**Agilent 34401A Multimeter**

**Uncompromising Performance for Benchtop and System Testing**

**Product Overview**

- Measure up to 1000 volts with 6½ digits resolution
- 0.0015% basic dcV accuracy (24 hour)
- 0.06% basic acV accuracy (1 year)
- 3Hz to 300kHz ac bandwidth
- 1000 readings/sec. direct to GPIB

**Superior performance**

The Agilent Technologies 34401A multimeter gives you the performance you need for fast, accurate bench and system testing. The 34401A provides a combination of resolution, accuracy and speed that rivals DMMs costing many times more. 6½-digits of resolution, 0.0015% basic 24-hr dcV accuracy and 1,000 readings/sec direct to GPIB assure you of results that are accurate, fast, and repeatable.

**Use it on your benchtop**

The 34401A was designed with your bench needs in mind. Functions commonly associated with bench operation, like continuity and diode test, are built in. A Null feature allows you to remove lead resistance and other fixed offsets in your measurements. Other capabilities like min/max/avg readouts and direct dB and dBm measurements make checkout with the 34401A faster and easier.

The 34401A gives you the ability to store up to 512 readings in internal memory. For trouble-shooting, a reading hold feature lets you concentrate on placing your test leads without having to constantly glance at the display.

**Use it for systems testing**

For systems use, the 34401A gives you faster bus throughput than any other DMM in its class. The 34401A can send up to 1,000 readings/sec directly across GPIB in user-friendly ASCII format.

You also get both GPIB and RS-232 interfaces as standard features. Voltmeter Complete and External Trigger signals are provided so you can synchronize to other instruments in your test system. In addition, a TTL output indicates Pass/Fail results when limit testing is used.

To ensure both forward and backward compatibility, the 34401A includes three command languages (SCPI, Agilent 3478A and Fluke 8840A /42A), so you don’t have to rewrite your existing test software. An optional rack mount kit is available.

**Easy to use**

Commonly accessed attributes, such as functions, ranges, and resolution are selected with a single button press. Advanced features are available using menu functions that let you optimize the 34401A for your applications.

The included Agilent IntuiLink software allows you to put your captured data to work easily, using PC applications such as Microsoft Excel® or Word® to analyze, interpret, display, print, and document the data you get from the 34401A.

You can specify the meter setup and take a single reading or log data to the Excel spreadsheet in specified time intervals. Programmers can use ActiveX components to control the DMM using SCPI commands. To find out more about IntuiLink, visit [www.agilent.com/find/intuilink](http://www.agilent.com/find/intuilink)

The 34401A can also be used in conjunction with the 34812A BenchLink Meter software. This Windows-based program lets you configure and initiate measurements from your computer, and transfer results from your test instrument to your PC.

**3-year warranty**

With your 34401A, you get full documentation, a high-quality test lead set, calibration certificate with test data, and a 3-year warranty, all for one low price.
### Accuracy Specifications ± (% of reading + % of range)\(^1\)

