Agilent
4263B LCR Meter 100 Hz to 100 kHz

Technical Overview

Introduction

The Agilent Technologies LCR meter makes fast measurements on components. It is optimized for applications that require precision and versatility. The instrument's performance ranges from general bench-top impedance measurements to complex transformer, coil and electrolytic capacitor measurements. The LCR meter offers fast, reliable, and versatile testing at a low cost.



Satisfy your needs for...

Fast system test throughput

- Maximize testing with rapid 25 ms measurements
- Minimize user intervention with pass/fail testing
- Communicate results with display and GPIB
- Automate testing with built-in handler interface

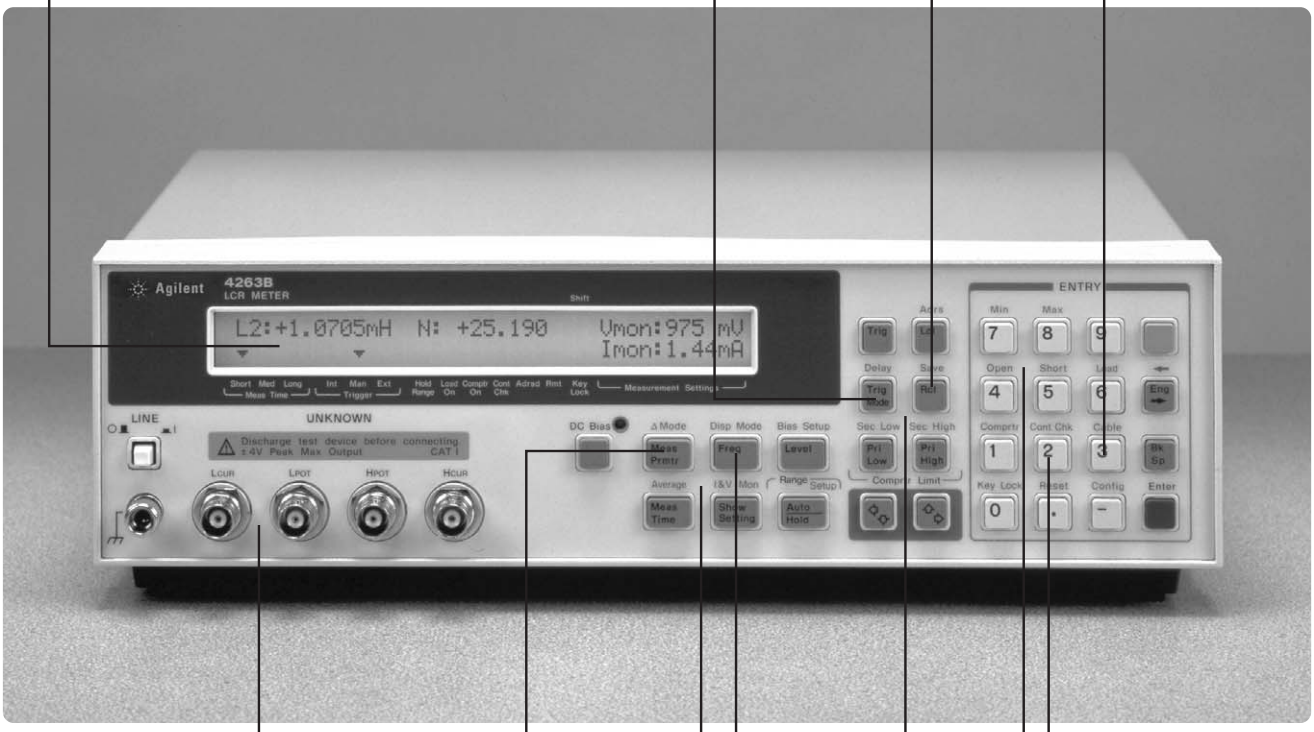
Fault-free results

- Test with confidence using contact check function
- Remove parasitics with error correction
- Get the best data with 0.1% basic accuracy
- Eliminate trigger timing errors with trigger delay function

