Agilent 34405A Multimeter
5.5 Digit Dual Display, Benchtop DMM
More Capabilities at a Value Price

Data Sheet
Features

- 120000 counts resolution
- 16 built-in measurement functions including temperature and capacitance
- 0.025% 1-year DC voltage accuracy
- USB 2.0
- SCPI compatible
- Agilent IO Library Suite and DMM Intuilink connectivity software included

Affordable and Feature Rich Measurement Tool

With the 34405A digital multimeter, you get all the tools you need at an affordable price without compromising the quality Agilent products are known for. It provides a broad range of features and measurement functions such as DC voltage, DC current, true-RMS AC voltage and AC current, 2-wire resistance, frequency, diode test and continuity which are designed to meet general industrial needs. Furthermore, it can measure temperature ranging from -80 °C to 150 °C. The true value is more evident with its capability to measure capacitance ranging from 1000 pF to 10000 µF. Agilent 34405A also improves efficiency and accuracy with its six built-in math operations: Null, dBm, dB, MinMax, Limit and Hold.

Quick Connection to the PC with USB 2.0 Interface

For those with a need to control and take preset measurements with a PC, the built-in USB 2.0 interface provides an easy and robust connection between the PC and DMM. The USB interface connects directly to the PC host and works seamlessly with Agilent Connectivity software and can be controlled remotely via industry standard SCPI commands or through DMM Intuilink Connectivity software. IVI-COM and LabVIEW drivers are included to ensure an easy integration with different programming environments.

Bright Display, Fast Reading Speed and Configuration Storage

When high throughput and productivity are the priority, Agilent 34405A VFD dual display feature allows users to take more than one measurement and display them simultaneously on the front panel. For speed critical applications, Agilent 34405A can take up to 19 readings/sec at 4.5 digits resolution directly to the PC. In addition, the user can configure and store complete instrument setups and recall them at anytime from any of the four built-in storing states.

Rugged and Reliable

The 34405A is designed and tested according to major Safety and Regulatory Standards. In addition, the shock absorbing bumpers is designed to prevent physical damage from your day-to-day use.

You can watch 34405A in action on your PC by downloading the interactive demo from the 34405A homepage at www.agilent.com/find/34405a

Go to the WEB for more information on Agilent’s DMM. Visit www.agilent.com
**DC CHARACTERISTICS**

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RANGE</th>
<th>TEST CURRENT OR BURDEN VOLTAGE</th>
<th>INPUT IMPEDANCE</th>
<th>1 Year</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23 °C ± 5 °C</td>
<td>0 °C - 18 °C</td>
</tr>
<tr>
<td></td>
<td>±</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>VOLTAGE</strong></td>
<td>100.000 mV</td>
<td>-</td>
<td>10.0 MΩ ±2%</td>
<td>0.025+0.008</td>
<td>0.0015+0.0005</td>
</tr>
<tr>
<td></td>
<td>1.00000 V</td>
<td>-</td>
<td>10.0 MΩ ±2%</td>
<td>0.025+0.006</td>
<td>0.0010+0.0005</td>
</tr>
<tr>
<td></td>
<td>10.000 V</td>
<td>-</td>
<td>10.1 MΩ ±2%</td>
<td>0.025+0.005</td>
<td>0.0020+0.0005</td>
</tr>
<tr>
<td></td>
<td>100.000 V</td>
<td>-</td>
<td>10.1 MΩ ±2%</td>
<td>0.025+0.005</td>
<td>0.0020+0.0005</td>
</tr>
<tr>
<td></td>
<td>1000.00 V</td>
<td>-</td>
<td>10.0 MΩ ±2%</td>
<td>0.025+0.005</td>
<td>0.0015+0.0005</td>
</tr>
<tr>
<td><strong>RESISTANCE</strong></td>
<td>100.000 Ω</td>
<td>1.0 mA</td>
<td>-</td>
<td>0.05+0.008</td>
<td>0.0060+0.0008</td>
</tr>
<tr>
<td></td>
<td>1.00000 kΩ</td>
<td>0.83 mA</td>
<td>-</td>
<td>0.05+0.005</td>
<td>0.0060+0.0005</td>
</tr>
<tr>
<td></td>
<td>10.0000 kΩ</td>
<td>100 μA</td>
<td>-</td>
<td>0.05+0.006</td>
<td>0.0060+0.0005</td>
</tr>
<tr>
<td></td>
<td>100.000 MΩ</td>
<td>10.0 μA</td>
<td>-</td>
<td>0.05+0.007</td>
<td>0.0060+0.0005</td>
</tr>
<tr>
<td></td>
<td>1.00000 MΩ</td>
<td>900 nA</td>
<td>-</td>
<td>0.06+0.007</td>
<td>0.0060+0.0005</td>
</tr>
<tr>
<td></td>
<td>10.0000 MΩ</td>
<td>205 nA</td>
<td>-</td>
<td>0.25+0.005</td>
<td>0.0250+0.0005</td>
</tr>
<tr>
<td></td>
<td>100.000 MΩ</td>
<td>205 nA</td>
<td>10 MΩ</td>
<td>-</td>
<td>2.00+0.05</td>
</tr>
<tr>
<td><strong>CURRENT</strong></td>
<td>10.0000 mA</td>
<td>&lt; 0.2 V</td>
<td>-</td>
<td>0.05+0.015</td>
<td>0.0055+0.0005</td>
</tr>
<tr>
<td></td>
<td>100.000 mA</td>
<td>&lt; 0.2 V</td>
<td>-</td>
<td>0.05+0.005</td>
<td>0.0055+0.0005</td>
</tr>
<tr>
<td></td>
<td>1.00000 A</td>
<td>&lt; 0.5 V</td>
<td>-</td>
<td>0.20+0.007</td>
<td>0.0100+0.0005</td>
</tr>
<tr>
<td></td>
<td>10.0000 A</td>
<td>&lt; 0.6 V</td>
<td>-</td>
<td>0.25+0.007</td>
<td>0.0150+0.0005</td>
</tr>
<tr>
<td><strong>CONTINUITY</strong></td>
<td>1000 Ω</td>
<td>0.83 mA</td>
<td>-</td>
<td>0.05+0.005</td>
<td>0.0050+0.0005</td>
</tr>
<tr>
<td><strong>DIODE TEST</strong></td>
<td>1.0000 V</td>
<td>0.83 mA</td>
<td>-</td>
<td>0.05+0.005</td>
<td>0.0050+0.0005</td>
</tr>
</tbody>
</table>

