of up to 2 mV and 20Ω respectively on any input channel.

1-9. SCANNER.

1-10. A four channel scanner multiplexes inputs one-at-a-time to the Logging Multimeter measurement circuitry. All four input pairs are floating and scanning occurs in a break-before-make sequence.

1-11. PRINTER.

1-12. A 16 character/line thermal printer provides hard-copy of measurement results and elapsed time. Printing can be both manually and timer initiated. A full roll of thermal paper provides approximately 5500 lines of printing (approximately 2½ hours of continuous printing).

1-17. SWITCH-SELECTABLE FEATURES.

1-18. Selectable °C - °F Temperature Units.

1-19. Temperature units are switch selectable between °C or °F. The Logging Multimeter is shipped from the factory with °C units selected. Service trained personnel may refer to Section VIII, "INTERNAL SWITCH SETTINGS" for information required to modify this.

1-20. Selectable "Data" - "Text" Printer Character Orientation.

1-21. Printer character orientation is switch selectable between "DATA" or "TEXT" mode formats. "DATA" mode printing is convenient for reading measurement results from the printer without removing the tape. "TEXT" mode printing is convenient for performing long logging sequences with numerous measurements. The Logging Multimeter is shipped from the factory with "DATA" printer character orientation selected. Refer to Section III, "PRINTER CHARACTER ORIENTATION," for further explanation of the relative merits of "DATA" and "TEXT" character orientations along with a sample of each. Service trained personnel may refer to Section VIII, "INTERNAL SWITCH SETTINGS" for information required to modify the printer character orientation.

1-22. SPECIFICATIONS.

1-23. *Specifications are performance characteristics which are warranted.* The specifications for the -hp- Model 3467A Logging Multimeter are listed in Table 1-1. These specifications provide the standards or limits to which the Logging 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 in a manual change supplement or revised manual pages. These specifications supercede any previously published.

1-24. INSTRUMENT AND MANUAL IDENTIFICATION.

1-25. 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 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.

1-26. OPTIONS.

1-27. The options available for the Logging Multimeter are:

Option 908	Rack Flange Kit
Option 910	Additional Operating and Service Manual

Table 1-1. Specifications.

DC VOLTMETER

Range	Maximum Reading
20mV	19.999mV
200mV	199.99mV
2 V	1.9999 V
20 V	19.999 V
200 V	199.99 V
350 V	349.9 V

Maximum Input: ± 350 V from any terminal to ground and between any two terminals
Ranging: Automatic or Hold Step
Sensitivity: 1 μV on 20 mV range
Polarity: Automatically sensed and displayed
Zero Adjustment: Front panel pushbutton compensates for up to ± 2 mV offset for each channel
Accuracy: 6 months, 18°C to 28°C
(Assuming 30 minute warmup and use of zero adjustment)

Range	± (% of Reading + Number of Counts)
20 mV	0.05 + 10
200 mV	0.04 + 2
2V - 20V, 350V	0.03 + 1

Temperature Coefficient: (0° to 18°C, 28° to 50°C) ± (0.003% of reading + 0.15 counts)/°C
Input Resistance: 10 MΩ ± 5% on all ranges
Normal Mode Rejection: > 60 dB at 50/60 Hz ± 0.1%
Effective Common Mode Rejection (1 kΩ unbalance): > 120 dB at 50/60 Hz ± 0.1%
Single Channel Response Time (without printing): < 0.7 seconds to within 1 count of final value on one range. Add 0.8 seconds for each range change

OHMMETER

Range	Maximum Reading	Current Through Unknown
200 Ω	199.99 Ω	5mA
2kΩ	1.9999kΩ	1mA
20kΩ	19.999kΩ	100μA
200kΩ	199.99kΩ	10μA
2MΩ	1.9999MΩ	1μA
20MΩ	19.999MΩ	100nA

Input Protection: 250 V RMS or 350 V (DC + peak AC)
Ranging: Automatic or Hold Step
Sensitivity: 10 mΩ on 200 Ω range
Configuration: 2 wire with front panel pushbutton zero adjustment. Lead resistance of up to 20 Ω can be nulled out for each channel
Accuracy: 6 months, 18°C to 28°C
(Assuming use of zero adjustment on 200 Ω range)

Range	± (% of reading + number of counts)
200 Ω	0.08 + 10
2kΩ	0.03 + 3
20kΩ - 200kΩ	0.03 + 1
2MΩ	0.04 + 1
20MΩ	0.15 + 1

Temperature Coefficient

Range	(0°C to 18°C, 28°C to 50°C)
200 Ω	± (0.002% of reading + 1 count)/°C
2kΩ - 2MΩ	± (0.002% of reading + 0.1 count)/°C
20MΩ	± (0.01% of reading + 0.1 count)/°C

