

## LIST OF PRODUCTS

- \* Digital Multimeter
- \* Digital AC & AC/DC Clampmeter
- \* AC Clamp Adaptor
- \* AC/DC Current Adaptor
- \* Transistorised Electronic Analog & Digital Insulation Resistance Testers(upto 10 KV)
- \* Digital Sound Level Meter & Sound Level Calibrator
- \* Digital contact & Non-contact Type Tachometer
- \* Digital Non-contact (infrared) Thermometer & Portable Infrared Calibrator
- \* Thermo Hygrometer / Anemometer
- \* Digital Absolute pressure meter
- \* Wood, Paper & Grain Moisture Meter
- \* Distance Meter & Network Cable Tester
- \* Digital Hand Held Temperature Indicators
- \* Digital Lux Meter
- \* Thermal Imaging Camera
- \* Power Factor Regulator
- \* Maximum Demand Controller/Digital Power Meter
- \* Earth Resistance Tester
- \* Digital Panel Meters & DC Power Supplies
- \* Digital Storage / Analog Storage Oscilloscope.
- \* Coating Thickness Guage
- \* Process Calibrators & Multifunction Calibrators
- \* Gas Analysers & Waterproof Pen Testers
- \* Frequency Counter / Function Generator
- \* Phasing Sticks & High Voltage Detector
- \* Transducer & Transmitter
- \* Digital Milli Ohm Meter
- \* Solar Power Meter
- \* EMF/ELF Detector / RF Field Strength Meter

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**KUSAM-MECO**<sup>®</sup>

## Multi-Function LCR

**MODEL KM 520B**



**OPERATION  
MANUAL**

Thank you for purchasing the multi-function LCR meter. Please take a few minutes to browse through this user manual before you begin to operate the meter to ensure that you are fully familiarized with how best to operate the meter as accurately and safely as possible.

**Overview**

This multi-function LCR meter is a portable instrument designed with microprocessor control and low power consumption. It can measure 6 basic parameters: inductance L, capacitance C, AC resistance R, DC resistance DCR, dissipation factor D and quality factor

Q. The instrument can easily communicate with PC and realize remote control through USB interface.

With battery external power supply, the meter is ideal for field and portable applications, such as component inspection at fixed place, and immediate measurement by maintenance personnel.

**Cautions**

- This instrument can only be used in indoor.
- Be sure to turn off the instrument when replacing the battery or DC power adapter.
- Although the instrument has a protection for shocks, inputting dc voltage or current will still damage the instrument. The capacitance requires completely discharge before measuring.

- If the instrument is idle for more than 15 days please take the batteries out.
- Use AAA \* 6 batteries. The instrument can not work properly when low battery voltage indication appears.
- In order to ensure the measurement accuracy, open / short calibration should be carried out again after replacing the test fixtures.
- Do not using the instrument under dusty, vibration, direct sunlight and corrosion gas. environment

**Introduction****Features**

- 19,999/1,999 counts dual LCD display
- Basic accuracy : 0.3% with resolution of 0.01%
- Analog bar display
- Measurement frequency up to 100KHz
- Mini-USB interface
- Auto LCR smart check and measurement
- Sorting function
- Relative measurement
- Data hold,
- Back light, full angle for LCD display
- 4-terminal measurement configuration
- Automatic power off
- Battery and external power supply
- Battery voltage indication.

