DIGITAL *POCKET*
LCR METER

LCR-9063

TABLE OF CONTENTS

1. FEATURES

* A pocket, Battery operated, Inductance, Capacitance and Resistance Meter.
* LSI-circuit provides high reliability and durability.
* LCD display for clear readout even in bright ambient light conditions.
* Input overload protection .
* Rotary switch function selector .
* Color-coded panel for easy indentification of functions and ranges .
* Low battery indicator.

2. SPECIFICATIONS

2-1 General Specifications

Display	13 mm (0.5") LCD, 3 1/2 digits. Max. reading 1999.
Over-input indicator	" 1 " mark indication.
Sampling Time	Approx. 0.4 second.
Operating Temp.	0 蚓 to 50 蚓 (32 蚌 to 122 蚌).
Operating Humidity	Less than 80% RH.
Power Supply	006 P DC 9V battery, heavy duty battery.
Dimensions	120 x 72 x 37 mm .
Weight	185 g/0.41 LB.
Power Consumption	R - Approx. 8 mA. L - Approx. 9 mA. C - Approx. 9 mA.
Accessories Included	Instruction Manual .....1 PC Test alligator clips .....1 pair

2-2 Electrical specifications (23 5 C)

A. Inductance

Range	*In-range Display*	*Reso-lution*	*Accuracy*	*Inductor Resistance Limitation*
* 2 mH	0.02 mH-2 mH	1 uH	3%+3d)	< 2 ohm
20 mH	2 mH-20 mH	10 uH		< 100 ohm
200 mH	20 mH-200 mH	100 uH		< 500 ohm
2 H	0.2 H-2 H	1 mH	5%+5d)	
20 H	2 H-20 H	10 mH		

@ uH = micro Henry (10 -6H), mH = mili Henry (10 -3H).
@ Test frequency : Approx. 250 Hz.

** Zero stray inductance of 2 mH range (short circuit) :0 uH.*
** The exact measuring value for the 2 mH range, should read the meter's reading value, then deduct the Zero stray inductance value (short circuit value). For example : The meter's reading is 7 uH, the short value is -15 uH, the exact measuring value is 7 uH - (-15 uH) = 22 uH.*

B. Capacitance

Range	*In-range Display*	*Reso-lution*	*Test Fre-quency*	*Accuracy*
* 2 nF	10 pF-2 nF	1 pF	250 Hz	(3 % + 3 d)
20 nF	200 pF-20 nF	10 pF	250 Hz	
200 nF	2 nF - 200 nF	100 pF	250 Hz	
2 uF	.02 uF - 2 uF	1 nF	250 Hz	
20 uF	0.2 uF - 20 uF	10 nF	250 Hz	
200 uF	2 uF - 200 uF	100 nF	40 Hz	

pF= pico Farad (10 -12F) nF= nano Farad (10 -9F)
uF= micro Farad (10 -6F)

** Zero stray capacitance of 2 nF range (open circuit,* 30 pF
** The exact measuring value for the 2 nF range, should read the meter's reading value, then deduct the Zero stray capacitance value (open circuit value). For example : The meter's reading is 32 pF, the open circuit value is 12 pF, the exact measuring value is 32 pF - 12 pF = 20 pF.*

C. Resistance

Range	***Resolution***	***Open Circuit Voltage***	***Accuracy***
200 ohm	0.1 ohm	Approx. 600 mV	(2 % + 3 d)
2 k	1 ohm		
20 k	10 ohm		
200 k	100 ohm		
2000 k	1 k		
20 M	10 k	Approx. 300 mV	

