

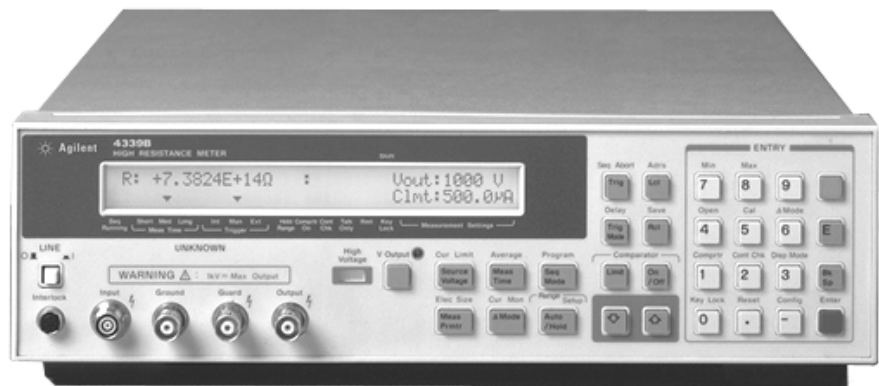
# Agilent 4339B/4349B High Resistance Meters

## Technical Overview

**Within Budget.  
Without Compromise.**

**Introducing the Agilent Technologies 4339B and 4349B high resistance meters used for making ultra-high resistance measurements.**

For precision bench-top applications, the 1-channel 4339B is the premier solution for accurate high resistance and low current tests. For high resistance testing in manufacturing environments, the 4349B offers simultaneous 4-channel high resistance measurements for increased test throughput.



### Satisfy Your Needs For ...

#### High quality results

- High confidence testing with contact check function
- Remove parasitics with error correction
- Consistent data with 0.6% basic accuracy
- Compensation for handler contact chattering with trigger delay

#### Versatile measurements

- Select from four test parameters
- Use a variety of test fixtures and accessories
- Perform a charge-measure-discharge sequence with the test sequence program function
- Save and recall up to ten measurement setups

#### High test throughput: 4349B

- 9.5 ms measurements
- 4-channels for multiple DUTs
- 4-channel simultaneous testing
- Fast contact checking: 2 ms/measurement
- GPIB and handler interfaces
- Ideal for high volume capacitor testing



**Agilent Technologies**

**Display:**

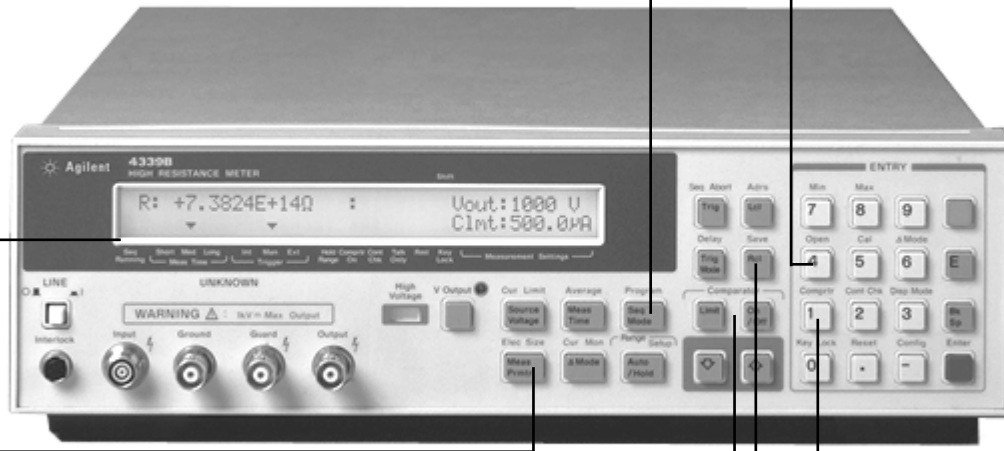
LCD with back-light. Displays measurement values. Instrument slates and comparator results.

**Test sequence program:**

Controls a series of resistance measurements. (Charge-measure-discharge)

**Open:**

Compensate leakage current and capacitance in test fixtures and cables.

**Measurement parameter:**

Select the right parameter for the measurement.

**Comparator:**

Select values for high, in, and low testing.

**Save/Recall:**

Store and retrieve up to 10 measurement states.

**Contact check:**

Verifies reliability of capacitor test connections.



