

DE-5000

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The DE-5000 is a portable, high-performance LCR meter that is full-featured yet cost effective. It measures in true 4-wire Kelvin mode and rivals the capabilities and options of many of its bench counterparts.

This LCR meter features automatic L-C-R selection, a Sorting mode, and selectable test frequencies. It can transfer data to a PC via a fully isolated, optical IR-USB interface.

Features:

- 4-wire measurement
- Automatic L-C-R selection
- Component sorting function with selectable PASS/FAIL tolerances
- Selectable test frequencies:
100 Hz / 120 Hz / 1 kHz / 10 kHz / 100 kHz
- Selectable test model: series or parallel
- Backlit, 20,000/2,000 count display
- Relative mode
- Low-battery indicator
- USB interface



DE-5000 Portable LCR Meter

Specifications

Parameters measured:

Ls / Lp / Cs / Cp / Rs / Rp / DCR with D/Q/θ/ESR measurement
Automatic L-C-R selection

Accuracy:

See next page

Selectable test model:

Series or Parallel

Display:

Backlit
20,000/2,000 count

Terminals:

4-wire spring-loaded sockets and binding post jacks
Accepts normal or shrouded banana plugs

Automated LCR ranges:

L: 20.000 μH -- 2000 H
C: 200.00 pF -- 20.00 MfF
R: 20.000 Ω -- 200.0 MΩ
DCR: 200.00 Ω -- 200.0 MΩ

Selectable test frequencies:

100 Hz / 120 Hz / 1 kHz / 10 kHz / 100 kHz

Measurement rate:

1.2/second nominal

Available tolerances for sorting function:

±0.25%	±5%
±0.5%	±10%
±1%	±20%
±2%	-20/+80%

Response time:

Approx. 1 second/DUT

Temperature coefficient:

[0.15 x (specified accuracy)]/°C
0-18°C, 28-50°C

Test signal level:

0.5 Vrms Typical

Environmental:

Operating temperature: 0°C to 50°C; <70% RH
Storage temperature: -20°C to 60°C; <80% RH

Battery:

Uses a standard 9V alkaline battery
Display includes battery level indicator

Mechanical:

Dimensions: 18.8 cm H x 9.5 cm W, 5.3 mm D (7.4" x 3.75" x 2")
Weight: 350 g (0.75 lb)

Ordering Information

DE-5000 Standard Package:

LCR meter
Carrying case
Alligator-clip test-lead adapter
(4-wire joined at alligator clips)
Guard lead
Standard 9 V battery
Instruction manual

DE-5000-LCR
DE-5000-CS
TL-21

TL-23
DE-5000-9V
DE-5000-IM

Optional Accessories:

AC adapter
SMD tweezers (4-wire)
Data transfer kit

- IR to USB Interface Adapter
- USB cable
- CD with software for PC

DE-5000-AC
TL-22
DE-5000-DTK



DE-5000 Carrying Case with Accessories



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Accuracy Specifications

Accuracy is specified at 23°C ± 5°C, <75% RH.

All accuracy is specified as ±[(% of reading) + (value of least significant digit)].

For the most precise measurement results, the meter has to be zeroed before taking a reading.

Resistance Accuracy:

Range	Resolution	100/120Hz	1kHz	10kHz	100kHz
20.000 Ω	0.001 Ω	--	1.0%+3	1.0%+3	2.0%+3
200.00 Ω	0.01 Ω	1.0%+3	0.3%+2	0.3%+2	0.6%+3
2.0000 kΩ	0.0001 kΩ	0.3%+2	0.3%+2	0.3%+2	0.6%+3
20.000 kΩ	0.001 kΩ	0.3%+2	0.3%+2	0.3%+2	0.6%+3
200.00 kΩ	0.01 kΩ	0.5%+2	0.5%+2	0.5%+2	1.0%+3
2.0000 MΩ	0.0001 MΩ	1.0%+3	1.0%+3	1.0%+3	--
2.000 MΩ	0.001 MΩ	--	--	--	2.0%+3
20.000 MΩ	0.001 MΩ	2.0%+3	2.0%+3	--	--
20.00 MΩ	0.01 MΩ	--	--	2.0%+3	--
200.0 MΩ	0.1 MΩ	2.0%+3	2.0%+3	--	--

Inductance Accuracy:

Range	Resolution	100/120Hz	1kHz	10kHz	100kHz
20.000 μH	0.001 μH	--	--	--	2.5%+5
200.00 μH	0.01 μH	--	--	1.2%+5	0.6%+3
2000.0 μH	0.1 μH	--	2.0%+5	0.6%+3	0.6%+3
20.000 mH	0.001 mH	1.2%+5	1.0%+5	0.3%+2	0.6%+3
200.00 mH	0.01 mH	0.3%+2	0.6%+3	0.3%+2	1.2%+5
2000.0 mH	0.1 mH	0.3%+2	0.3%+2	0.6%+3	--
20.000 H	0.001 H	0.3%+2	0.6%+3	1.2%+5	--
200.0 H	0.1 H	0.6%+3	1.2%+5	--	--
2.000 kH	0.001 kH	1.2%+5	--	--	--

*If reading <2000, unit on display is μH

Accuracy v.s. Resistance (Z_{DUT}):

Range	DCR	100/120Hz	1kHz	10kHz	100kHz
0.1-1 Ω	1.2%+5	1.2%+5	1.2%+5	1.2%+5	2.5%+5
1-10 Ω	0.6%+3	0.6%+3	0.6%+3	0.6%+3	1.2%+5
10-100 kΩ	0.3%+2	0.3%+2	0.3%+2	0.3%+2	0.6%+3
100 k-1 MΩ	0.6%+3	0.6%+3	0.6%+3	0.6%+3	2.5%+5
200.00 kΩ	0.01 kΩ	0.5%+2	0.5%+2	0.5%+2	1.0%+3
1 M-20 MΩ	1.2%+5	1.2%+5	1.2%+5	2.5%+5	2.5%+5 (2 MΩ max.)
>20 MΩ	2.5%+5	2.5%+5	2.5%+5	--	--

Adjustment to accuracy (Z) based on dissipation (D) reading:

$$D > 0.1: Z = \frac{Z}{\sqrt{1+D^2}}$$

$$\text{In capacitance mode, } D \leq 0.1: Z_c = 1/(2\pi f C)$$

$$\text{In inductance mode, } D \leq 0.1: Z_L = 2\pi f L$$

Capacitance Accuracy:

Range	Resolution	100/120Hz	1kHz	10kHz	100kHz
2000.0 pF	0.01 pF	--	--	1.2%+5	2.0%+5
2000.0 nF	0.1 nF	--	2.0%+3	0.3%+2	0.6%+3
20.000 nF	0.001 nF	2.0%+3	0.3%+2	0.3%+2	0.6%+3
200.00 nF	0.01 nF	0.3%+2	0.3%+2	0.3%+2	0.6%+3
2000.0 nF	0.1 nF	0.3%+2	0.3%+2	0.6%+2	2.0%+5
20.000 μF	0.001 μF	0.3%+2	0.6%+2	1.2%+5	--
20.00 μF	0.01 μF	--	--	--	3.0%+5 (10μF max.)
200.00 μF	0.01 μF	0.6%+2	1.0%+3	--	--
200.0 μF	0.1 μF	--	--	3.0%+5 (100μF max.)	--
2000.0 μF	0.1 μF	1.0%+3	--	--	--
2000 μF	1 μF	--	1.2%+3	--	--
20.00 mF	0.01 mF	1.2%+3	--	--	--

*If reading <2000, unit on display is pF

DCR Accuracy:

Range	Resolution	Accuracy
200.00 Ω	0.01 Ω	1.0%+3
2.0000 kΩ	0.0001 kΩ	0.2%+2
20.000 kΩ	0.001 kΩ	0.2%+2
200.00 kΩ	0.01 kΩ	0.5%+2
2.0000 MΩ	0.0001 MΩ	1.0%+3
20.000 MΩ	0.001 MΩ	2.0%+3
200.0 MΩ	0.1 MΩ	2.0%+3

Secondary Parameters Accuracy:

A_Z = impedance (Z) accuracy

Definition: Q = 1/D & R_p = ESR * (1+1/D²)

D value accuracy: D_Z = ± A_Z * (1+D)

ESR accuracy: R_Z = ± Z_M * A_Z (Ω)

ie., Z_M = impedance calculated by 1/(2πfC) or 2πfL

Phase angle Θ accuracy: Θ_Z = ±(180/π)*A_Z (deg)