<table>
<thead>
<tr>
<th>Function</th>
<th>Range(^2)</th>
<th>Frequency, etc.</th>
<th>24 Hour (^3)</th>
<th>90 Day</th>
<th>1 Year</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>dc Voltage</td>
<td>100.0000 mV</td>
<td></td>
<td>0.0030 ± 0.0030</td>
<td>0.0040 ± 0.0035</td>
<td>0.0050 ± 0.0035</td>
<td>0.0050 ± 0.0005</td>
</tr>
<tr>
<td></td>
<td>1.000000 V</td>
<td></td>
<td>0.0020 ± 0.0006</td>
<td>0.0030 ± 0.0007</td>
<td>0.0040 ± 0.0007</td>
<td>0.0050 ± 0.0001</td>
</tr>
<tr>
<td></td>
<td>10.000000 V</td>
<td></td>
<td>0.0015 ± 0.0004</td>
<td>0.0020 ± 0.0005</td>
<td>0.0035 ± 0.0005</td>
<td>0.0050 ± 0.0001</td>
</tr>
<tr>
<td></td>
<td>100.0000 V</td>
<td></td>
<td>0.0020 ± 0.0006</td>
<td>0.0035 ± 0.0006</td>
<td>0.0045 ± 0.0006</td>
<td>0.0050 ± 0.0001</td>
</tr>
<tr>
<td></td>
<td>1000.000 V</td>
<td></td>
<td>0.0020 ± 0.0006</td>
<td>0.0035 ± 0.0010</td>
<td>0.0045 ± 0.0010</td>
<td>0.0050 ± 0.0001</td>
</tr>
<tr>
<td>True rms ac Voltage(^4)</td>
<td>100.0000 mV</td>
<td>3 Hz - 5 Hz</td>
<td>1.00 ± 0.03</td>
<td>1.00 ± 0.04</td>
<td>1.00 ± 0.04</td>
<td>0.10 ± 0.004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Hz - 10 Hz</td>
<td>0.35 ± 0.03</td>
<td>0.35 ± 0.04</td>
<td>0.35 ± 0.04</td>
<td>0.035 ± 0.004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 Hz - 20 kHz</td>
<td>0.04 ± 0.03</td>
<td>0.05 ± 0.04</td>
<td>0.06 ± 0.04</td>
<td>0.005 ± 0.004</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 kHz - 50 kHz</td>
<td>0.10 ± 0.05</td>
<td>0.11 ± 0.05</td>
<td>0.12 ± 0.04</td>
<td>0.011 ± 0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 kHz - 100 kHz</td>
<td>0.55 ± 0.08</td>
<td>0.60 ± 0.08</td>
<td>0.60 ± 0.08</td>
<td>0.060 ± 0.008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 kHz - 300 kHz(^5)</td>
<td>4.00 ± 0.50</td>
<td>4.00 ± 0.50</td>
<td>4.00 ± 0.50</td>
<td>0.20 ± 0.02</td>
</tr>
<tr>
<td>Resistance(^6)</td>
<td>100.0000 Ω</td>
<td>1 mA Current Source</td>
<td>0.0030 ± 0.0030</td>
<td>0.008 ± 0.004</td>
<td>0.010 ± 0.004</td>
<td>0.0010 ± 0.0005</td>
</tr>
<tr>
<td></td>
<td>1.000000 kΩ</td>
<td>1 mA</td>
<td>0.0020 ± 0.0005</td>
<td>0.008 ± 0.004</td>
<td>0.010 ± 0.004</td>
<td>0.0010 ± 0.0005</td>
</tr>
<tr>
<td></td>
<td>10.000000 kΩ</td>
<td>100 µA</td>
<td>0.0020 ± 0.0005</td>
<td>0.008 ± 0.004</td>
<td>0.010 ± 0.004</td>
<td>0.0010 ± 0.0005</td>
</tr>
<tr>
<td></td>
<td>100.000000 kΩ</td>
<td>10 µA</td>
<td>0.002 ± 0.01</td>
<td>0.008 ± 0.01</td>
<td>0.010 ± 0.01</td>
<td>0.0010 ± 0.0002</td>
</tr>
<tr>
<td></td>
<td>10.0000000 Ω</td>
<td>500 nA</td>
<td>0.015 ± 0.01</td>
<td>0.020 ± 0.01</td>
<td>0.040 ± 0.01</td>
<td>0.0030 ± 0.0004</td>
</tr>
<tr>
<td></td>
<td>100.0000000 Ω</td>
<td>500 nA</td>
<td>0.300 ± 0.010</td>
<td>0.800 ± 0.010</td>
<td>0.800 ± 0.010</td>
<td>0.150 ± 0.0002</td>
</tr>
<tr>
<td>dc Current</td>
<td>10.0000 mA</td>
<td>&lt;0.1 V Burden Voltage</td>
<td>0.005 ± 0.010</td>
<td>0.030 ± 0.020</td>
<td>0.050 ± 0.020</td>
<td>0.002 ± 0.0020</td>
</tr>
<tr>
<td></td>
<td>100.0000 mA</td>
<td>&lt;0.6 V</td>
<td>0.010 ± 0.004</td>
<td>0.030 ± 0.005</td>
<td>0.050 ± 0.005</td>
<td>0.002 ± 0.0005</td>
</tr>
<tr>
<td></td>
<td>1.000000 A</td>
<td>&lt;1 V</td>
<td>0.050 ± 0.006</td>
<td>0.080 ± 0.010</td>
<td>0.100 ± 0.010</td>
<td>0.005 ± 0.0010</td>
</tr>
<tr>
<td></td>
<td>3.000000 A</td>
<td>&lt;2 V</td>
<td>0.100 ± 0.020</td>
<td>0.120 ± 0.020</td>
<td>0.120 ± 0.020</td>
<td>0.005 ± 0.0020</td>
</tr>
<tr>
<td>True rms ac Current(^4)</td>
<td>1.000000 A</td>
<td>3 Hz - 5 Hz</td>
<td>1.00 ± 0.04</td>
<td>1.00 ± 0.04</td>
<td>1.00 ± 0.04</td>
<td>1.00 ± 0.006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Hz - 10 Hz</td>
<td>0.30 ± 0.04</td>
<td>0.30 ± 0.04</td>
<td>0.30 ± 0.04</td>
<td>0.035 ± 0.006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 Hz - 5 kHz</td>
<td>0.10 ± 0.04</td>
<td>0.10 ± 0.04</td>
<td>0.10 ± 0.04</td>
<td>0.015 ± 0.006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 Hz - 5 Hz</td>
<td>1.10 ± 0.06</td>
<td>1.10 ± 0.06</td>
<td>1.10 ± 0.06</td>
<td>1.00 ± 0.006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Hz - 10 Hz</td>
<td>0.35 ± 0.06</td>
<td>0.35 ± 0.06</td>
<td>0.35 ± 0.06</td>
<td>0.035 ± 0.006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 Hz - 5 kHz</td>
<td>0.15 ± 0.06</td>
<td>0.15 ± 0.06</td>
<td>0.15 ± 0.06</td>
<td>0.015 ± 0.006</td>
</tr>
<tr>
<td>Frequency or Period(^8)</td>
<td>100 mV</td>
<td>3 Hz - 5 Hz</td>
<td>0.10</td>
<td>0.10</td>
<td>0.10</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 Hz - 10 Hz</td>
<td>0.05</td>
<td>0.05</td>
<td>0.05</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 Hz - 40 Hz</td>
<td>0.03</td>
<td>0.03</td>
<td>0.03</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>40 Hz - 300 kHz</td>
<td>0.006</td>
<td>0.01</td>
<td>0.01</td>
<td>0.001</td>
</tr>
<tr>
<td>Continuity</td>
<td>1000.0 Ω</td>
<td>1mA Test Current</td>
<td>0.002 ± 0.010</td>
<td>0.008 ± 0.020</td>
<td>0.010 ± 0.020</td>
<td>0.001 ± 0.002</td>
</tr>
<tr>
<td>Diode Test</td>
<td>1.000000V</td>
<td>1mA Test Current</td>
<td>0.002 ± 0.010</td>
<td>0.008 ± 0.020</td>
<td>0.010 ± 0.020</td>
<td>0.001 ± 0.002</td>
</tr>
</tbody>
</table>