Agilent 4349B 4-channel high resistance meter

### Key parameters and specifications

	Agilent 4339B	Agilent 4349B
<b>Test channels</b>	1	2ch, Option 4349B-001 4ch, Option 4349B-700
<b>Test voltage(Vdc)</b>	0.1 to 1000	Requires external power source
<b>Measurement parameters</b>	R, I, pv, ps	R, I
<b>Measurement range (Ω)</b>	10 <sup>3</sup> to 1.6x10 <sup>16</sup>	10 <sup>3</sup> to 10 <sup>15</sup>
<b>Basic accuracy</b>	0.6%	2%
<b>Display resolution</b>	3 / 4 / 5 digits	3 / 4 / 5 digits
<b>Measurement time</b>	10 ms/30 ms/390 ms	9.5 ms/28 ms/98 ms/397 ms

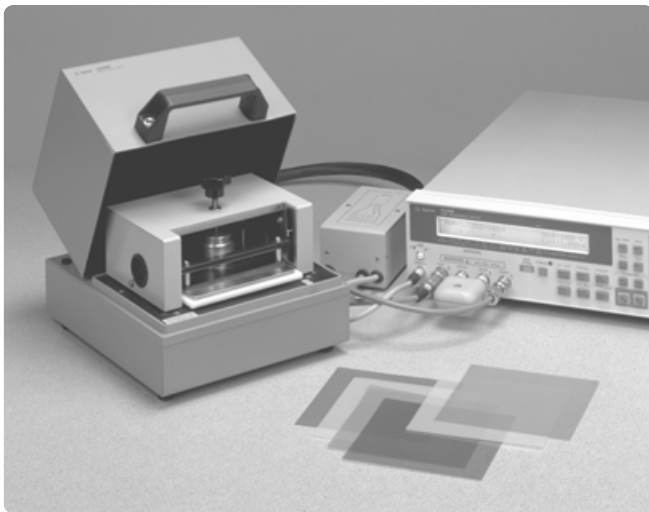


**High quality measurements with flexible hardware**

- Resolve data to 5 digits (3, 4, or 5 digits selectable)
- Make precise measurements with 0.6% basic accuracy
- Verify DUT performance at the exact voltage rating
- Reliable and safety measurements with Agilent 16339A component test fixture

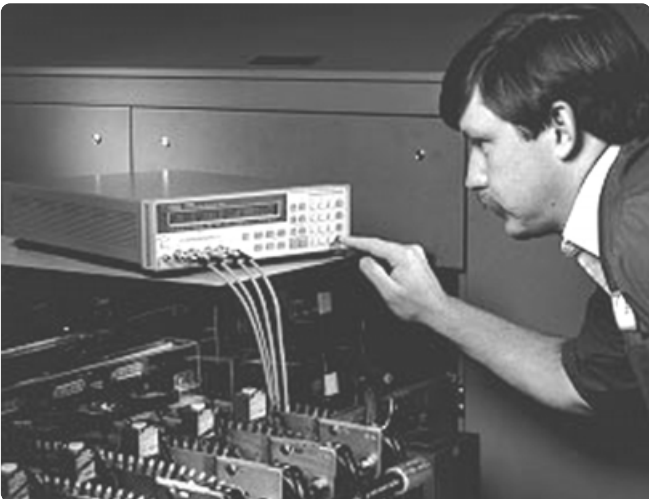
**4339B solutions for high voltage material testing**

- Resistivity mathematics built-in: surface and volume
- Agilent 16008B resistivity cell for solid samples
- Easy measurements with test sequence program function (controls charge-measure-discharge sequence)
- Customize your fixture cabling with the Agilent 16117C test leads



**System features you need to be successful**

- Maximize accuracy with error correction
- Test capacitor contact failure with contact check function
- Automate testing with GPIB interface
- Reduce ground-loops with isolated handler interface
- Pass/Fail testing with comparator function (high/in/low)



**Capacitor evaluation with the 4349B**

- Optimize capacitor Vdc rating tests
- Increase throughput four times with 4-channels
- Improve reliability with contact check
- Get low noise results with Agilent 16117E test lead