**AC CHARACTERISTICS**

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RANGE</th>
<th>FREQUENCY</th>
<th>ACCURACY ± (% of reading + % of range)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>±</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>TRUE-RMS AC VOLTAGE</strong></td>
<td>100.000 mV</td>
<td>20 Hz - 45 Hz</td>
<td>1.0+0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 Hz - 10 kHz</td>
<td>0.2+0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 kHz - 30 kHz</td>
<td>1.5+0.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 kHz - 100 kHz</td>
<td>5.0+0.3</td>
</tr>
<tr>
<td></td>
<td>1.00000 V to 750.00 V</td>
<td>20 Hz - 45 Hz</td>
<td>1.0+0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 Hz - 10 kHz</td>
<td>0.2+0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 kHz - 30 kHz</td>
<td>1.0+0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 kHz - 100 kHz</td>
<td>3.0+0.2</td>
</tr>
<tr>
<td><strong>TRUE-RMS AC CURRENT</strong></td>
<td>10.0000 mA to 10.0000 A</td>
<td>20 Hz - 45 Hz</td>
<td>1.5+0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>45 Hz - 1 kHz</td>
<td>0.5+0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 kHz - 10 kHz</td>
<td>2.0+0.2</td>
</tr>
</tbody>
</table>
### AC CHARACTERISTICS[1]

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RANGE[9]</th>
<th>FREQUENCY</th>
<th>1 Year</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>FREQUENCY[10],[16]</td>
<td>100.000 mV to 750.00 V</td>
<td>&lt; 2 Hz[17]</td>
<td>0.18+0.003</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 20 Hz</td>
<td>0.04+0.003</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 Hz - 100 kHz[11]</td>
<td>0.02+0.003</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 kHz ~ 300 kHz[12]</td>
<td>0.02+0.003</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td>10.0000 mA to 10.0000 A</td>
<td>&lt; 2 Hz[17]</td>
<td>0.18+0.003</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 20 Hz</td>
<td>0.04+0.003</td>
<td>0.005</td>
</tr>
<tr>
<td></td>
<td></td>
<td>20 Hz ~ 10 kHz[11]</td>
<td>0.02+0.003</td>
<td>0.005</td>
</tr>
</tbody>
</table>