Versatile measurements

- Select from 11 impedance parameters
- Add three complex transformer parameters with Option 4263B-001
- Set signal level with 5 mVrms resolution
- Monitor actual ac voltage and current levels
- Pick from many test fixtures and accessories
- Save and recall up to ten measurement setups

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Display:
LCD with back-light.
Displays measurement values, instrument states, and comparator results

Trigger mode:
Choose internal, external, or manual trigger

Save/recall:
Store and retrieve up to 10 measurement states

Cable:
Extend front panel cable length from 0 to 4 meters

Four-terminal pair:
Reduces errors due to cable extension

Measurement parameter:
Select the desired test parameter

I&V monitor:
Monitor actual ac voltage and current levels

Frequency:
Select one of five test frequencies

Comparator:
Select values for HIGH, IN, and LOW testing

Contact check:
Verify reliability of test connections

Open/short/load:
Correct for test fixture and cable errors

Key Parameters and Specifications

Test frequencies:
100 Hz, 120 Hz, 1 kHz, 10 kHz, 100 kHz

Option 4263B-002 adds 20 kHz

AC test signal levels:
20 m–1 Vrms, 5 mVrms steps

Basic accuracy:
0.1%

Impedance parameters:
|Z|, R, X, |Y|, G, B, C, L, D, Q, u

Option 4263B-001 adds transformer measurement functions: turns-ratio, mutual-inductance and dc-resistance

Cable length settings:
0, 1, 2, 4 meters

Bias:
1.5 and 2.0 Vdc

Error correction:
Open, short, and load

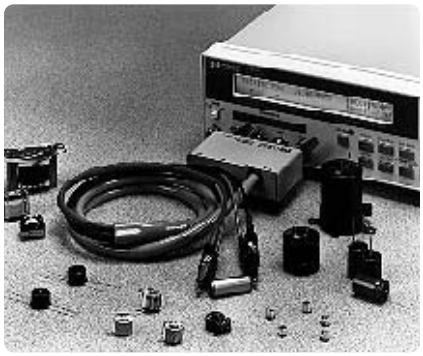
Built-in system features:
GPIB and handler interfaces

Measurement time (typical):
25 ms at best conditions

Contact check time (typical):
5 ms per measurement

High-quality results

- See five digits of data
- Make precise measurements with 0.1% basic accuracy
- Select from 11 impedance parameters
- Verify device performance at simulated operating conditions
- Monitor actual test signal voltage and current levels



Make reliable impedance measurements.

System features for test automation

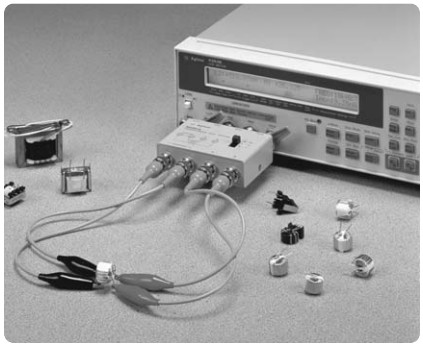
- Maximize accuracy with error correction
- Use performance specified with 0, 1, 2, and 4 meter cables
- Test device contact failure with contact check function
- Automate testing with GPIB interface
- Reduce ground-loops with isolated handler interface
- Continue testing after ac power loss with continuous memory
- Perform pass/fail testing with comparator function (High/In/Low)



The 4263B LCR meter is designed for automated applications.

Evaluate transformers and coils with Option 4263B-001

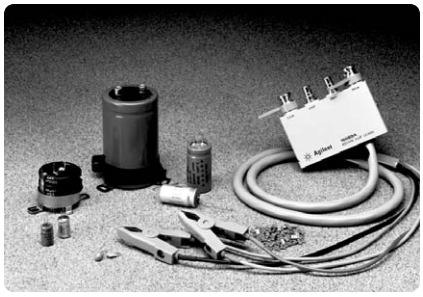
- Measure turns-ratio, mutual inductance and dc-resistance
- Easily make connections with 16060A transformer test fixture
- Measure parameter responses with variable signal levels



Simplify transformer testing.