Open Circuit Voltage: < 5 V
Single Channel Response Time (without printing): < 1.1 seconds to within 1 count of final value on one range. Add 0.8 seconds for each range change

DIODE TEST

Function: kΩ ►
Range: 2kΩ
Current Source: 1mA ± 4%
Diode Voltage Drop Displayed in Volts: 1.9999 volts maximum measurable voltage

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

AC VOLTMETER

AC Converter: True RMS Responding and calibrated in true RMS AC coupled

Range	Maximum Reading
200mV	199.99mV
2 V	1.9999 V
20 V	19.999 V
200 V	199.99 V
250 V	249.9 V

Maximum Input: ± 350 V (DC + Peak AC), 10^7 V Hz from any terminal to ground and between any two terminals

Ranging: Automatic or Hold Step

Sensitivity: 10 μV on 200 mV range

Crest Factor: 4:1 at full scale

Accuracy: Accuracy applies with readings of ≥ 9% full scale (≥ 1800 counts on 250 V range), 6 months, 18°C to 28°C, sinusoidal waveform

Frequency	±(% of reading + number of counts)
45Hz - 100Hz	1 + 40
100Hz - 10kHz	0.2 + 40
10kHz - 20kHz	1 + 40
20kHz - 100kHz	2 + 200

Temperature Coefficient:

Frequency	(0°C to 18°C, 28°C to 50°C)
45Hz - [illegible] Hz	± (0.05% of reading + 2 counts)/°C
100Hz - [illegible] kHz	± (0.03% of reading + 2 counts)/°C
10kHz - [illegible] kHz	± (0.05% of reading + 2 counts)/°C
20kHz - 100kHz	± (0.05% of reading + 15 counts)/°C

Input Impedance: 2 MΩ ± 5% in parallel with < 100 pF

Single Channel Response Time (without printing): < 2 seconds to within 4 counts of final value on one range. Add 1.2 seconds for each range change

TEMPERATURE MEASUREMENT

Technique: Temperature measurements using thermistors can be made directly in °C or °F (selectable by an internal switch). Thermistor linearization is included for the following thermistors: YSI 44007, OMEGA UUA 35J3, FENWAL UUA 35J1 or equivalent (One thermistor is furnished with each 3467A)

Accuracy: The accuracy specification includes ohmmeter accuracy, thermistor curve fit accuracy, and thermistor self heating

-80°C to +80°C ± 0.3°C
+80°C to +110°C ± 0.5°C
+110°C to +150°C ± 1.3°C

Yellow Spring Instrument (YSI) Yellow Springs, Ohio 45387
OMEGA Box 0947, Stamford, Connecticut 06907
FENWAL 63 Fountain Street, Framingham Massachusetts 01701

FOUR-CHANNEL SCANNER

Type: One 2 pole low thermal dry reed relay per channel

Inputs: Floating inputs. Any combination of four channels may be selected to measure one of the following functions: DC volts, true RMS AC volts, resistance or temperature. Measurements of temperature on channels 1 and 2, and either DC volts, AC volts, or resistance on channels 3 and 4 can also be made

Channel-to-Channel Isolation:

Source Impedance	Up to 1kHz	Up to 100kHz
100Ω	>100 dB	>60 dB
10kΩ	> 80 dB	>40 dB

PRINTER AND TIMER/PACER

Type: Thermal Printer

Print Modes:
Manual: Initiates a printout of selected input channels
Automatic: Scans, measures and prints selected input channels at preset time intervals

Time Interval*: 1, 3, 6, 10, 18, 30, 60, or 180 Seconds. Minutes interval selectable via front panel pushbuttons

Timer: Internal 24 hour crystal controlled interval timer. Timer starts at 00:00:00 (HH:MM:SS). A time offset can be manually entered to synchronize the timer with the time of day

Timer Accuracy: Within 1 minute in 24 hours

Power Failure Protection: Should a power failure occur for up to 6 seconds, the 3467A will retain the math constant, elapsed time, offsets, and ranges

* Time intervals < 10 seconds may be shorter than the actual time required to completely measure and print the selected channels. In these cases, the next printout will be initiated upon completion of the present scan sequence

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Reading Rate: Depends on input signal level: 2 to 4½ readings/second

Operating Temperature: 0°C to +50°C

Storage Temperature: -40°C to +65°C without thermal paper

Thermal Paper Storage Temperature: -40°C to +30°C

Humidity: 95% R.H., +15°C to +40°C without thermal paper
60% R.H., +15°C to +30°C with thermal paper

Power: 100/120/220/240 +5%, -10%
48 to 440 Hz line operation, < 25 VA

Dimension: 190.5 mm (7½ in.) high
212.9 mm (8.3/8 in.) wide
304.8 mm (12 in.) deep

Weight:
Net 4.77 kg (10.5 lb.)
Shipping 5.44 kg (12 lb.)