



LCR METER

4230

Specification

1.1

18th May 2006

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1 SPECIFICATION

1 Measurement Parameters

Any of the following parameters can be measured and displayed:

DC Function

Resistance (Rdc).

Simulated Rdc measurement using 5 Hz square wave

AC Functions

Capacitance (C), Inductance (L), Resistance (R), Conductance (G), Susceptance (B), Reactance (X), Dissipation Factor (D), Quality Factor (Q), Impedance (Z), Admittance (Y) and Phase Angle (θ).

The following display formats are available:

C+R, C+D, C+Q, L+R, L+Q, L+D, R+X, Y + Phase Angle, Y + Phase Angle, G+B

2 Measurement Ranges

Z R X	0.01m Ω to 100.0M Ω
Z G B	0.0001 nS to 1000.0 S
Cs Cp	0.01 pF to 1 F
Ls Lp	1 μ H to 100 kH
D	0.0001 to 9.9999
Q	0.1 to 9999.9
θ	-180° to +180°
Δ	-999.99% to 999.99%
DCR	0.01 m Ω to 100.00 M Ω

3 Measurement Speeds

Fast	5 measurements per second
Medium	3 measurements per second
Slow	2 measurements per second

4 AC Frequency Range:

100Hz to 200KHz , Accuracy of set frequency $\pm 0.01\%$

Frequency Steps (Unit=kHz)

0.10 to 2.09 step 0.01

2.11 2.12 2.13 2.14 2.15 2.16 2.17 2.19 2.20 2.21 2.22 2.23 2.25 2.26 2.27 2.29

2.30 2.31 2.33 2.34 2.35 2.37 2.38 2.40 2.41 2.42 2.44 2.45 2.47 2.48

2.50 2.52 2.53 2.55 2.56 2.58 2.60 2.61 2.63 2.65 2.67 2.68

2.70 2.72 2.74 2.76 2.78 2.80 2.82 2.84 2.86 2.88

2.90 2.92 2.94 2.96 2.99 3.01 3.03 3.05 3.08

3.10 3.12 3.15 3.17 3.20 3.23 3.25 3.28 3.31 3.33 3.36 3.39 3.42 3.42 3.45 3.48
 3.51 3.54 3.57 3.60 3.64 3.67 3.70 3.74 3.77 3.81 3.85 3.88
 3.92 3.96 4.00 4.04 4.08 4.12 4.17 4.21 4.26 4.30 4.35 4.40 4.44 4.49 4.55
 4.60 4.65 4.71 4.76 4.82 4.88 4.94
 5.00 5.06 5.13 5.19 5.26 5.33 5.41 5.48 5.56 5.63 5.71 5.80 5.88 5.97
 6.06 6.15 6.25 6.35 6.45 6.56 6.67 6.78 6.90 7.02 7.14 7.27 7.41 7.55 7.69 7.84
 8.00 8.16 8.33 8.51 8.70 8.89 9.09 9.30 9.52 9.76
 10.00 10.26 10.53 10.81 11.11 11.43 11.76 12.12 12.50 12.90
 13.33 13.79 14.29 14.81 15.38 16.00 16.67 17.39 18.18 19.05
 20.00 21.05 22.22 23.53 25.00 26.67 28.57 30.77 33.33 36.36 40.00 44.44
 50.00 57.14 66.67 80.00 100.00 133.33 200.00

5 Drive Level (AC & DC Measurements)

AC Open circuit voltage 0.05V, 0.1V, 0.25V, 0.5V, 1V

DC Open circuit voltage 0.5V (Simulated Rdc measurement using 5 Hz square wave)

Signal source impedance 100Ω nominal

Accuracy 10%

Bias Voltage 2V

6 Measurement Connections

4 front panel BNC guarded connectors with the screens at ground potential.

Terminals withstand connection of charged capacitor up to 5V, either polarity.

7 Measurement Accuracy

The accuracy statements given apply when the instrument is used under the following measurement conditions.

Slow speed, 4-terminal measurement. The instrument must have warmed up for at least 30 minutes at a steady ambient temperature of between 18°C and 28°C. The instrument must have been trimmed with its measuring leads and fixture at the measurement frequency.

Except on the highest and lowest hardware measurement ranges, the accuracy chart also apply to medium speed. For maximum and fast speed, the figure must be doubled.

Accuracy chart define the measurement ranges available, at specified accuracies, over the available frequency band. All curves assume that Slow measurement speed is used, that the LCR meter has been trimmed at the frequency and level used for measurements, factory calibration are valid and that the component under test is pure.

