Hewlett Packard
HP 3478A
Multimeter
Specifications

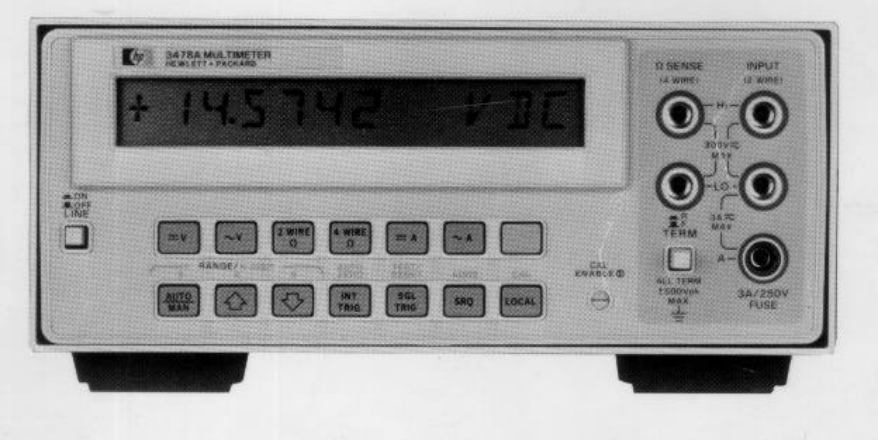

Table 1-1. Specifications

DC VOLTAGE

Input Characteristics:

Range	Maximum Reading (5½ Digit)	Resolution 5½ Digit	4½ Digit	3½ Digit
30mV	±30.3099mV	100nV	1μV	10μV
300mV	±303.099mV	1μV	10μV	100μV
3 V	±3.03099 V	10μV	100μV	1mV
30 V	±30.3099 V	100μV	1mV	10mV
300 V	±303.099 V	1mV	10mV	100mV

Input Resistance:

30mV, 300mV,3V ranges: $>10^{10}\Omega$
30V, 300V ranges: 10MΩ ± 1%

Maximum Input Voltage: (non-destructive)

Hi to Lo: 303V rms or 450V peak
Hi or Lo to Earth Ground: ±500V peak

Measurement Accuracy:

±(% of reading + number of counts)
Auto-zero ON

5½ Digit Mode:

Range	Cal. Temp ± 1°C 24 Hours	Cal. Temp. ±5°C 90 Day	1 Year
30mV	0.025 + 40	0.275 + 40	0.035 + 40
300mV	0.004 + 4	0.005 + 5	0.007 + 5
3 V	0.003 + 2	0.004 + 2	0.006 + 2
30 V	0.004 + 3	0.005 + 4	0.007 + 4
300 V	0.004 + 2	0.005 + 2	0.007 + 2

4½ and 3½ Digit Mode:

Accuracy is the same as 5½ digit mode for % of reading; use 1 count for number of counts on all ranges except 30mV range use 4 counts.

The Cal. Temp. (Calibration Temperature) is the temperature of the environment where the 3478A was calibrated. Calibration should be performed with the temperature of the environment between 20°C and 30°C.

Auto-Zero Off:

(5½ digit) for a stable environment (±1°C), for <24 hrs., add 110 counts to accuracy specification for 30mV range, 11 counts for 300mV and 30V ranges, 3 counts for 3V and 300V range.

Temperature Coefficient:

0°C to 55°C
5½ digit display, auto-zero ON
± (% of reading + number of counts)/°C

Range	Temperature Coefficient
30mV	0.0028 + 5.0
300mV	0.0005 + 0.5
3 V	0.0004 + 0.05
30 V	0.0006 + 0.5
300 V	0.0004 + 0.05

Noise Rejection:

In dB, with 1kΩ imbalance in Lo lead. AC rejection for 50, 60Hz ± 0.1%. Auto-zero ON.

Display	AC NMR	AC ECMR	DC CMR
5½ digits	80	150	140
4½ digits	59	130	140
3½ digits	0	70	140

Maximum Reading Rates: (readings/sec)

First reading is correct when triggered coincident with step input.

The reading rates are dependent on the speed of the controller being used.