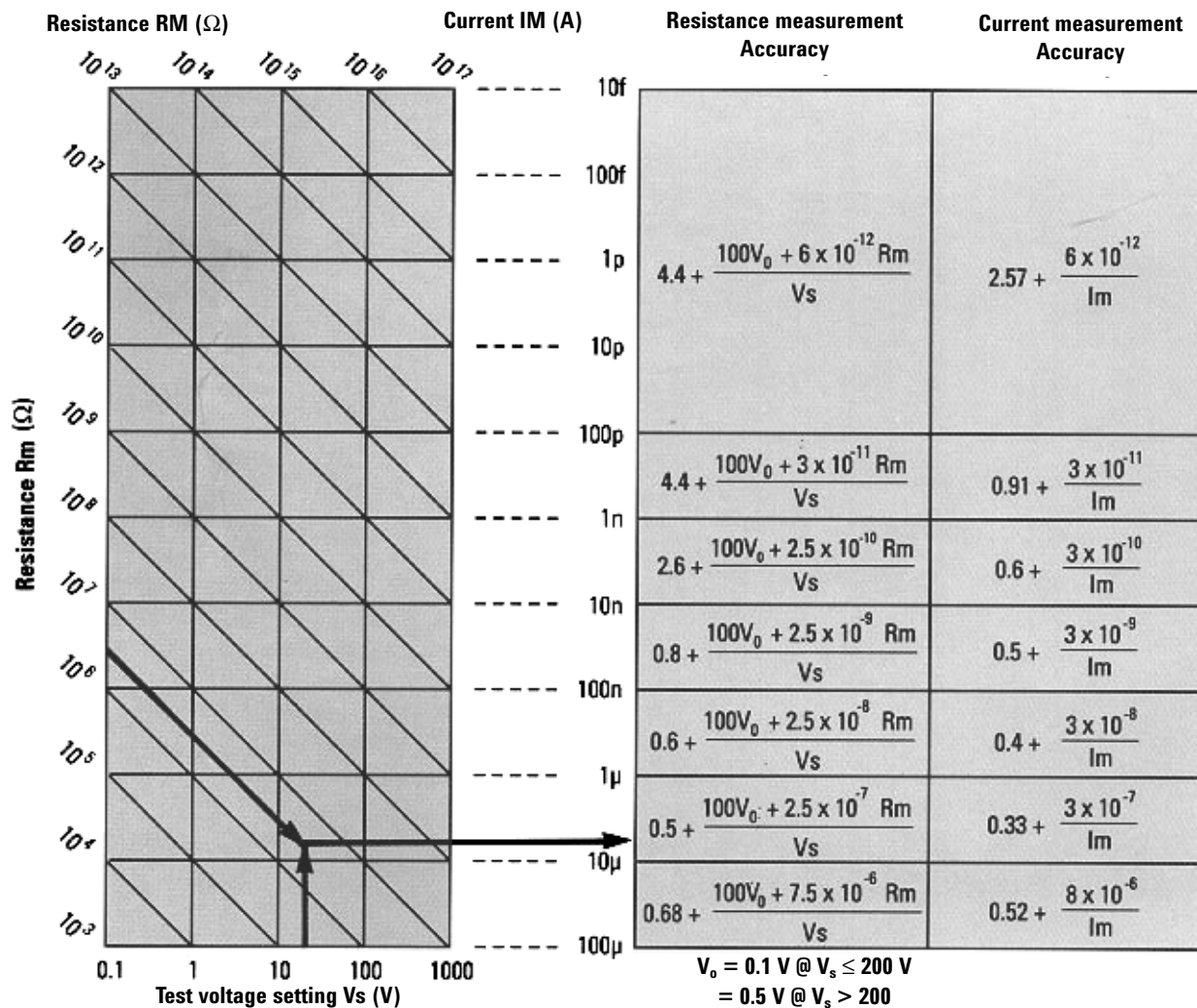


Figure 1. Conversion diagram

Table 1. Agilent 4339B measurement accuracy ( $\pm\%$  of reading)

**Specifications**  
**Measurement Accuracy**

**Agilent 4339B test conditions\*:**

1. Warm up time:  $\geq 30$  minutes
2. Ambient temperature:  $23 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$
3. Test cable length:  $\leq 1.5$  meters
4. Open error correction performed
5. Long measurement time setting
6. Contact check: off

**Accuracy parameters:**

$R_m$ : Measured resistance value in  $\Omega$   
 $I_m$ : Measured current value in amperes  
 $V_s$ : Source voltage in volts  
 $V_0$ :  $0.1 \text{ V} @ V_s \leq 200 \text{ V}$ ,  $0.5 \text{ V} @ V_s > 200 \text{ V}$

