

KEYSIGHT TECHNOLOGIES (AGILENT HP)

34401A

The Keysight (formerly Agilent / Hewlett-Packard) 34401A is an industry-standard 6½ digit precision benchtop digital multimeter. Renowned for its reliability and accuracy, it provides comprehensive measurement capabilities including DC/AC voltage and current, 2-wire and 4-wire resistance, frequency, period, continuity, and diode testing. Standard features include True RMS AC measurements, built-in math functions, and standard GPIB and RS-232 interfaces, making it highly versatile for both bench exploration and automated test system (ATE) applications.

SPECIFICATIONS

General

Interfaces	RS-232, GPIB (Standard); USB (Optional via adapter)
Display	Vacuum Fluorescent Display (VFD)
Measurement Functions	DCV, ACV, DCI, ACI, 2-wire Resistance, 4-wire Resistance, Frequency, Period, Continuity, Diode Test

Physical

Power Supply	100V / 120V / 220V / 240V $\pm 10\%$, 45 Hz - 66 Hz or 360 Hz - 440 Hz, 25 VA max
Operating Temperature	0 to 55 °C
Dimensions (W×H×D)	254 × 103.6 × 374 mm
Weight	3.6 kg

DC Voltage Specifications

Ranges	100.0000 mV, 1.000000 V, 10.00000 V, 100.0000 V, 1000.000 V
Maximum Resolution	100 nV (on 100 mV range)
Input Resistance	>10 G Ω (100 mV, 1 V, 10 V ranges); 10 M Ω $\pm 1\%$ (100 V, 1000 V ranges)
Input Bias Current	< 30 pA at 25 °C
Maximum Input Protection	1000 VDC
Common Mode Rejection Ratio (CMRR)	140 dB (for 1 k Ω unbalance in LO lead, DC)
Normal Mode Rejection Ratio (NMRR)	60 dB (at 50/60 Hz $\pm 0.1\%$, for 1 NPLC or greater)
1-Year Accuracy	$\pm(0.0035\%$ of reading + 0.0005% of range) on 10 V range

DC Current Specifications

Shunt Resistance	5 Ω for 10 mA / 100 mA; 0.1 Ω for 1 A / 3 A
Burden Voltage	< 0.15 V at 10 mA, < 1.5 V at 100 mA, < 0.3 V at 1 A, < 1 V at 3 A

Resistance Specifications

Measurement Method	Selectable 4-wire or 2-wire ohms (Current source referenced to LO input)
Maximum Lead Resistance (4-Wire)	10% of range per lead for 100 Ω and 1 k Ω ranges; 1 k Ω per lead on all other ranges

AC Voltage Specifications

Frequency Range	3 Hz to 300 kHz
Measurement Technique	AC-coupled True RMS (measures AC component only)
Maximum Crest Factor	5:1 at full scale
Input Impedance	1 M Ω $\pm$ 2% in parallel with 100 pF

Frequency and Period Specifications

Frequency Ranges	3 Hz to 300 kHz
Period Ranges	3.33 μ s to 333 ms
Input Signal Level	100 mV to 750 V rms

Continuity and Diode Test

Continuity Threshold	Adjustable from 1 Ω to 1000 Ω
Diode Test Current	1 mA
Diode Voltage Range	0 to 1.2 V

Measurement Characteristics

A/D Converter Type	Multi-Slope III
Integration Times (NPLC)	0.02, 0.2, 1, 10, 100 Power Line Cycles
Math Functions	Null, Min/Max/Average, dB, dBm, Limit Test
Reading Memory / Storage	512 readings

System and Operating Speeds

Maximum Readings per Second (Over Interface)	1000 readings/second in ASCII format across GPIB
Maximum Readings per Second (To Memory)	1000 readings/second

Triggering Characteristics

Trigger Sources	Internal, External, Bus (Software)
Trigger Delay Range	0 to 3600 seconds (10 μ s step size)

Interfaces and Programming

Supported Command Languages	SCPI (Standard Commands for Programmable Instruments), Agilent 3478A, Fluke 8840A/8842A
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Environmental and Compliance

Storage Temperature Range	-40 °C to 70 °C
Warm-up Time	1 hour
Calibration Cycle	1 year (recommended)

Physical Specifications

Rack Mount Size	2U half-rack
Front and Rear Input Terminals	Standard, switch-selectable

Performance

Overrange Capability	20% on all ranges (except 1000 Vdc and 750 Vac)
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Power

Power Line Frequency	45 Hz to 66 Hz, and 360 Hz to 440 Hz (automatically sensed at power-on)
Power Consumption	25 VA peak (10 W average)
AC Power Voltage Options	100V, 120V, 220V, 240V (±10%)

Environmental

Shock and Vibration	MIL-T-28800E Type III, Class 5 (operating)
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Compliance

Safety Compliance	IEC 1010-1, EN 61010-1, UL 1244, CSA 1010
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AC Characteristics

AC Filter Bandwidths	3 Hz (slow), 20 Hz (medium), 200 Hz (fast)
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Performance Characteristics

A/D Linearity	0.0002% of reading + 0.0001% of range
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System Speeds

Reading Speed (4½ Digits, 0.02 NPLC)	1000 readings/s
Reading Speed (5½ Digits, 1 NPLC)	60 readings/s (60 Hz line) / 50 readings/s (50 Hz line)
Reading Speed (6½ Digits, 10 NPLC)	6 readings/s (60 Hz line) / 5 readings/s (50 Hz line)

TECHNOLOGY

Digital Multimeter

APPLICATIONS

Precision electronic testing, benchtop measurements, automated test systems (ATE), calibration

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