Line Frequence	Auto Zero	Resolution 3½ Digits	4½ Digits	5½ Digits
60Hz	Off	90	35	4.4
	On	60	20	2.3
50Hz	Off	85	30	3.7
	On	50	17	1.9

AC VOLTAGE(true rms responding)

Input Characteristics:

Range	Maximum Reading (5½ Digit)	Resolution 5½ Digit	4½ Digit	3½ Digit
300mV	303.099mV	1μV	10μV	100μV
3 V	3.03099 V	10μV	100μV	1mV
30 V	30.3099 V	100μV	1mV	10mV
300 V	303.099 V	1mV	10mV	100mV

Input Impedance:

1MΩ ± 1% shunted by <60pF

Maximum Input Voltage: (non-destructive)

Hi to Lo: 303Vrms or 450V peak
Hi or Lo to Earth Ground: ±500V peak

Measurement Accuracy:

±(% of reading + number of counts)
Auto-zero ON. 5½ digit display. Accuracy is specified for sine-wave inputs only, >10% of full scale.
1 Year, Cal. Temp. ±5°C

Input Frequency	300mV	Ranges 3V, 30V	300V
20Hz-50Hz	1.14 + 163	1.14 + 102	1.18 + 102
50Hz – 100Hz	0.46 + 163	0.46 + 103	0.50 + 102
100Hz – 20kHz	0.20 + 120	0.20 + 70	0.24 + 70
20kHz – 50kHz	0.38 + 205	0.26 + 140	0.42 + 140
50kHz – 100kHz	1.20 + 840	0.87 + 780	0.98 + 780
100kHz – 300kHz		10.1 + 3720 (30V Range Only)	

Table 1-1. Specifications (Cont'd)

Auto Zero Off:

(5½ digits) for a stable environment (±1°C), for <24 hrs., add 10 counts to accuracy specifications for all ranges.

Temperature Coefficient:

0°C to 55°C
5½ digit display, auto-zero ON.
For frequencies <20kHz, ±(0.016% of reading + 10 counts)/°C
For frequencies >20kHz, ±(0.04% of reading + 10 counts)/°C

Crest Factor:

>4:1 at full scale.

Common Mode Rejection:

With 1kΩ imbalance in Lo lead, >70dB, at 60Hz.

Maximum Reading Rates: (readings/sec)

First reading is correct within 70 counts of final value, when on correct range, triggered coincident with step input. Add 0.6 seconds for each range change.

Reading rates are the same as dc volts using fast trigger (T5). Using Normal Trigger (T1, T2, T3):

For 50 or 60Hz operation, auto-zero ON or OFF.
3½ or 4½ digits: 1.4
5½ digits: 1.0

RESISTANCE (2-wire Ω, 4-wire Ω)

Input Characteristics:

Range	Maximum Reading (5½ Digit)	Resolution 5½ Digit	4½ Digit	3½ Digit
30 Ω	30.3099 Ω	100 μΩ	1mΩ	10mΩ
300 Ω	303.099 Ω	1mΩ	10mΩ	100mΩ
3 kΩ	3.03099 kΩ	10mΩ	100mΩ	1 Ω
30 kΩ	30.3099 kΩ	100mΩ	1 Ω	10 Ω
300 kΩ	303.099 kΩ	1 Ω	10 Ω	100 Ω
3MΩ	3.03099MΩ	10 Ω	100 Ω	1 kΩ
30MΩ	30.3099MΩ	100 Ω	1 kΩ	10 kΩ

Input Protection: (non-destructive)

Hi source to Lo source: ±350V peak
Hi sense to Lo sense: ±350V peak
Hi or Lo to Earth Ground: ±500V peak

Measurement Accuracy:

±(% of reading + number of counts)
Auto-zero ON. 4-wire ohms.
Maximum INPUT LO impedance is 3.3% of full scale.

5½ Digit Mode:

Range	Cal. Temp ± 1°C 24 Hours	Cal. Temp. ±5°C 90 Day	1 Year
30Ω	0.023 + 35	0.027 + 41	0.034 + 41
300Ω	0.0045 + 4	0.012 + 5	0.017 + 5
3k – 300kΩ	0.0035 + 2	0.011 + 2	0.016 + 2
3 MΩ	0.0052 + 2	0.011 + 2	0.016 + 2
30MΩ	0.036 + 2	0.066 + 2	0.078 + 2

Note

>30 M ohm Range accuracy is approximately 0.002%/M ohm.

2-Wire Ohms Accuracy:

Same as 4-wire ohms, except add a maximum of 200mΩ offset. On the 3M ohm Range, add .0016% of reading and on the 30M ohm Range, add .0083%.