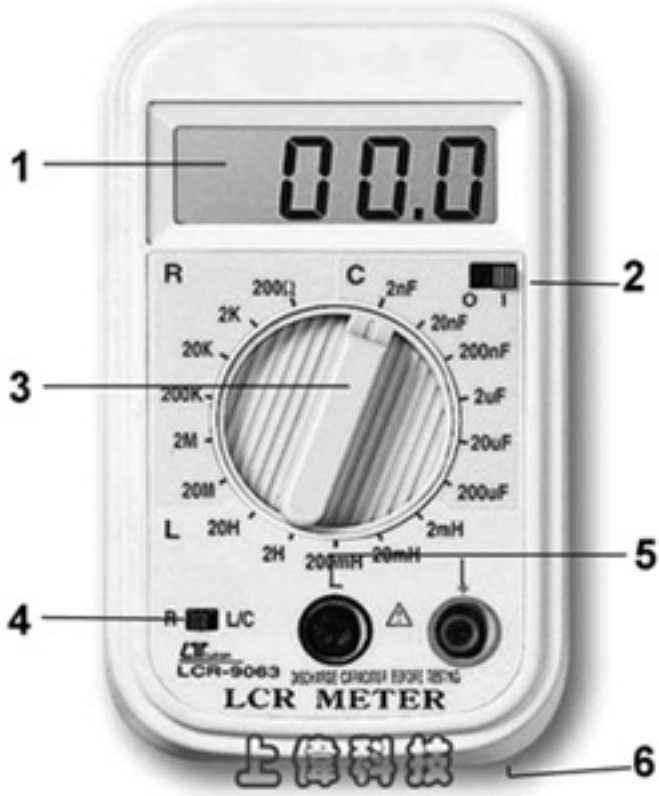
Remark :

a. Though the internal test frequency is approx. 250 Hz. However the accuracy adjustment are executed as :

- For the capacitance (2 uF, 200 nF, 20 nF, 2 nF) range, the acuracy adjustment is compared with the " Standard capacitor that tested under the 1 KHz frequency ".
- For the capacitance (20 uF, 200 uF) range, the accuracy adjustment is compared with the " Standard capacitor that tested on the 100 Hz frequency ".
- For the inductance (2 mH, 20 mH, 200 mH, 2 H) range, the accuracy adjustment is compared the " Standard inductor that tested on the 1 KHz ".
- For the inductance (20 H) range, the calibration is compared the " Standard inductor that tested on the 100 Hz ".

b. The above spec. accuracy are tested under the environment RF Field Strength less than 3 V/M & frequency less than the 30 MHz only.

3. FRONT PANEL DESCRIPTION



3-1 Display
3-2 Power On/Off switch
3-3 Function switch
3-4 LC/R select switch
3-5 Measuring input
3-6 Battery Compartment/ cover

4. INDUCTANCE (L) MEASURING PROCEDURE

1) Slide the " Power On/Off switch " (3-2, Fig. 1) to the " 1 " position.

" 1 " = On " 0 " = Off

2) Slide the " L/C,R switch " (3-4, Fig. 1) to the " L/C " position.
3) Rotate the function switch for the maximum expected inductance range.
4) Plug the " Test alligator clips " to the " Measuring input " (3-5, Fig.1), then connect the inductor to the alligator clips.
5) Read the display. The value indicated corresponds to the range selected. If the DISPLAY shows "1", it indicates an Out-of-Range measurement. In order to improve the resolution, Select the next higher range.

NOTE:

1) * ***If the inductance value is unmarked start with the Lower range (2 mH) and keep increasing until a suitable reading is obtained.***
2) * *For the 200 mH range are designed for measuring from 20 mH to 200 mH only. It is normal, if get the no convineant reading value when measue inductance less than 20 mH of 200 mH range.*
   * *For the 2H range are designed for measuring from 0.2 H to 2H only. It is normal, if get the no convineant reading value when measue inductance less than 0.2 H of 2 H range.*
   * *For the 20H range are designed for measuring from 2 H to 20H only. It is normal, if get the no convineant reading value when measue inductance less than 2 H of 20 H range.*

3) Consideration for internal circuit's stray inductance of 2 mH range, if intend to make the precision measurement, should short the input terminal first, record the display Then final true measurement value will be the " reading value " deduct above " internal circuit stray inductance " *For example : If the stray inductance is -15 uH, then the real real value is the reading value plus 15 uH (deduct -15 uH).*
4) Measurement of very low inductance should be performed using extremely short leads in order to avoid introducing any stray capacitance.
5) This instruments is not intended for determining the "Q" factor for the inductor. Misleading readings may be obtained if the measurement of the inductance of a resistor is attempted.

5. CAPACITANCE (C) MEASUREMENT PROCEDURE

1) Slide the " Power On/Off switch " (3-2, Fig. 1) to the " 1 " position.