**Specifications**

|                    |                                   |   |                |
|--------------------|-----------------------------------|---|----------------|
| Parameters         | Primary                           | DCR : DC resistance<br>Ls/Cs : series inductance / capacitance<br>Lp/Cp : parallel inductance / capacitance                               |                |
|                    | Secondary                         | θ : phase angle<br>D: dissipation factor<br>ESR: equivalent series resistance<br>Q : quality factor<br>RP: equivalent parallel resistance |                |
| Frequency          | 100/120/1K/10K/100KHz             |   |                |
| Display            | Dual display + analog bar display |   |                |
| Measurement range  | L                                 | 100/120Hz   | 20mH ~ 20KH    |
|                    |                                   | 1KHz  | 2000μH ~ 2000H |
|                    |                                   | 10K   | 200μH ~ 20H    |
|                    |                                   | 100KHz  | 20μH ~ 200mH   |
|                    | C                                 | 100/120Hz   | 20nF ~ 20mF    |
|                    |                                   | 1KHz  | 2000pF ~ 2mF   |
|                    |                                   | 10K   | 200pF ~ 200μF  |
|                    | R                                 | 100/120Hz   | 200Ω ~ 200MΩ   |
|                    |                                   | 1KHz  | 20Ω ~ 200MΩ    |
|                    |                                   | 10K   | 20Ω ~ 20MΩ     |
|                    |                                   | 100KHz  | 20Ω ~ 2MΩ      |
|                    | DCR                               | 200 ~ 200M  |                |
| D/Q                | 0.001 ~ 1999                      |   |                |
| θ                  | 0.00° ~ ± 180.0°                  |   |                |
| Test Level         | 0.6 Vrms                          |   |                |
| Range mode         | Auto and Hold                     |   |                |
| Equivalent circuit | Parallel and Series               |   |                |

**Specifications**

|                       |   |
|-----------------------|---|
| Calibration function  | Open / Short  |
| Interface             | Mini - USB  |
| Measurement speed     | Approx. 1.2 times/second  |
| Measurement terminal  | 4-terminal  |
| Basic accuracy        | 0.3%  |
| Power                 | AAA*6 battery or external power supply                            |
| Auto Power off        | 5 min (with batteries)  |
| Operating Environment | temperature 0°C ~ 40 °C<br>humidity ≤90%RH (40°C no condensation) |
| Storage temperature   | -25°C ~ 50 °C   |

**Impedance Accuracy Ae**

The below - listed accuracies are guaranteed by the meter with normal use under the operating temperature of 18°C -28°C and relative humidity less than 80%

| Z \ Freq  | 0.1-1Ω  | 1-10Ω   | 10-100kΩ | 100k-1MΩ | 1M-20MΩ          | 20M-200MΩ | Remark  |
|-----------|---------|---------|----------|----------|------------------|-----------|---------|
| DCR       | 1.0%+5d | 0.5%+3d | 0.3%+2d  | 0.5%+3d  | 1.0%+5d          | 2.0%+5d   | D < 0.1 |
| 100/120Hz | 1.0%+5d | 0.5%+3d | 0.3%+2d  | 0.5%+3d  | 1.0%+5d          | 2.0%+5d   |         |
| 1kHz      | 1.0%+5d | 0.5%+3d | 0.3%+2d  | 0.5%+3d  | 1.0%+5d          | 5.0%+5d   |         |
| 10kHz     | 1.0%+5d | 0.5%+3d | 0.3%+2d  | 0.5%+3d  | 2.0%+5d          | N/A       |         |
| 100kHz    | 2.0%+5d | 1.0%+5d | 0.5%+3d  | 1.0%+5d  | 2.0%+5d (1M-2MΩ) |           |         |

**Note** :- All accuracy is guaranteed by proper ratio resistor calibration and open/short calibration.

If  $D > 0.1$ , the accuracy should be multiplied by

$$\sqrt{1+D^2}$$

$Z_c = \frac{1}{2\pi f c}$ , if  $D \ll 0.1$  in capacitance mode

$Z_L = 2\pi f L$ , if  $D \ll 0.1$  in inductance mode

**Sub-display parameters accuracy :**

Ae = impedance (Z) accuracy.