Make electrolytic capacitor measurements

- Obtain versatile testing with a large capacitance range
- Keep costs down with built-in dc bias source
- Protect your investment: high energy protection on terminals
- Increase test throughput with fast system measurements
- Make reliable handler measurements with contact check function



Quickly evaluate electrolytic capacitors.

Specifications

Measurement accuracy

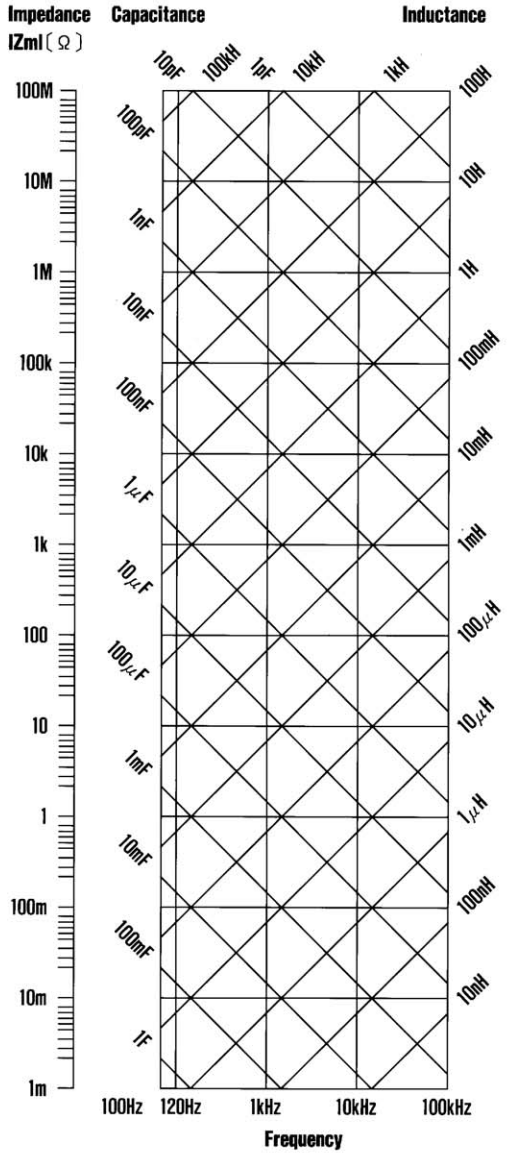


Figure 1. Conversion diagram

DC	100/120	1k	10k	20k (Option 002 only)	100k
$0.85 + 2.9\times10^{-8}\|Z\|m$	$0.15 + 2.9\times10^{-8}\|Z\|m$	$0.1 + 5.6\times10^{-8}\|Z\|m$	$0.48 + 3.8\times10^{-7}\|Z\|m$	$1.9 + 7.7\times10^{-7}\|Z\|m$	Accuracy not specified
$0.85 + 2\times10^{-7}\|Z\|m$	$0.15 + 2\times10^{-7}\|Z\|m$	$0.095 + 1.4\times10^{-7}\|Z\|m$	$0.36 + 5.1\times10^{-7}\|Z\|m$	$1.4 + 1\times10^{-6}\|Z\|m$	$1.2 + 1.4\times10^{-5}\|Z\|m$
$0.85 + 2\times10^{-6}\|Z\|m$	$0.15 + 2\times10^{-6}\|Z\|m$	$0.09 + 1\times10^{-6}\|Z\|m$	$0.16 + 1.9\times10^{-6}\|Z\|m$	$0.8 + 3.7\times10^{-6}\|Z\|m$	
$0.85 + 2\times10^{-5}\|Z\|m$	$0.15 + 2\times10^{-5}\|Z\|m$	$0.09 + 1\times10^{-5}\|Z\|m$	$0.16 + 1.5\times10^{-5}\|Z\|m$	$0.7 + 3.1\times10^{-5}\|Z\|m$	$1.1 + 1\times10^{-4}\|Z\|m$
$0.85 + 2\times10^{-4}\|Z\|m$	$0.15 + 2\times10^{-4}\|Z\|m$	$0.09 + 1\times10^{-4}\|Z\|m$	$0.16 + 1.5\times10^{-4}\|Z\|m$	$0.7 + 3\times10^{-4}\|Z\|m$	$1.1 + 1\times10^{-3}\|Z\|m$
$0.85 + 2/\|Z\|m$	$0.15 + 2/\|Z\|m$	$0.09 + 1/\|Z\|m$	$0.16 + 1.5/\|Z\|m$	$0.5 + 3.1/\|Z\|m$	$0.83 + 10/\|Z\|m$
$0.85 + 0.2/\|Z\|m$	$0.17 + 0.22/\|Z\|m$	$0.12 + 0.1/\|Z\|m$	$0.2 + 0.18/\|Z\|m$	$0.6 + 0.35/\|Z\|m$	$0.97 + 1.3/\|Z\|m$