" 1 " = On " 0 " = Off

2) Slide the " L/C,R switch " (3-4, Fig. 1) to the " L/C " position.
3) Rotate the function switch for the maximum expected capacitance range.
4) Plug the " Test alligator clips " to the " Measuring input " (3-5, Fig.1), then connect the inductor to the alligator clips.

* ***Observe polarity when connecting polarized capacitors.***
* ***Fully discharge any charged capacitors.***

5) Read the display. The value indicated corresponds to the range selected. If the DISPLAY shows "1", it indicates an Out-of-Range measurement. In order to improve the resolution, Select the next higher range.

NOTE:

1) * ***If the capacitance value is unmarked start with the Lower range (2 nF) and keep increasing until a suitable reading is obtained.***

2) * *For the 200 nF range are designed for measuring from 2 nF to 200 nF only.*
   * *For the 2 uF range are designed for measuring from 0.02 uF to 2 uF only.*
   * *For the 20 uF range are designed for measuring from 0.2 uF to 20 uF only.*
   * *For the 200 uF range are designed for measuring from 2 uF to 200 uF only.*

   It is normal, if get the no convineant reading value when measue capacitacitance :

   < 2 nF of 200 nF range.
   < 0.02 uF of 2 uF range.
   < 0.2 uF of 20 uF range.
   < 2 uF of 200 uF range.

3) Consideration for internal circuit's stray capacitance of 2 nF range, if intend to make the precision measurement, should open the test alligators (not connect the measuring capacitor), record the display (for example 15 uF ..... it is the circuit's stray capacitance). Then final true measurement value will be the " reading value " deduct above " internal circuit stray capacitance "

4) A capacitor with low voltage leakage will read over range, or a much higher value than normal. An open circuit capacitor will read zero on all ranges (possibly a few pF on 2nF range, due to stray capacitance of the instrument).
5) Measurement of very low capacitance should be performed using extremely short leads in order to avoid introducing any stray capacitance.
6) When using the test leads, remember that the leads may introduce a measurable capacitance to the measurement. Capacitors, especially electrolytics, often have notoriously wide tolerances.

6. RESISTANCE (R) MEASUREMENT PROCEDURE

1) Slide the " Power On/Off switch " (3-2, Fig. 1) to the " 1 " position.
2) Slide the " L/C,R switch " (3-4, Fig. 1) to the " R " position.
3) Rotate the function switch for the maximum expected inductance range.
4) Plug the " Test alligator clips " to the " Measuring input " (3-5, Fig.1), then connect the inductor to the alligator clips.
5) Read the display. The value indicated corresponds to the range selected. If the DISPLAY shows "1", it indicates an Out-of-Range measurement. In order to improve the resolution, Select the next higher range.

NOTE:

In order to make precision measurement at lower ranges, deduct the stray resistance of measuring leads from the readings. The stray resistance can be measured by shorting the leads.

7. MAINTENANCE

(1) This LCR METER is intended for measuring the capacitance value of a capacitor, the inductance value of an inductor. It is not intended for determining the "Q" factor for above reactive components. Misleading readings may be obtained if the measurement of the inductance or capacitance of a resistor is attempted .
(2) When measuring components within a circuit ensure the circuit the is switched off and de-energized before connecting the test leads.
(3) Instruments used in dusty environments should be stripped and cleaned periodically.
(4) Do not leave the instrument exposed to direct heat from the sun for long periods.
(5) Before removing the battery compartment cover, ensure that the instrument is disconnected from any circuit and the power switch is in the off position.
(6) For all measurements, connect the BLACK test lead into " - " terminal and RED test lead into " + " terminal.

8. BATTERY REPLACEMENT

1) When the left corner of LCD display show "LOBAT", it indicate a normal battery output of less than 6.4 V - 7.7 V. It is necessary to replace the battery, However in-spec. measurement may still be made for several hours after LOW BATTERY INDICATOR appears before the instrument become inaccurate.
2) Open the screw of " Battery Cover " (3-6, Fig 1) by screwdriver, then move the battery.
3) Replace with 9V battery and reinstate the cover.