**Accuracy example:**

To determine the accuracy of a measurement use Figure 1, "Conversion diagram".  
 For example: determine the accuracy of a  $5 \text{ M}\Omega$  ( $= 5 \times 10^6 \Omega$ ) measurement at  $50 \text{ Vdc}$ .  
 $R_m = 5 \times 10^6 \Omega$   
 $V_s = 50 \text{ V}$

The intersection of  $R_m$  running parallel to the  $10^6 \Omega$  diagonal line intersects the vertical  $V_s$  line at the second row from the bottom of the diagram. Moving horizontally across to Table 1, the following equation is found:

$$0.5 + \frac{100 V_0 + (2.5 \times 10^{-7} \times R_m)}{V_s}$$

Entering the values for  $R_m$ ,  $V_0$ , and  $V_s$  yields an accuracy of  $\pm 0.725\%$ .

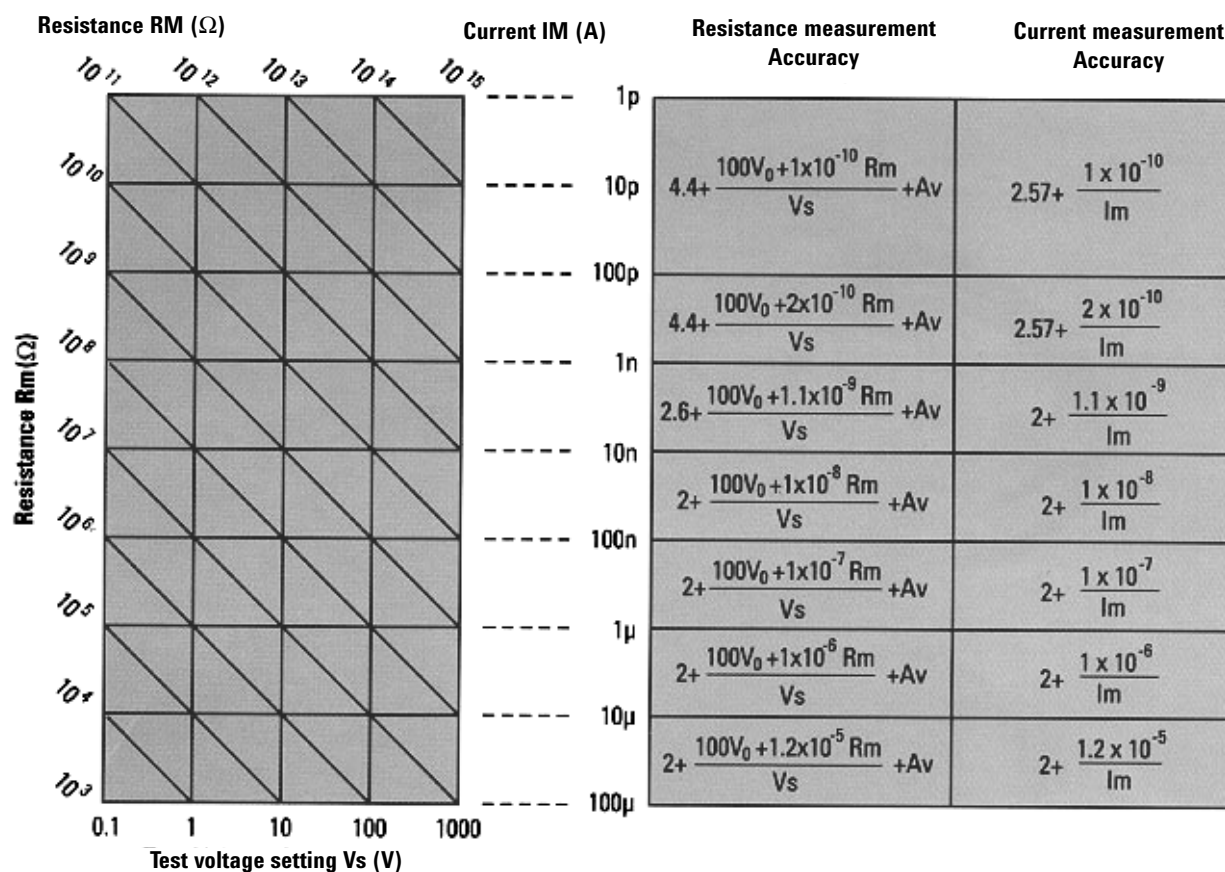


Figure 2. Conversion diagram

Table 2. Agilent 4349B measurement accuracy ( $\pm\%$  of reading)

**Agilent 4349B test conditions\*:**

1. Warm up time:  $\geq 30$  minutes
2. Ambient temperature:  $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$
3. Test cable length:  $\leq 1.5$  meters
4. Open error correction performed
5. 30 ms measurement time setting

**Accuracy parameters:**

$R_m$ : Measured resistance value in ohms  
 $I_m$ : Measured current value in amperes

**External power supply parameters:**

$V_s$ : Source voltage in volts  
 $V_0$ : Source offset voltage in Volts  
 $Av$ : Voltage accuracy

\* Other test condition data available in the operation manual.