### TEMPERATURE and CAPACITANCE CHARACTERISTICS[1]

<table>
<thead>
<tr>
<th>FUNCTION</th>
<th>RANGE</th>
<th>TEST CURRENT, etc.</th>
<th>1 Year</th>
<th>Temperature Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMPERATURE</td>
<td>-80 °C - 150 °C</td>
<td>5 kΩ thermistor probe</td>
<td>Probe accuracy + 0.2 °C</td>
<td>0.002 °C</td>
</tr>
<tr>
<td></td>
<td>-110.0 °F - 300.0 °F</td>
<td>5 kΩ thermistor probe</td>
<td>Probe accuracy + 0.4 °F</td>
<td>0.0036 °F</td>
</tr>
<tr>
<td>CAPACITANCE</td>
<td>1.000 nF</td>
<td>0.75 μA</td>
<td>2.0+0.8</td>
<td>0.02+0.001</td>
</tr>
<tr>
<td></td>
<td>10.00 nF</td>
<td>0.75 μA</td>
<td>1.0+0.5</td>
<td>0.02+0.001</td>
</tr>
<tr>
<td></td>
<td>100.0 nF</td>
<td>8.3 μA</td>
<td>1.0+0.5</td>
<td>0.02+0.001</td>
</tr>
<tr>
<td></td>
<td>1.000 μF - 100.0 μF</td>
<td>83 μA</td>
<td>1.0+0.5</td>
<td>0.02+0.001</td>
</tr>
<tr>
<td></td>
<td>1000 μF</td>
<td>0.83 mA</td>
<td>1.0+0.5</td>
<td>0.02+0.001</td>
</tr>
<tr>
<td></td>
<td>10 000 μF</td>
<td>0.83 mA</td>
<td>2.0+0.5</td>
<td>0.02+0.001</td>
</tr>
</tbody>
</table>

[1] Specifications are for 30 minutes warm-up, 5 1/2 digit resolution and calibration temperature 18 °C - 28 °C.
[2] 20% over range on all ranges except 1000 Vdc.
[3] Specifications are 2-wire ohms using Math Null. If without Math Null, add 0.2 Ω additional error.
[4] Specifications are for the voltage measured at the input terminals only.
[5] 20% over range on all range except 750 Vac.
[6] Specifications are for sinewave inputs >5% of range. Maximum crest factor : 3 at full scale.
[7] Additional error to be added as frequency >30 kHz and signal input <10% of range. 30 kHz ~ 100 kHz: 0.003% of full scale per kHz.
[8] For 12 A terminal, 10 A dc or ac rms continuous, >10 A dc or ac rms for 30 seconds ON and 30 seconds OFF.
[9] For 1 A and 10 A ranges, the frequency is verified for less than 5 kHz.
[10] Specifications are for half-hour warm-up, using 0.1 second aperture. The frequency can be measured up 1 MHz as 0.5 V signal to 100 mV/1 V ranges.
[11] For 20 Hz ~ 10 kHz, the sensitivity is AC input current from 10% to 120% of range except where noted.
[12] For 100 kHz ~ 300 kHz, the sensitivity will be 12% ~ 120% of range except 750 V range.
[13] Input Impedence is in paralleled with capacitance <120 pF.
[16] For frequency, use AC Accuracy ± (% of reading + 3 counts).
[17] Minimum measured frequency is 1 Hz.
## OPERATING CHARACTERISTICS

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>DCV</td>
<td>5.5</td>
<td>15 /s</td>
<td>0.3</td>
<td>0.3</td>
<td>&lt; 1.2</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>4.5</td>
<td>70 /s</td>
<td>0.2</td>
<td>0.2</td>
<td>&lt; 1.1</td>
<td>19</td>
</tr>
<tr>
<td>DCI</td>
<td>5.5</td>
<td>15 /s</td>
<td>0.4</td>
<td>0.4</td>
<td>&lt; 1.0</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>4.5</td>
<td>70 /s</td>
<td>0.3</td>
<td>0.3</td>
<td>&lt; 0.5</td>
<td>19</td>
</tr>
<tr>
<td>ACV</td>
<td>5.5</td>
<td>2.5 /s</td>
<td>1.3</td>
<td>1.7</td>
<td>&lt; 5.7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4.5</td>
<td>2.5 /s</td>
<td>1.2</td>
<td>1.5</td>
<td>&lt; 5.1</td>
<td>2</td>
</tr>
<tr>
<td>ACI</td>
<td>5.5</td>
<td>2.5 /s</td>
<td>1.8</td>
<td>2.2</td>
<td>&lt; 4.7</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4.5</td>
<td>2.5 /s</td>
<td>1.5</td>
<td>1.9</td>
<td>&lt; 4.0</td>
<td>2</td>
</tr>
<tr>
<td>FREQ[^6]</td>
<td>5.5</td>
<td>9 /s</td>
<td>2.8</td>
<td>2.8</td>
<td>&lt; 5.8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>4.5</td>
<td>9 /s</td>
<td>2.5</td>
<td>2.5</td>
<td>&lt; 5.0</td>
<td>1</td>
</tr>
</tbody>
</table>