1 Specifications are for 1hr warm-up and 6½ digits, Slow ac filter.
2 Relative to calibration standards.
3 20% over range on all ranges except 1000Vdc and 750Vac ranges.
4 For sinewave input > 5% of range. For inputs from 1% to 5% of range and < 50kHz, add 0.1% of range additional error.
5 750V range limited to 100 kHz or 8 x 10⁷ V olt-Hz.
6 Typically 30% of reading error at 1MHz.
7 Specifications are for 4-wire ohms function or 2-wire ohms using Math Null. Without Math Null, add 0.2 Ω additional error in 2-wire ohms function.
8 Input >100 mV. For 10 mV inputs multiply % of reading error x10.
Measurement Characteristics

**dc Voltage**

**Measurement Method** Continuously
Integrating Multi-slope
III A-D Converter

**A-D Linearity** 0.0002% of reading +
0.0001 % of range

**Input Resistance**
0.1V, 1V, 10 V ranges Selectable 10 MΩ or
>10,000 MΩ
100 V, 1000 V ranges 10 MΩ ± 1%

**Input Bias Current** < 30pA at 25° C

**Input Protection** 1000 V all ranges

dcV:dcV Ratio Accuracy
V_input Accuracy +
V_reference Accuracy

**True rms ac Voltage**

**Measurement Method** ac coupled True rms –
measures the ac component of the input
with up to 400 Vdc of bias on any range.

