

# 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



**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

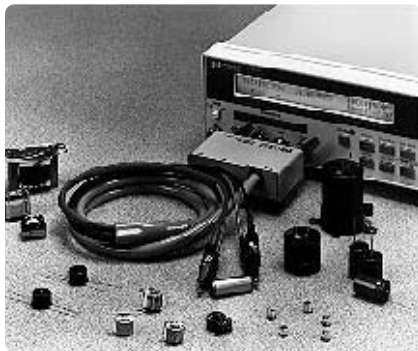
**Built-in system features:**  
GPIB and handler interfaces

**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

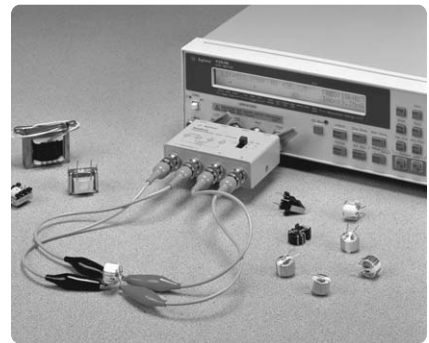
- Maximize accuracy with error correction
- Use performance specified with 0, 1, 2, and 4 meter cables
- Test device contact failure with contact check function
- Automate testing with GPIB interface
- Reduce ground-loops with isolated handler interface
- Continue testing after ac power loss with continuous 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