$0.85 + 0.022/\|Z\|m$	$0.4 + 0.022/\|Z\|m$	$0.4 + 0.015/\|Z\|m$	$0.4 + 0.04/\|Z\|m$	$0.6 + 0.08/\|Z\|m$	$0.97 + 0.35/\|Z\|m$
$0.85 + 0.012/\|Z\|m$	$0.4 + 0.012\|Z\|m$	$0.4 + 0.0075/\|Z\|m$	$0.4 + 0.028/\|Z\|m$	$0.6 + 0.056/\|Z\|m$	$0.97 + 0.26/\|Z\|m$

Frequency (Hz)

Table 1. Measurement accuracy (±% of reading)

Measurement conditions

1. Warm-up time: ≥ 15 min.
2. Ambient temperature: 23 ±5 °C
3. Test signal voltage: 1 Vrms
4. Test cable length: 0 meter
5. Open and short corrections performed
6. Measurement time: Medium or Long

(Other test condition data is available in the operation manual.)

For |Z|, |Y|, L, C, R, X, G, and B accuracy (Ae), refer to Table 1. Table 1 equations yield accuracy based on frequency and DUT characteristic impedance (Zm). Zm is from Figure 1, Conversion Diagram.

D accuracy(De) = ± Ae/100

Q accuracy(Qe) = $\pm \frac{(Qm)^2 x De}{1-/+(Qm x De)}$
where(Qm x De < 1)

u accuracy (ue) = 0.573 x Ae

Ae = Accuracy of |Z|, |Y|, L, C, R, X, G, and B
De = D accuracy
Dm = Measured value of D
Qe = Q accuracy
Qm = Measured value of Q
ue = u phase angle accuracy
Zm = DUT impedance at test frequency in Hertz

Other Specifications

Measurement parameters/ranges

Parameter	Range
|Z|, R, X	1 mΩ to 100 MΩ
|Y|, G, B	10 nS to 1000S
C	1 pF to 1 F
L	10 nH to 100 kH
D	0.0001 to 9.9999
Q	0.1 to 9999.9
u	-180 ° to + 180 °
Δ	-999.99% to 999.99%

Option 4263B-001: DC resistance 1 mΩ to 100 MΩ

Mutual inductance 1 µH to 100 H (typical)

Turns-ratio 0.9 to 200 (typical)

Measurement conditions and functions

Test frequency: 100 Hz, 120 Hz, 1 kHz, 10 kHz, 100 kHz. (Option 4263B-002 adds 20 kHz.)