**Crest Factor** Maximum of 5:1 at Full Scale

**Additional Crest Factor Errors (non-sinewave)**
Crest Factor 1–2
0.05 % of reading
Crest Factor 2–3
0.15 % of reading
Crest Factor 3–4
0.30 % of reading
Crest Factor 4–5
0.40 % of reading

**Input Impedance** 1 MΩ ± 2% in parallel
with 100 pF

**Input Protection** 750Vrms all ranges

**Resistance**

**Measurement Method** Selectable 4-wire or
2-wire Ohms. Current source
terminated to LO input.

**Maximum Lead Resistance**
(4-wire) 10% of range per lead
for 100Ω and 1kΩ ranges, 1kΩ per lead
on all other ranges.

**Input Protection** 1000 V all ranges

**dc Current**

**Shunt Resistance** 5Ω for 10 mA, 100 mA;
0.1 Ω for 1 A, 3 A

**Input Protection** Externally accessible
3 A 250 V Fuse
Internal 7 A 250 V Fuse

**Shunt Resistance** 0.1 Ω for 1 A and 3 A ranges

**Input Protection** Externally accessible
3 A 250 V Fuse
Internal 7 A 250 V Fuse

**Frequency and Period**

**Measurement Method** Reciprocal counting
technique

**Voltage Ranges** Same as ac Voltage Function
Gate Time 1 s, 100 ms, or 10 ms.

**Continuity / Diode**
Response Time 300 samples/s with
audible tone

**Continuity Threshold** Selectable from 1 Ω to
1000 Ω

**Measurement Noise Rejection 60 (50) Hz**
dc CMRR 140 dB
ac CMRR 70 dB

**Integration Time Normal Mode Rejection**
100 plc / 1.67 s (2 s) 60 dB
10 plc / 167 ms (200 ms) 60 dB
1 plc / 16.7 ms (20 ms) 60 dB
<1 plc / 3 ms or 800 µs 0 dB

**Operating Characteristics**

<table>
<thead>
<tr>
<th>Function</th>
<th>Digits</th>
<th>Readings/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>dcV, dcl, and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resistance</td>
<td>6½</td>
<td>0.6 (0.5)</td>
</tr>
<tr>
<td>6½</td>
<td>6 (5)</td>
<td></td>
</tr>
<tr>
<td>5½</td>
<td>60 (50)</td>
<td></td>
</tr>
<tr>
<td>5½</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td>4½</td>
<td>1000</td>
<td></td>
</tr>
<tr>
<td>acV, acl</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6½</td>
<td>0.15 (Slow (3Hz)</td>
<td></td>
</tr>
<tr>
<td>6½</td>
<td>1 Medium (20Hz)</td>
<td></td>
</tr>
<tr>
<td>6½</td>
<td>10 Fast (200Hz)</td>
<td></td>
</tr>
<tr>
<td>6½</td>
<td>50 (50)</td>
<td></td>
</tr>
<tr>
<td>Frequency or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period</td>
<td>6½</td>
<td>1</td>
</tr>
<tr>
<td>5½</td>
<td>9.8</td>
<td></td>
</tr>
<tr>
<td>4½</td>
<td>80</td>
<td></td>
</tr>
</tbody>
</table>

**System Speeds**

<table>
<thead>
<tr>
<th>Configuration Rates</th>
<th>26/s to 50/s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autorange Rate (dc Volts)</td>
<td>&gt;30/s</td>
</tr>
<tr>
<td>ASCII readings to RS-232</td>
<td>55/s</td>
</tr>
<tr>
<td>Maximum Internal Trig. Rate</td>
<td>1000/s</td>
</tr>
<tr>
<td>Max. Ext. Trig. Rate to Memory</td>
<td>1000/s</td>
</tr>
</tbody>
</table>

**Triggering and Memory**

<table>
<thead>
<tr>
<th>Reading HOLD Sensitivity</th>
<th>10%, 1%, 0.1%, or 0.01% of range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Samples/trigger</td>
<td>1 to 50,000</td>
</tr>
<tr>
<td>Trigger Delay</td>
<td>0 to 3600 s: 10 µs step size</td>
</tr>
<tr>
<td>External Trigger Delay</td>
<td>&lt; 1 ms</td>
</tr>
<tr>
<td>External Trigger Jitter</td>
<td>&lt; 500 µs</td>
</tr>
<tr>
<td>Memory</td>
<td>512 readings</td>
</tr>
</tbody>
</table>

**Math Functions**

NULL, Min/Max/Average, dBm, dB, Limit Test
(with TTL output)

**Standard Programming Languages**

SCPI (IEEE-488.2), Agilent 3478A,
Fluke 8840A/42A

**Accessories Included**

Test Lead Kit with probe, alligator, and grabber
attachments.
Operating Manual, Service Manual, test report,
and power cord.