7.1 |Z| Accuracy Chart

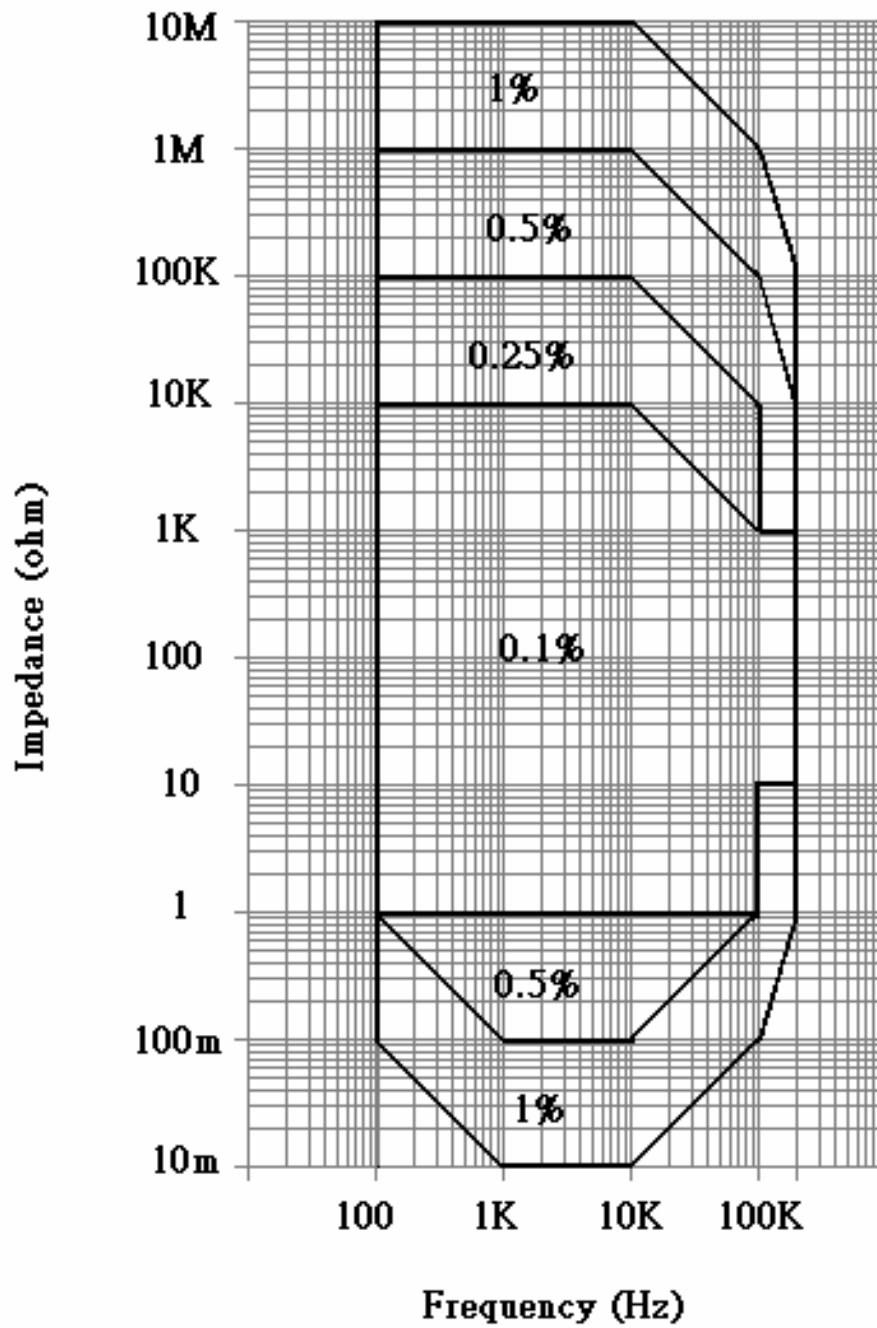


Figure 1-1 Accuracy Chart

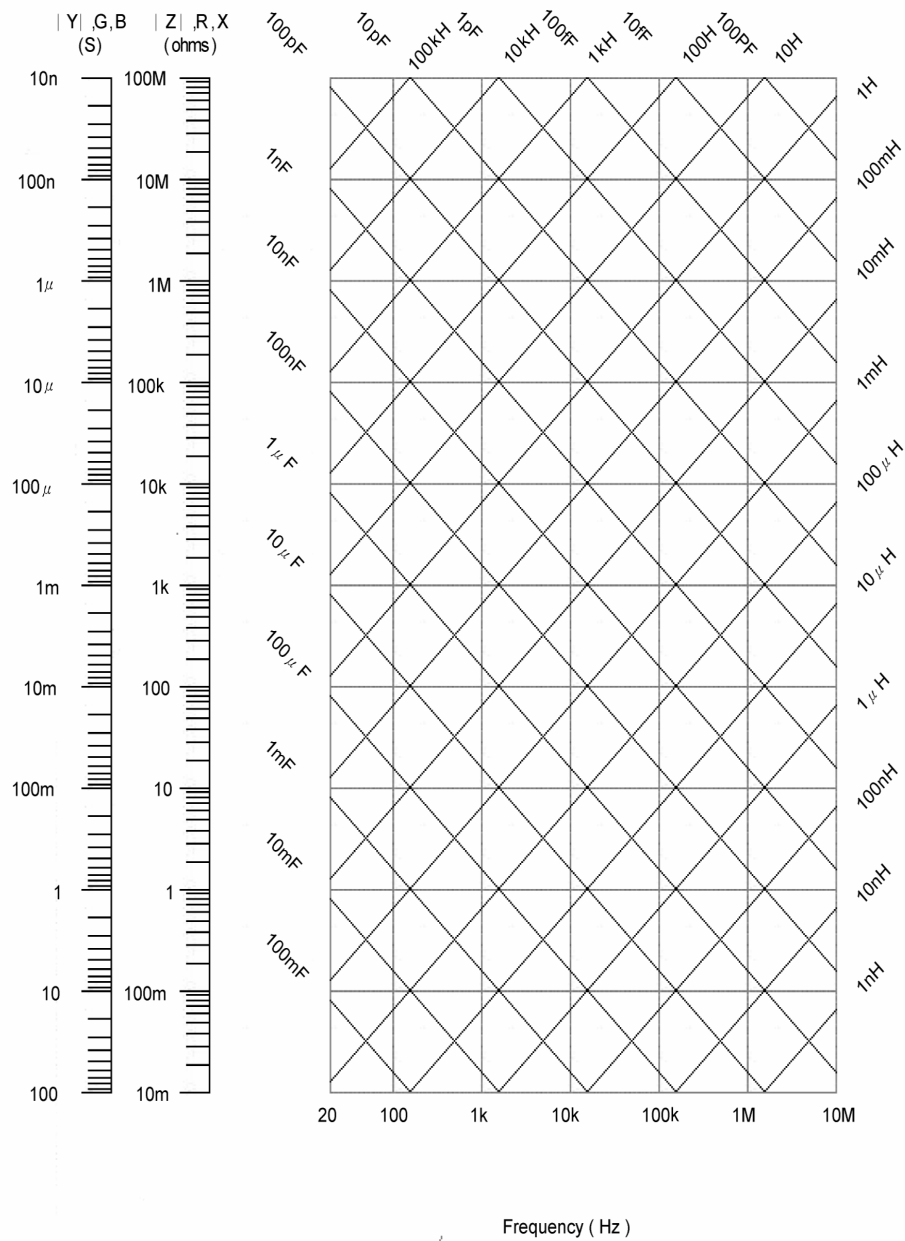


Figure 1-2 Z, L and C Cross Reference

7.2 |Z|, |Y|, L, C, R, X, G and B Accuracy

For high impedance value:

$$Ae[\%] = \pm((A + 0.0000001 * Z_x) * K_v * K_t)$$

For low impedance value

$$Ae[\%] = \pm((A + 0.1 / Z_x) * K_v * K_t)$$

Where,

A= Accuracy from accuracy chart

Z_x = Measured value of unknown component

K_v = Test voltage factor (Refer to Table A)

K_t = Temperature factor (Refer to Table B)

L, C, X, and B accuracy apply when $D < 0.1R$

When $D \geq 0.1$, multiply A_e by $\sqrt{1 + D^2}$ for L, C, X and B accuracies.

When $Q \geq 0.1$, multiply A_e by $\sqrt{1 + Q^2}$ for R, and B accuracies

7.3 Rdc Accuracy

Impedance (Z) at 100Hz.

7.4 D Accuracy

$D_e = \pm(A_e / 100)$

If $D > 0.1$, multiply D accuracy by $(1+D^2)$

7.5 Q Accuracy

$Q_e = \pm((Q_x^2 * D_e) / (1 \pm Q_x * D_e))$

Where, Q_x is the measured Q value,

D_e is the relative D accuracy.

Accuracy applies when $Q_x * D_e < 1$

Drive Level	Test Voltage Factor (K_v)
1V	1
0.5V	1
0.25V	1
0.1V	1.5
0.05V	2.5

Temperature($^{\circ}$ C)	Temperature Factor (K_t)