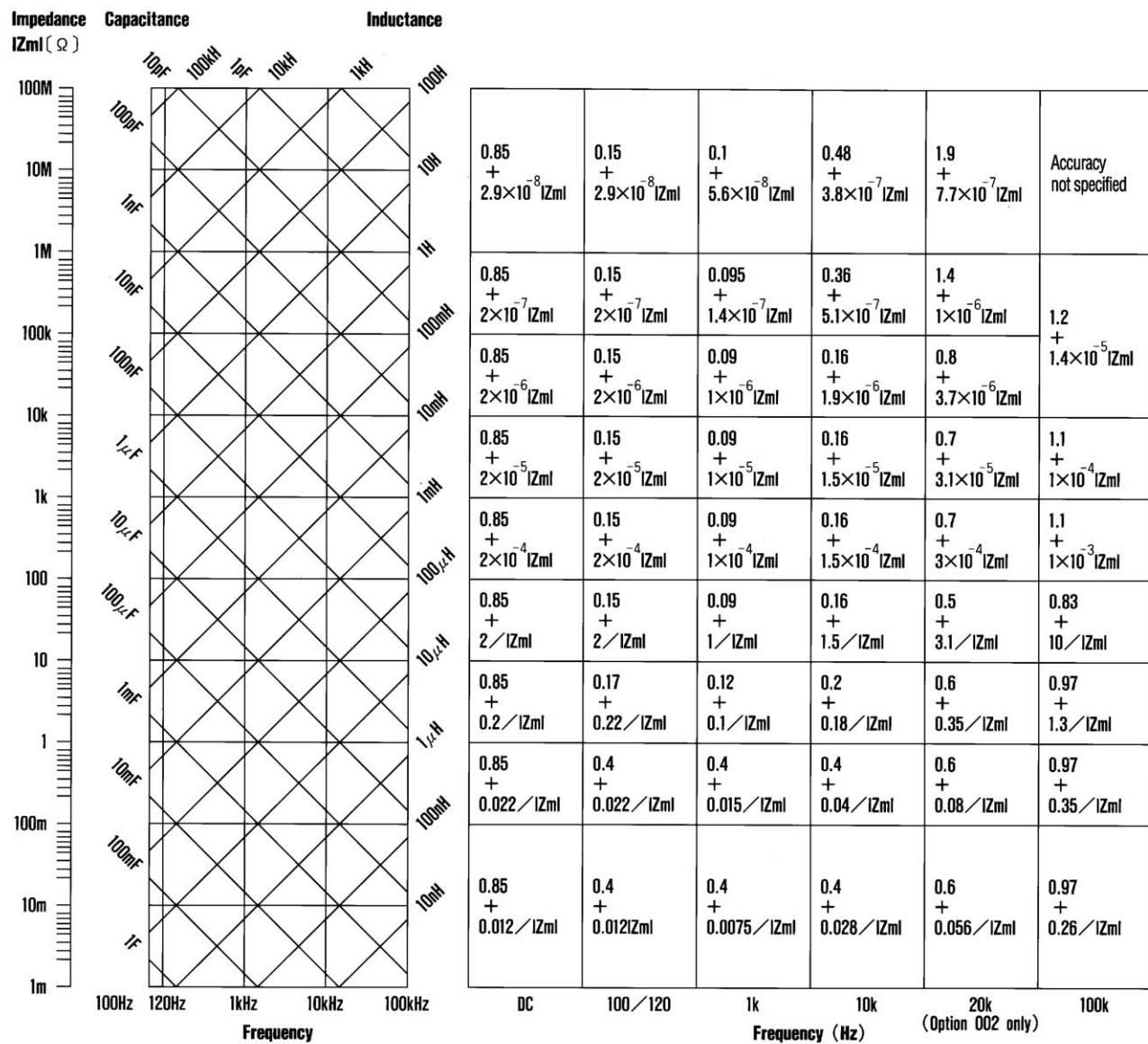


Figure 1. Conversion diagram

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

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

## Measurement conditions

1. Warm-up time:  $\geq 15$  min.
2. Ambient temperature:  $23 \pm 5$  °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.

$$D \text{ accuracy}(De) = \pm Ae/100$$

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

$$u \text{ accuracy}(ue) = 0.573 \times Ae$$

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 m $\Omega$ to 100 M $\Omega$
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°
$\Delta$	-999.99% to 999.99%

**Option 4263B-001:** DC resistance 1 m $\Omega$  to 100 M $\Omega$

Mutual inductance 1  $\mu$ H 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 @  $f \leq 100$  kHz

2 meter @  $f \leq 10$  kHz (20 kHz)

4 meter @  $f \leq 1$  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:*

$$V_{max} = \sqrt{8/C} \quad @ \quad V_{max} \leq 250 \text{ V}$$

$$V_{max} = \sqrt{2/C} \quad @ \quad V_{max} \leq 1000 \text{ V}$$

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

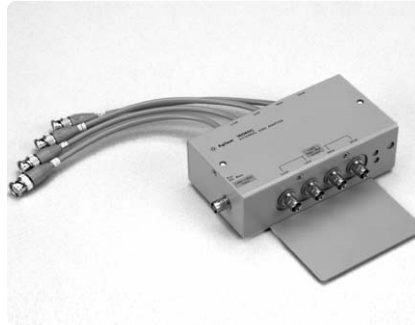
*Weight:* 4.5 kg (typical)



## 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.  $V_{max} \leq 40$  Vdc.



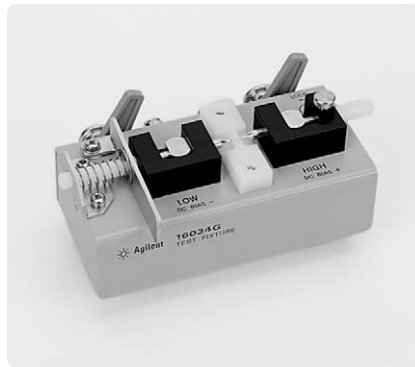
**16089C Kelvin IC clip leads**  
IC package clip. 1 meter length.



**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 <sup>1</sup>

### 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 <sup>2</sup>

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** <sup>3</sup> Test fixture

#### Options

**16044A-ABA** U.S. - English localization

**16044A-ABJ** Japan - Japanese localization

**16047A/E** <sup>3</sup> 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

<sup>1</sup> Accessories and options are priced individually.

<sup>2</sup> Manual is not furnished as standard

<sup>3</sup> Must specify one of language options (ABA or ABJ) for operation manual of 16047E for shipment with product.

## Web Resource

[www.agilent.com/find/lcmmeters](http://www.agilent.com/find/lcmmeters)



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