**General Specifications**

<table>
<thead>
<tr>
<th>Power Supply</th>
<th>100 V/120 V/220 V/240 V ±10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Line Frequency</td>
<td>45 Hz to 66 Hz and 390 Hz to 440 Hz</td>
</tr>
<tr>
<td>Automatically sensed at power-on</td>
<td></td>
</tr>
<tr>
<td>Power Consumption</td>
<td>25 VA peak (10W average)</td>
</tr>
<tr>
<td>Operating Environment</td>
<td>Full accuracy for 0° C to 55° C</td>
</tr>
<tr>
<td>Full accuracy to 80% R.H. at 40° C</td>
<td></td>
</tr>
<tr>
<td>Storage Environment</td>
<td>– 40° C to 70° C</td>
</tr>
<tr>
<td>Weight</td>
<td>3.6 kg (8.0 lbs)</td>
</tr>
<tr>
<td>Safety</td>
<td>Designed to CSA, UL-1244, IEC-348</td>
</tr>
<tr>
<td>RFI and ESD</td>
<td>MIL-461C, FTZ 1046, FCC</td>
</tr>
<tr>
<td>Vibration and Shock</td>
<td>MIL-T-28800E, Type III, Class 5 (Sine Only)</td>
</tr>
<tr>
<td>Warranty</td>
<td>3 years</td>
</tr>
</tbody>
</table>

1 For 1kΩ unbalance in LO lead.
2 For power line frequency ± 0.1%.
3 For power line frequency ± 1% use 40dB or ± 3%
use 30dB.
4 Reading speeds for 60Hz and (50Hz) operation.
5 Maximum useful limit with default settling delays
defeated.
6 Speeds are for 4½ digits, Delay 0, Auto-zero and
Display OFF.
Ordering Information
Agilent 34401A Multimeter

Accessories included
Test Lead Kit with probe, alligator, and grabber attachments, IntuiLink connectivity software, operating manual, service manual, calibration certificate, test report, and power cord.

Options
Opt. 908 Rack Mount Kit* (P/N 5062-3972)
Opt. 910 Extra manual set (English)
Opt. OBO DMM without manuals
Opt. W50 Additional 2-year warranty (5-year total)
Opt. 1BP MIL-STD-45662A calibration with data

Manual options (please specify one)
ABA US English
ABD German
ABE Spanish
ABF French
ABJ Japanese
ABZ Italian
ABO Taiwan Chinese
AB1 Korean
AB2 Chinese
AKT Russian

Agilent Accessories
11059A Kelvin Probe set
11060A Surface Mount Device (SMD) test probes
11062A Kelvin clip set
34131 Hard Transit Case
34161A Accessory pouch
34171A Input terminal connector (sold in pairs)
34172A Input calibration short (sold in pairs)
34330A 30 A current shunt
34812A BenchLink Meter software
E2308A 5K thermistor probe

*For racking two side-by-side, order both items below
Lock link kit (P/N 5081-9694)
Flange kit (P/N 5063-9212)

Agilent Technologies’ Test and Measurement Support, Services, and Assistance
Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent’s overall support policy: “Our Promise” and “Your Advantage.”

Our Promise
Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage
Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

By internet, phone, or fax, get assistance with all your test & measurement needs
Online assistance:
www.agilent.com/find/assist

Phone or Fax
United States: (tel) 1 800 452 4844
Canada: (tel) 1 877 894 4414 (fax) (995) 282-6495
Europe: (tel) (31 20) 547 2323 (fax) (31 20) 547 2390
Japan: (tel) (81) 426 56 7832 (fax) (81) 426 56 7840
Latin America: (tel) (305) 269 7500 (fax) (305) 269 7599
Australia: (tel) 1 800 829 485 (fax) (61 3) 9210 5947
New Zealand: (tel) 0 800 738 378 (fax) 64 4 495 8950
Asia Pacific: (tel) (852) 3197 7777 (fax) (852) 2506 9284

Product specifications and descriptions in this document subject to change without notice.
Copyright © 2001 Agilent Technologies
Printed in the USA January 23, 2001 5968-0162EN