8-18	2
18-28	1
28-35	2

8 Comparator test mode

Upper and lower test limits in units and percentage

9 Ranging

Auto and Hold

10 Trigger

Internal, Manual, External, and Bus

11 Display and Indicators

240 x 64 pixel dot matrix LCD

PASS, FAIL and BIAS LED indicators

Internal speaker

12 Memory

127 instrument set-up conditions can be saved.

13 Interfaces

RS-232 port, Handler Interface, GPIB

14 Power Supply

Input voltage	90 – 132Vac or 198 – 264Vac (selectable)
Frequency	47 – 66Hz
Power	45VA typical

15 Environmental

Installation category	II (in accordance with IEC664)
Temperature range	Operating: 10°C to 40°C
Relative humidity	up to 90% non-condensing
Pollution degree	2 (mainly non-conductive)
Altitude	up to 2000m

16 Safety

Complies with the requirements of EN61010-1

17 EMC

Immunity	EN61326-1
Emissions	EN55022 Class A

18 Mechanical

Height	150mm
Width	320mm
Depth	300mm
Weight	6kg without accessories

19 Accessories Supplied

4-Terminal BNC Kelvin Clips

Power Cord

User Manual

20 Ordering Information

Item	Part Number
4230 LCR Meter	1J4230
4-Terminal Component Fixture (optional)	FX-0000C1
SMD Tweezers (optional)	1EVA40120
4-Terminal BNC Kelvin Clips	AC-6870K1