AC test signal level: 20 m - 1 Vrms, 5 mVrms steps

Bias:
Internal: + 1.5 and +2.0 Vdc
External: 0 to + 3.0 Vdc

Ranging: Auto and Hold

Trigger: Internal, Manual, and External

Trigger delay time: 0 to 9999 ms in 1 ms steps

Test cable lengths:
0, 1 meter @ f ≤ 100 kHz
2 meter @ f ≤ 10 kHz (20 kHz)
4 meter @ f ≤ 1 kHz

Measurement time:

SHORT	MEDIUM	LONG
25 ms	65 ms	500 ms

Other instrument functions

Test signal level monitor:
Voltage, current

Error Correction: Open, Short, Load

Comparator: HIGH, IN, and LOW for each displayed parameter

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

Front-end Protection:
Vmax = $\sqrt{8/C}$ @ Vmax ≤ 250 V
Vmax = $\sqrt{2/C}$ @ Vmax ≤ 1000 V
C in Farads

Handler interface: Negative logic and isolated. Signals are HIGH/IN/LOW, No-Contact, EOM, Index, Alarm, Keylock, Ext. Trigger.

GPIB interface: Instrument control, TALK-only mode for LISTEN-only printers using GPIB or Centronics/GPIB converter

Physical characteristics

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

Operating temperature: 0 to 45 °C

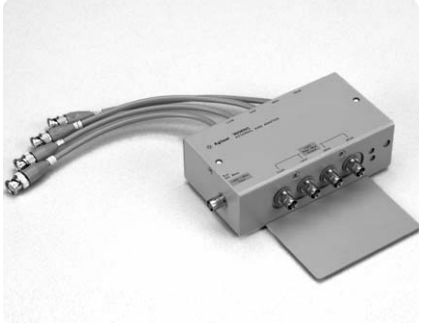
Dimensions: 320 (W) x 100 (H) x 300 (H) mm

Weight: 4.5 kg (typical)

Test Fixtures/Accessories for the Agilent 4263B



16060A transformer test fixture
Allows fast connections to transformers



16065C external bias adapter
For external dc bias of DUT. Vmax ≤ 40 Vdc.



16089C Kelvin IC clip leads
IC package clip. 1 meter length.



16089A Kelvin clip leads
Large clip. 1 meter length.

16089B Kelvin clip leads
Medium clip. 1 meter length.

16089D Alligator clip leads
Four clips. 1 meter length.



16034G Test fixture
For SMD components.

Component dimensions (L x W):
0.6 mm x 0.3 mm to 5.0. mm x 1.6 mm

Ordering information [1]

Agilent 4263B LCR Meter

Furnished accessory: power cable

Options

4263B-001 Add N/M/DCR Measurement Function

4263B-002 Add 20 kHz Test Frequency

Test fixtures are not furnished as standard.

Manual options [2]

4263B-ABA U.S. - English localization

4263B-ABJ Japan - Japanese localization

4263B-0BW Add service manual

Cabinet options

4263B-1CM Rackmount kit

4263B-1CN Handle kit
(Rack flange and handle kit are not compatible.)

Calibration certificate option

4263B-1A7 ISO 17025 compliant calibration

Test fixtures and accessories

16034E/G/H SMD component test fixture

16043-60011/12 3-terminal SMD test fixture

16044A [3] Test fixture

Options

16044A-ABA U.S. - English localization

16044A-ABJ Japan - Japanese localization

16047A/E [3] Axial and radial test fixture

Options

16047E-ABA U.S. - English localization

16047E-ABJ Japan - Japanese localization

16334A SMD tweezer test fixture

16048A 0.94-meter/BNC test leads

16048-60030 0.94-meter/SMC test leads

16048D 1.89-meter/BNC test leads

16048E 3.8-meter/BNC test leads

16060A Transformer test fixture

16065A 200-Vdc external voltage bias fixture

16065C 40-Vdc external voltage bias adapter

16089A Large Kelvin clip leads

16089B Medium Kelvin clip leads

16089C Kelvin IC clip leads

16089D Alligator clip leads

16089E Kelvin clip leads

1 Accessories and options are priced individually.
2 Manual is not furnished as standard
3 Must specify one of language options (ABA or ABJ) for operation manual of 16047E for shipment with product.

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