[^1]: Reading rate of the A/D converter.
[^2]: Time to change from 2-wire resistance to this specified function and to take at least one reading using SCPI “FUNC” and “READ?” commands.
[^3]: Time to change from one range to the next higher range and to take at least one reading using SCPI “FUNC” and “READ?” commands.
[^4]: Time to automatically change one range and to take at least one reading using SCPI “CONF AUTO” and “READ?” commands.
[^5]: Number of measurements per second that can be read through USB using SCPI “READ?” command.
[^6]: Reading rate depends on signal frequency >10 Hz.

## DIMENSIONS

![Dimensions Diagram](image)

- 261.1mm
- 103.8mm
- 303.2mm
## SUPPLEMENTAL MEASUREMENT CHARACTERISTICS

### DC VOLTAGE
- **Measuring Method:** Sigma Delta A-to-D converter
- **Input Resistance:** 10 MΩ ± 2% range (typical)
- **Input Protection:** 1000 V on all ranges

### RESISTANCE
- **Measuring Method:** 2-wire Ohms
- **Open-circuit voltage:** Limited to < 2.8 V
- **Input Protection:** 1000 V on all ranges

### DC CURRENT
- **Shunt Resistance:**
  - 0.1 Ω to 10 Ω for 10 mA to 1.2 A ranges
  - 0.01 Ω for 12 A range
- **Input Protection:**
  - Front Panel 1.25 A, 500 V fuse for I terminal
  - Internal 15 A, 600 V fuse for 12 A terminal

### CONTINUITY/DIODE TEST
- **Measuring Method:** Uses 0.83 mA ± 0.2% constant current source, < 5 V open circuit voltage
- **Response Time:** 70 samples/second with audible tone
- **Continuity Threshold:** 10 Ω fixed
- **Input Protection:** 1000 V

### TEMPERATURE
- **Measurement Method:** 2-wire Ohms measurement of 5 kΩ thermistor sensor (E2308A) with computer conversion
- **Input Protection:** 1000 V

### MEASUREMENT NOISE REJECTION
- **CMRR (Common Mode Rejection) for 1 kΩ unbalance LO lead**
  - DC: 120 dB
  - AC: 70 dB
- **NMR (Normal Mode Rejection) For 60 Hz (50 Hz) ± 0.1%**
  - 5 1/2 digit: 65 dB (55 dB)
  - 4 1/2 digit: 0 dB

### AC VOLTAGE
- **Measurement Method:** AC coupled true-RMS - measure the ac component with up to 400 Vdc bias any range
- **Crest Factor:** Maximum 5:1 at full scale
- **Input Impedance:** 1 MΩ ± 2% in parallel with < 100 pF of all ranges
- **Input Protection:** 750 Vrms on all ranges

### AC CURRENT
- **Measuring Method:** DC coupled to the fuse and current shunt, AC coupled true-RMS measurement (measure the AC component only)
- **Shunt Resistance:**
  - 0.1 Ω to 10 Ω for 10 mA to 1.2 A range
  - 0.1 Ω for 12 A range
- **Input Protection:**
  - Externally accessible 1.25 A, 500 V fuse for I terminal
  - Internally replaceable 15 A, 600 V fuse for 12 A terminal

### FREQUENCY
- **Measurement Method:** Reciprocal counting technique. AC coupled input using AC voltage function.
- **Signal Level:**
  - 10% of range to full scale input on all ranges
- **Auto or manual range selection**
- **Gate Time:** 0.1 second or 1 period of the input signal, whichever is longer.
- **Input Protection:** 750 Vrms on all ranges

### MATH FUNCTIONS
- Null, dBm, dB, Min/Max/Avg, Hold, Limit Test

### TRIGGER and MEMORY
- Single trigger, 1 reading memory

### REMOTE INTERFACE
- USB 2.0 full speed, USBTMC-USB488 device class

### PROGRAMMING LANGUAGE
- SCPI, IEEE-488.1, IEEE-488.2
GENERAL CHARACTERISTICS

POWER SUPPLY
100V/120V(127V)/220V(230V)/240V ± 10%
AC line frequency 45Hz - 66Hz and (360Hz - 440Hz,
100/120V operation)