Auto-Zero Off:

(5½ digit) for a stable environment (±1°C), for <24 hrs., add 110 counts to accuracy specification for 30Ω range, 11 counts for 300Ω, 3 counts for 3KΩ through 300KΩ ranges, 8 counts for 3MΩ range, and 33 counts for 30MΩ range.

Temperature Coefficient:

0°C to 55°C
5½ digit display, auto-zero ON
± (% of reading + number of counts)/°C

Range	Temperature Coefficient
30Ω	0.003 + 5
300Ω	0.0009 + .5
3k – 300kΩ	0.0009 + .05
3MΩ	0.0021 + .05
30MΩ	0.021 + .05

Current Through Unknown:

Range	Current
30 ohm	1mA
300 ohm	1mA
3K ohm	1mA
30K ohm	100μA
300K ohm	10μA
3M ohm	1μA
30M ohm	100nA

Maximum Open Circuit Voltage:

6.5V

Maximum Reading Rates:

Same as dc volts, except for 3MΩ and 30MΩ ranges. For 3MΩ range, add 30ms; for 30MΩ range, add 300ms per reading.

DC CURRENT

Input Characteristics:

Range	Maximum Reading (5½ Digit)	Resolution 5½ Digit	4½ Digit	3½ Digit
300mA	±303.099mA	1μA	10μA	100μA
3 A	±3.03099 A	10μA	100μA	1mA

Maximum Input: (non-destructive)

3A from <250V source; fuse protected

Measurement Accuracy:

± (% of reading + number of counts)
Auto-zero ON. 5½ digit display.

Range	Cal. Temp. ±5°C 90 Days	1 Year
300mA	0.11 + 40	0.15 + 40
3A, <1A input	0.14 + 6	0.17 + 6
3A, >1A input	1.0 + 30	1.0 + 30

Table 1-1. Specifications (Cont'd)

Auto-Zero Off:

(5½ digit) for a stable environment (±1°C), for <24 hrs., add 110 counts to accuracy specification for 300mA range, 11 counts for 3A range.

Temperature Coefficient:

0°C to (Cal. Temp. −5°C),(Cal. Temp. +5°C) to 55°C
5½ digit display, auto-zero ON
± (% of reading + number of counts)/°C

Range	Temperature Coefficient
300mA	0.012 + 5
3 A	0.012 + 0.5

Maximum Burden at Full Scale:

1V

Maximum Reading Rates:

Same as dc volts

AC CURRENT (true rms responding)

Input Characteristics:

Range	Maximum Reading (5½ Digit)	Resolution 5½ Digit	4½ Digit	3½ Digit
300mA	303.099mA	1μA	10μA	100μA
3 A	3.03099 A	10μA	100μA	1mA

Maximum Input: (non-destructive)

3A from <250V source; fuse protected

Measurement Accuracy:

± (% of reading + number of counts)
Auto-zero ON, 5½ digit display, accuracy specified for sine-wave inputs only >10% of full scale.
1 YEAR, CAL. TEMP. ±5°C

Frequency	Ranges 300mA	3A
20Hz – 50Hz	1.54 + 163	2.24 + 163
50Hz – 1kHz	0.81 + 163	1.5 + 163
1kHz – 10kHz	0.72 + 163	1.42 + 163
10kHz – 20kHz	0.86 + 163	1.56 + 163

Auto-zero Off:

(5½ digits) for a stable environment (±1°C), for <24 hrs., add 10 counts to accuracy specification.

Temperature Coefficient:

0°C to 55°C.
5½ digits, auto-zero ON.
± (0.021% of reading + 10 counts)/°C

Maximum Burden at Full Scale:

1V

Crest Factor:

>4:1 at full scale

Maximum Reading Rates:

Same as ac volts

GENERAL INFORMATION

Operating Temperature:

0 to 55°C

Humidity Range:

95% R.H., 0 to 40°C

Storage Temperature:

−40°C to 75°C

Warm-up Time:

1 hr. to meet all specifications.

Integration Time:

Number of Digits	Line Frequency 50Hz	60Hz
5½	200ms	166.7ms
4½	20ms	16.67ms
3½	2ms	1.667ms

Power:

AC Line 48 – 440Hz; 86 – 250V, (see configuration)

Maximum Power:

<25 watts

Size:

102mm H x 215mm W x 356mm D
(4 in H x 8 in W x 14 in D)

Weight:

3Kg (6.5 lbs.)