

Agilent

4338B Milliohm Meter

10 $\mu\Omega$ to 100 k Ω

Technical Overview



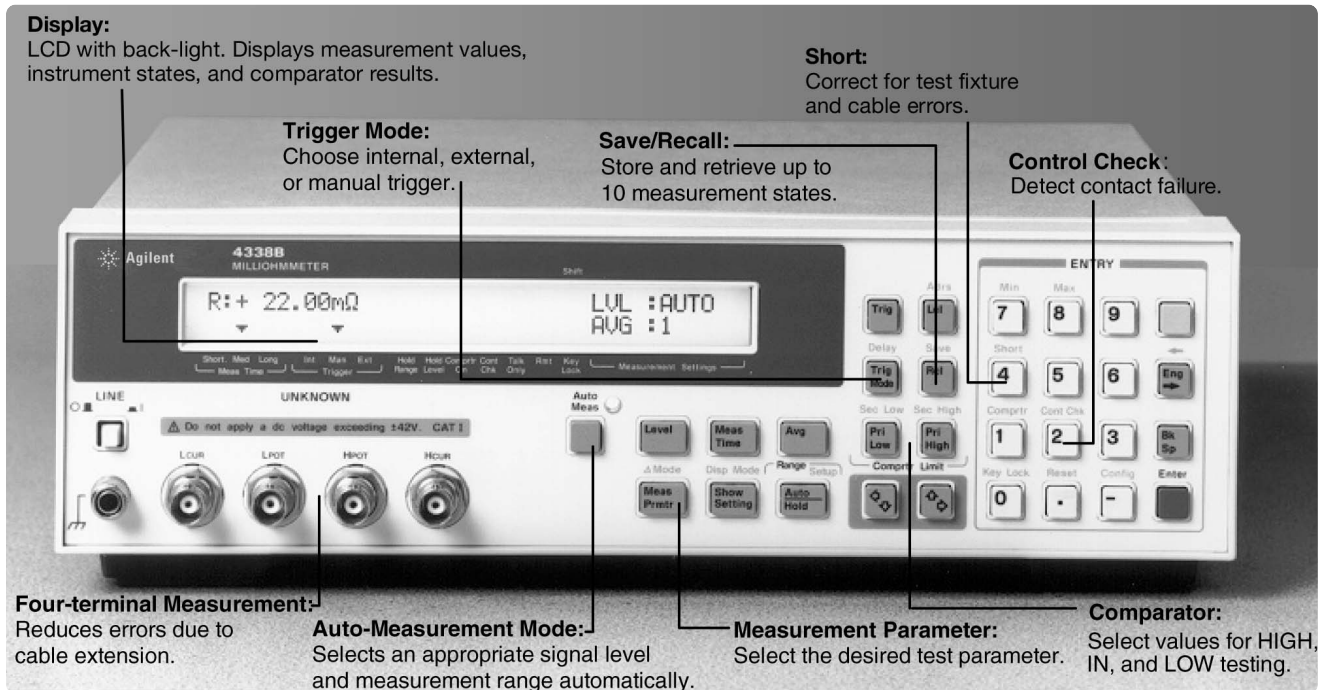
Introduction

Ideal for precise measurements of extremely low resistances using an ac test signal, the Agilent Technologies 4338B suits bench-top applications that require flexible testing and reliable results. The milliohm meter satisfies system throughput demands for fast, high-quality measurements.



Agilent Technologies

The Agilent 4338B



Satisfy Your Needs for ...

High-quality testing

- Remove parasitics with error correction
- Achieve consistent results with 0.4% basic accuracy
- Verify test connections with contact check function
- Stabilize data with selectable measurement times and averaging
- Eliminate trigger timing errors with trigger delay

Operating versatility

- Select from 5 impedance parameters
- Pick from 7 probes, test fixtures, and accessories
- Configure the instrument quickly with Save/Recall
- Reduce test complexity with auto-measurement function

Fast test throughput

- Get 34 ms/measurement speed
- Perform Pass/Fail testing with comparator function
- Operate remotely via the GPIB interface
- Use the built-in handler interface

Key Parameters and Specifications

Test frequency:

1 kHz

Impedance parameter sets:

R, |Z| θ , R-L, R-X

Basic accuracy:

0.4%

Test current levels:

1 μ A, 10 μ A, 100 μ A, 1 mA, 10 mA

Error correction:

Short compensation

Display digits:

3, 4, or 5 digits (selectable)

Save/recall:

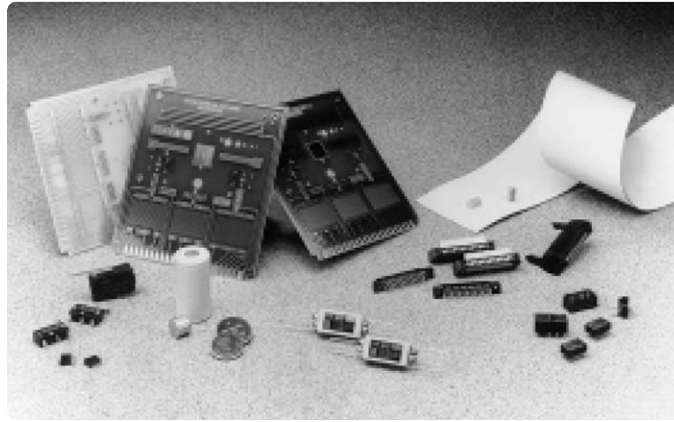
10 instrument states

Interfaces:

GPIB and handler interface

Satisfy your need for high-quality testing

- Resolve data to 5 digits
- Make precise measurements with 0.4% basic accuracy
- Eliminate impedance calculations; select the parameter you need: R, |Z|, θ , L, X
- Verify DUT performance under simulated operating conditions
- Perform dry contact testing with minimal test signal (≤ 20 mV)
- Obtain high-confidence testing with contact check function



Test electromechanical devices

- Perform dry contact testing with low-level test signals
- Select from a variety of probes and test fixtures to fit your application
- Resolve measurements to $10 \mu\Omega$
- Test switches, cables, connectors, relays, and pc board traces

Make precise ultra-low resistance measurements with the 4338B.

Evaluate battery internal resistance

- Protect your investment with voltage protection on terminals (Max. 42 Vdc)
- Perform non-invasive testing with no effects on charge/discharge cycles
- Avoid polarization effects with an ac test signal



System features for automation in manufacturing

- Maximize accuracy with error correction
- Automate testing with GPIB interface for computer control
- Reduce ground-loops with isolated handler interface
- Continue testing after ac power loss with non-volatile memory
- Perform pass/fail testing with comparator function (HIGH, IN, LOW)

Use the milliohm meter for electromechanical contact testing.



The 4338B is ideal for battery evaluation.

Agilent 4338B Specifications

Measurement accuracy

Measured Resistance R_m (Ω)	Test Signal Current				
	1 μ A	10 μ A	100 μ A	1 mA	10 mA
100k	$0.4 + 0.0005 R_m$				
10k	$0.4 + \frac{250}{R_m} + 0.0005 R_m$				
1k	$0.4 + \frac{13}{R_m} + 0.0005 R_m$	$0.4 + \frac{25}{R_m} + 0.0005 R_m$			
100	$0.4 + \frac{4}{R_m} + 0.0005 R_m$	$0.4 + \frac{1.3}{R_m} + 0.0005 R_m$	$0.4 + \frac{2.5}{R_m} + 0.0005 R_m$		
10	$0.4 + \frac{1.5}{R_m}$	$0.4 + \frac{0.4}{R_m}$	$0.4 + \frac{0.13}{R_m}$	$0.4 + \frac{0.25}{R_m}$	
1		$0.4 + \frac{0.15}{R_m}$	$0.4 + \frac{0.041}{R_m}$	$0.4 + \frac{0.014}{R_m}$	$0.4 + \frac{0.026}{R_m}$
100m			$0.4 + \frac{0.016}{R_m}$	$0.4 + \frac{0.005}{R_m}$	$0.4 + \frac{0.0023}{R_m}$
10m				$0.4 + \frac{0.0025}{R_m}$	$0.4 + \frac{0.0014}{R_m}$
1m			$1.2 + \frac{0.0025}{R_m}$	$1.2 + \frac{0.0012}{R_m}$	
100 μ					
10 μ					

Table 1. Measurement accuracy (\pm % of reading)