POWER CONSUMPTION
16VA maximum, <11W average

OPERATING ENVIRONMENT
Full accuracy at 0 °C to 55 °C
Full accuracy to 80% RH at 30 °C (non-condensing)
Altitude up to 3000 meters

STORAGE COMPLIANCE
-40 °C to 70 °C

SAFETY COMPLIANCE
Certified to CSA for IEC/EN/CSA/UL 61010-1 2nd Edition

MEASUREMENT CATEGORY
CAT II, 300V: CAT I 1000Vdc, 750Vac rms, 2500Vpk
transient over voltage
Pollution degree 2

EMC COMPLIANCE
Certified to IEC/EN 61326:2002, CISPR 11, and
equivalents for Group 1, Class A

SHOCK and VIBRATION
Tested to IEC/EN 60086-2

SHOCK and VIBRATION
Tested to IEC/EN 60086-2

DIMENSION (HxWxD)
Rack: 88.5mm x 212.6mm x 272.3mm
Bench: 103.8mm x 261.2mm x 303.2mm

WEIGHT
3.75 kg, 8.27 lb

WARM UP TIME
30 minutes

WARRANTY
One year for 34405A
Three months for standard shipped accessories

Standard shipped accessories:
- Test lead kit
- Test report
- Power cord
- USB interface cable
- Quick Start Guide
- User’s and Service Guide
- Product Reference CD-ROM
- Agilent IO Library Suite CD-ROM

Options:
- Opt. 1CM - Rack mount adapter kit

Agilent Optional Accessories

34133A Precision Electronics Test Leads
34330A 30A Current Shunt
E2308A Thermistor Probe
Agilent 34405A Multimeter: Versatile and low cost solution for benchtop testing.

5.5 digit dual display increases productivity and throughput in troubleshooting.

Use the Up-Down keys to select the desired measurement range. Just press Shift -> Auto key to switch measurement range automatically.

Superior value with a broad range of functions, which includes the temperature and capacitance measurements.

Connect the supplied test leads to the Input Terminals to start your measurements.

Selecting the secondary display measurements.

Math functions and utility menu that allow users to take reference measurements (ie. Min/Max value and etc.) and store the measurement setups from the front panel.
LAN eXtensions for Instruments puts the power of Ethernet and the Web inside your test systems. Agilent is a founding member of the LXI consortium.

AdvancedTCA® Extensions for Instrumentation and Test (AXIe) is an open standard that extends the AdvancedTCA for general purpose and semiconductor test. Agilent is a founding member of the AXIe consortium.

PCI eXtensions for Instrumentation (PXI) modular instrumentation delivers a rugged, PC-based high-performance measurement and automation system.

Agilent Channel Partners

Get the best of both worlds: Agilent’s measurement expertise and product breadth, combined with channel partner convenience.

For more information on Agilent Technologies’ products, applications or services, please contact your local Agilent office. The complete list is available at:

www.agilent.com/find/contactus

Americas

Canada  (877) 894 4414
Brazil  (11) 4197 3600
Mexico  01800 5064 800
United States  (800) 829 4444

Asia Pacific

Australia  1 800 629 485
China  800 810 0189
Hong Kong  800 938 693
India  1 800 112 929
Japan  0120 (421) 345
Korea  080 769 0800
Malaysia  1 800 888 848
Singapore  1 800 375 8100
Taiwan  0800 047 866
Other AP Countries  (65) 375 8100

Europe & Middle East

Belgium  32 (0) 2 404 93 40
Denmark  45 45 80 12 15
Finland  358 (0) 10 856 2100
France  0825 010 700*
*0.125 €/minute
Germany  49 (0) 7031 464 6333
Ireland  1890 924 204
Israel  972-3-9288-504/544
Italy  39 02 92 60 8484
Netherlands  31 (0) 20 547 2111
Spain  34 (91) 631 3300
Sweden  0200-88 22 55
United Kingdom  44 (0) 118 927 6201

For other unlisted countries:

www.agilent.com/find/contactus

Product specifications and descriptions in this document subject to change without notice.

© Agilent Technologies, Inc. 2013
Published in USA, March 25, 2013
5989-4906EN