## Other Specifications

### Measurement parameters/ranges

Parameter	Range
<b>Agilent 4339B</b>	
R (dc resistance)	10 <sup>3</sup> Ω to 1.6 x 10 <sup>16</sup> Ω
I (dc current)	60 fA to 100 μA
ps (surface resistivity)	Refer to operation manual
pv (volume resistivity)	Refer to operation manual
<b>Agilent 4349B</b>	
R (dc resistance)	10 <sup>3</sup> Ω to 10 <sup>15</sup> Ω
I (dc current)	1 pA to 100 μA

### Measurement conditions and functions

*DC test voltage (4339B):* 0 V to 1000 V, 0.1 V steps @ V ≤ 200V, 1.0 V steps @ V > 200 V

*DC test voltage (Agilent 4349B):* None supplied, use external power supplies and voltage data entry for resistance measurements. Maximum of 5000 V input and 5 digit numerical entry.

*Max current (Agilent 4339B):* 10 mA @ ≤ 100 V, 5 mA @ ≤ 250 V, 2 mA @ ≤ 500 V, 1 mA @ ≤ 1 kV

*Number of test channels:*

4339B: 1 channel,  
4349B: Option 4349B-700:4 ch  
Option 4349B-001:2 ch

*Ranging:* Auto and hold

*Trigger:* Internal, manual, and external

*Delay time (trigger):* 0 ms to 9999 ms in 1 ms steps

*Test cable lengths:* 2 meters maximum

*Measurement time (typical):*

4339B: 10 ms / 30 ms / 390 ms

4349B: 9.5 ms / 28 ms / 98 ms / 397 ms

### Other instrument functions

*Error correction:* Open (removes errors due to parasitics).

*Comparator:* High, in, and low for each of the test parameters.

*Save/Recall:* 10 instrument states from non-volatile memory.

*Contact check:* Detects contact failure for capacitive devices (2 ms).

*GPIB:* Agilent's implementation of IEEE 488 for control and data.

*Handler interface:* Negative logic and isolated. Signals are high/in/low, no contact, EOM, index, alarm, keylock, ext. trigger.

### Physical characteristics

*Power:* 90 – 132 Vac or 198 – 264 Vac. 47 Hz – 66 Hz. 45 VA (typical)

*Operating*

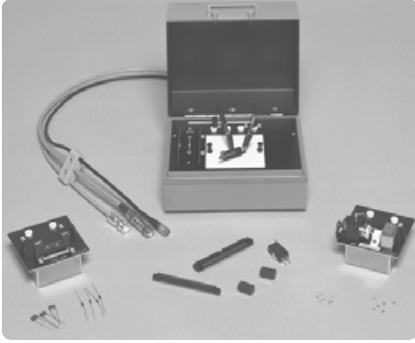
*temperature/humidity:*

0 – 45 °C/≤ 95% RH @ 40 °C.

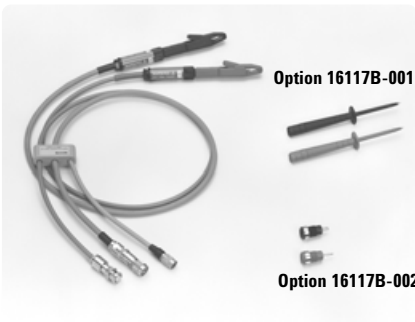
*Dimensions:* 320(W) x 100(H) x 450(D) mm.

*Weight:* 6.5 kg (typical).

## Test Fixtures/Accessories



**Agilent 16339A component test fixture**  
For manual high voltage testing of discrete components. For 4339B only.



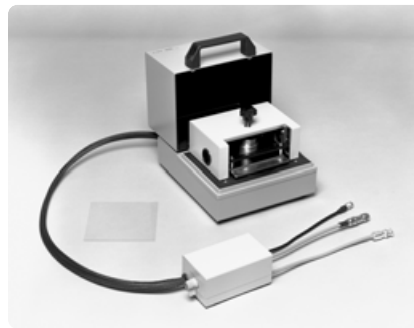
**Agilent 16117B low noise test leads**  
Wide jaw clip leads for 4339B. 1 meter cable. Applicable measurement range:  $\leq 1 \times 10^{11} \Omega$  (typical). For 4339B only. Option 16117B-001 adds a pair of pin-type probes. Option 16117B-002 adds a pair of socket adapters for connecting to a custom made fixture.