Measurement conditions

The following test conditions apply for the data shown in Table 1:¹

1. Warm-up time: ≥ 30 minutes
2. Ambient temperature: $23\text{ }^\circ\text{C} \pm 5\text{ }^\circ\text{C}$
3. Test cable length: 0 meter
4. Short error correction performed.
5. Measurement time: LONG

Measurement parameters/ranges

Parameter	Range
R	10 $\mu\Omega$ to 100 k Ω
X, Z	10 $\mu\Omega$ to 100 k Ω (typical)
L	10 nH to 10 H (typical)
θ	-180 $^\circ$ to +180 $^\circ$

1. Other test-condition data is available in the operation manual.

Measurement conditions and functions

Test frequency: 1 kHz \pm 0.1%

AC test signal level (rms current):
1 μ A, 10 μ A, 100 μ A, 1 mA, 10 mA

Maximum applied AC voltage:
20 mV peak

Maximum DC voltage to BNC terminals: 42 V

Ranging: Auto and hold

Maximum cable length: 2 meters

Trigger: Internal, manual, and external

Delay time: 0 to 9999 ms in 1-ms steps

Averaging: 1 to 256

Measurement time (typical):

Short	Medium	Long
34 ms	70 ms	900 ms

Other instrument functions

Math functions: Deviation (Δ) and percent deviation ($\% \Delta$).

Short error correction:

Eliminates measurement errors due to parasitic impedances in cables and test fixtures.

Comparator: HIGH, IN, and LOW for primary and secondary parameters.

Continuous memory: All instrument settings are automatically saved for up to 72 hours when power is lost or the instrument is turned off.

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

Contact check: Detects contact failure.

GPIB: Implementation of IEEE-488 for control and data.

Handler interface:

Negative logic and optically isolated; output signals: HIGH/IN/LOW, end-of-measurement, index, and alarm; input signals are keylock and external trigger.

Physical characteristics

Power: 90-132 Vac or 198-264 Vac. 47-66 Hz. 45 VA typical.

Operating temperature: 0 °C to 45 °C

Dimensions: 320(W) x 100(H) x 300(D) mm

Weight: 4.5 kg

Test Fixtures/Accessories for the Agilent 4338B Milliohm Meter



16005-60011 Kelvin clip lead (large)

Cable length, 0.4 meter. Jaws mate with large terminal devices. One lead supplied only.



16006-60001 pin-type probe lead

Cable length, 0.4 meter. Spring-loaded probe tips for firm contact. Useful for manual contact measurements. One lead supplied only.



16005-60012 Kelvin IC clip lead (red clip)

16005-60014 Kelvin IC clip lead (black clip)

Cable length, 0.4 meter. Small contacts for devices with fine leads. One lead supplied only.



16007-60001 alligator clip lead (red clip)

16007-60002 alligator clip lead (black clip)

Alligator clip lead. Cable length, 0.4 meter. Each test lead has a separate alligator clip voltage and current terminal. One lead supplied only.



16143-60011 mating cable

Interface between test leads and 4338B. Cable length, 0.5 meter.



16338A test lead kit

Contains one each of the following: 16143-60011, 16005-60012/14, 16007-60001/2, carrying case. Contains two each of the following: 16005-60011 and 16006-60001.

Ordering information

Agilent 4338B milliohm meter

Furnished accessories:

Power cable

(Test fixtures are not furnished as standard.)

Manual options¹

4338B-ABA U.S - English localization

4338B-ABJ Japan - Japanese localization

4338B-0BW Add service manual

Cabinet options

4338B-1CM Rack mount kit

4338B-1CN Front handle kit

(Rack flange handle kit is not compatible.)

Calibration certificate option

4338B-1A7 ISO 17025 compliant calibration

Test fixtures and accessories:

16005-60011 Kelvin clip lead (1 lead only)

16005-60012 Kelvin IC clip lead, red clip (1 lead only)

16005-60014 Kelvin IC clip lead, black clip (1 lead only)

16006-60001 pin-type probe lead (1 lead only)

16007-60001 alligator clip lead, red (1 lead only)

16007-60002 alligator clip lead, black (1 lead only)

16143-60011 mating cable (Requires 2 leads)

16338A test lead kit.

Includes 16005-60011, 16005-60012/14, 16006-60001, 16007-60001/2 leads, 16143-60011 mating cable and carrying case.

1. Manual is not furnished as standard.

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