**Agilent 16117C low noise test leads**  
Interlock, voltage source, and current sensing cables. Terminations are threaded triaxial, standard BNC, and bare interlock pair. Female BNC and triaxial connectors are included. For 4339B only.



**Agilent 16118A tweezer test fixture**  
Tweezer test fixture for easy testing for chip components. Maximum applied voltage: 100 Vdc. Applicable measurement range:  $\leq 1 \times 10^{11} \Omega$  (typical). For 4339B only.



**Agilent 16008B resistivity cell**  
For resistivity measurements of dry sheet samples. Upper electrode is spring loaded to apply pressure. Surface and volume measurements. Installed with 50 mm diameter electrode. Option 16008B-001 adds 26 mm/76 mm diameter electrodes. Option 16008B-002 adds 26 mm diameter electrode. For 4339B only. Maximum applied voltage: 1000 Vdc. Sheet thickness range: 10  $\mu\text{m}$  to 100 mm.



**Agilent 16117E low noise test lead**  
Male-triaxial to male-triaxial connectors. One meter cable. One female-triaxial connector included. For 4349B only.



**Agilent 16064B LED Display/Trigger box**  
Displays comparator status. Cable length 1.5 meters. Manual external trigger. For 4339B only.

## Ordering Information

= Choose ONE and ONLY one

= Choose any combination

### Agilent 4339B High Resistance Meter

Furnished accessories: shunt connector

Note: Test fixture is not furnished with the 4339B.

#### Documentation options

- Option 4339B-ABA: Add specified quantities of English manual
- Option 4339B-ABD: Add specified quantities of German manual
- Option 4339B-ABJ: Add specified quantities of Japanese manual
- Option 4339B-ABE: Add specified quantities of Spanish manual

Note: Manual is not furnished with the 4339B.

### Agilent 4339B Test Fixtures and Accessories

Agilent 16008B resistivity cell (50 mm diameter electrode)

- Option 16008B-001: Add 26 mm and 76 mm diameter electrodes
- Option 16008B-002: Add 26 mm diameter electrode

Agilent 16117B low noise test leads

- Option 16117B-001: Add pin probes
- Option 16117B-002: Add soldering sockets

16117C	Low noise test leads
16118A	Tweezer test fixture
16064B	LED display/trigger box
16339A	Component test fixture

### Agilent 4349B High Resistance Meter

#### Test channel options

- Option 4349B-700: 4-channels
- Option 4349B-001: 2-channels

(2-channels to 4-channels upgrade not available.)

Note: external power source required for resistance measurements. Recommendation for external power source for measurement of 1 G $\Omega$  sample @ 100Vdc with accuracy =  $\pm 10\%$ .

Ripple:	$\leq 1$ mVrms (50/60 Hz)
Wide band noise:	$\leq 5$ $\mu$ Vrms/ $\sqrt{\text{Hz}}$ (50 Hz)
Switching noise:	$\leq 50$ mVrms (100 kHz)

#### Documentation options

- Option 4349B-ABA: Add specified quantities of English manual
- Option 4349B-ABJ: Add specified quantities of Japanese manual

#### Cabinet options

- Option 4349B-1CM: Rack mount kit
- Option 4349B-1CN: Front handle kit

Note: Rack flange and handle kit are not compatible.

#### Certification option

- Option 4349B-A6J: ANSI Z540 compliant calibration

#### Service and support options

- Option R-51B: Return-to-Agilent warranty and service plan
- Option R-50C-001: Standards calibration
- Option R-50C-002: Commercial compliant calibration

### Agilent 4349B Test Fixtures and Accessories

Agilent 16117E low noise test lead

#### 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 onsite 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.

#### Agilent T&M Software and Connectivity

Agilent's Test and Measurement software and connectivity products, solutions and developer network allows you to take time out of connecting your instruments to your computer with tools based on PC standards, so you can focus on your tasks, not on your connections. Visit [www.agilent.com/find/connectivity](http://www.agilent.com/find/connectivity) for more information.

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