Definition :  $Q = \frac{1}{D}$

$R_p = ESR \text{ (or } R_s) \times (1 + \frac{1}{D^2})$

1) D value accuracy :  $D_e = \pm A_e \times (1+D)$

2) ESR accuracy :  $R_e = \pm Z_m \times A_e (\Omega)$

i.e.,  $Z_m$  = impedance calculated by  $\frac{1}{2\pi f c}$  or  $2\pi f L$

3. Phase angle  $\theta$  accuracy :  $\theta_e = \pm (180 / \pi) \times A_e \text{ (deg)}$

- Note** :-
- D : dissipation factor
  - Q : quality factor
  - ESR : equivalent series resistance
  - Rp : equivalent series parallel resistance
  - $\theta$  : phase angle

**Explanation on Front Panel**

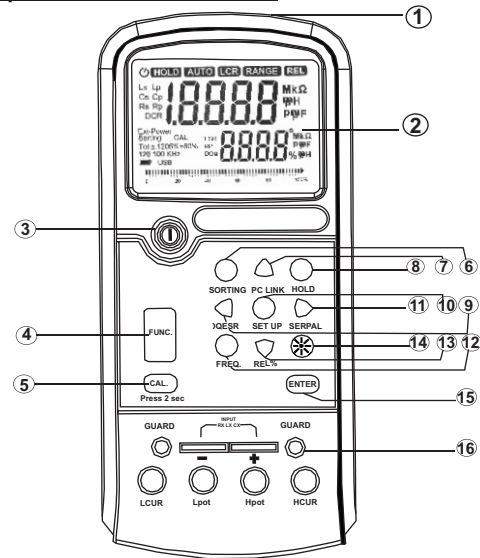


Figure 1

The front panel is shown as figure 1.

- 1) **Mini USB interface** :- Connect with PC, easily for data transmission and management.
- 2) **LCD** :- Used for displaying the measuring results and various symbols.
- 3) **Power key** :- Used for putting ON or OFF the operating power for the meter.
- 4) **Func. Key** :- When **Func.** key is pressed, the main test mode could be selected sequentially: Auto-LCR mode-Auto-L mode-Auto-C mode-Auto-R mode-DCR mode-Auto-LCR mode.

- 5) **CAL** key :- Used to do OPEN/SHORT calibration.
- 6) **SORTING** key :- Press this key to enter into sorting mode, which could help the user to make a quick sort for a bunch of components.
- 7) **PC LINK** key :- Press this key to communicate with PC.
- 8) **HOLD** key :- Used to maintain the measurement data unchanging, by pressing the key again it will resume the measurement.
- 9) **D/Q/ESR** key :- In L/C measurement mode, press the key to select parameters of D/Q/θ/ESR.
- 10) **SETUP** key :- When sorting mode is active, press **SETUP** key to modify the reference value, range and the tolerance setting sequentially.
- 11) **SER/PAL** key :- Used to select series and parallel mode.
- 12) **FREQ** key :- Press **FREQ** key to select five different test frequencies in turn : 100/120/1K/10K/100KHz
- 13) **REL%** key :- Press **REL%** key to enter into relative measurement mode. In auto LCR mode, this key is not available.
- 14) **☼** key :- By pressing this key for once, the backlight of the LCD screen will be turn ON and after 60 seconds the meter will automatically turn off the backlight. It is also possible to turn off the backlight by pressing this key before the 60 seconds.

- 15) **ENTER** key :- In sorting mode, press **ENTER** key to confirm the data modification.
- 16) Measurement terminal

The instrument has 4-terminal measurement configuration, as shown in figure 2.

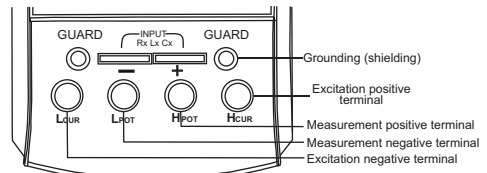


Figure-2

**Understanding Display Screen**

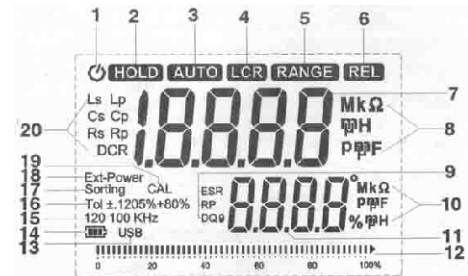


Figure-3

LCD screen is shown as in Figure 3, with its every symbol's meaning shown as in the Table 1:

| NO. | MEANING                       | NO. | MEANING                                    |
|-----|-------------------------------|-----|--|
| 1   | Auto power off indication     | 11  | Sub-display                                |
| 2   | Data hold                     | 12  | Analog bar indication                      |
| 3   | Auto mode indication          | 13  | The meter is in the data transmission mode |
| 4   | Auto LCR mode indication      | 14  | battery indication (with battery supply)   |
| 5   | Range indication              | 15  | Frequency indication                       |
| 6   | Relative Measurement mode     | 16  | Tolerance range                            |
| 7   | Main-display                  | 17  | Sorting mode indication                    |
| 8   | Unit for main parameters      | 18  | External power supply                      |
| 9   | Secondary parameters          | 19  | Open/Short calibration mode indication     |
| 10  | Unit for secondary parameters | 20  | Primary parameters                         |

**Operating instruction**

**Power on the meter**

Press **⏻** key to turn ON the power. The default mode is AUTO LCR smart mode and the default test frequency is 1kHz. When **⏻** key is pressed during power-on mode, the instrument will enter power-off mode. The LCD will show the "OFF" state before power off.

**Function Descriptions**

**1) Parameters setting**

Press **FUNC.** key to select the following parameters sequentially : AUTO LCR, L-Q, C-D, R, DCR.

| Parameter | MEANING  |
|-----------|--|
| AUTO-LCR  | Auto LCR smart mode  |
| L-Q       | Inductance measurement, the parameter on sub-display is quality factor Q       |
| C-D       | Capacitance measurement, the parameter on sub-display is dissipation factor D. |
| R         | Resistance measurement   |
| DCR       | DC resistance measurement mode   |

L/C/R measurement readings can be positive or negative. In C-D measurement, If the main parameter is "-", the actual component being tested is inductive; In L - Q measurement, if the main parameter is "-", the actual component being tested is capacitive; Theoretically, R is positive, in some cases, R is "-", which may be calibration error, please re-calibrate the instrument.

**2. Auto LCR smart Mode**

The default test mode is Auto LCR mode which could check the type of impedance smartly.

If  $|\theta| < 11^\circ$ , the Auto - R mode is selected. The parameter on sub - display is  $\theta$ .

If  $\theta > 11^\circ$ , the Auto - L mode is selected. The parameter on sub - display is Q.

If  $\theta < -11^\circ$ , the Auto - C mode is selected. The parameter on sub - display is D.

If the  $C < 5\text{pF}$ , the parameter on sub-display is parallel resistance  $R_p$ .

**Note : In order to avoid damaging the instrument, the capacitance requires discharge before measuring.**

**3. Frequency setting**

Press **FREQ** key to select frequency value : 100/120/1K/10K/100KHz. The LCR impedance scale ranges are depended on the test frequency.

**4. Data Hold**

Press this key to hold the measurement data and press it again to resume the measurement.

**5. Relative mode**

During relative measurement the meter remembers the current readings on primary display (called initial value) when pressing the **REL%** key, and

"REL" symbol appears on LCD. The secondary display will show the percentage of relative value REL%

The  $REL\% = (\text{present value} - \text{initial value}) / \text{initial value} * 100\%$ .

Press **REL%** key again to show the current readings on primary display and the "REL" symbol will be blinking. The percentage range is from -99.9% ~ 99.9% when the present value is larger than double of initial value, the "OL%" indication will be shown on the secondary display.

During relative measurement, analog bar is always indicating the present measurement value but not the relative value.

**6. Open / Short calibration**

- 1) Press **CAL** key larger than 2 seconds to start the open / short calibration procedure.
- 2) In open calibration mode, the secondary display will show "Open". There are two ways for open state input:
  - a) When using square terminals, the square terminals and  $L_{CUR}/L_{POT}/H_{POT}/H_{CUR}$  terminals hang in the air (shown in figure 4);

- b) When using  $L_{CUR}/L_{POT}/H_{POT}/H_{CUR}$  terminals insert the black and red testing lines with alligator clip into the "L<sub>CUR</sub>", "L<sub>POT</sub>", terminal and "H<sub>CUR</sub>", "H<sub>POT</sub>" terminal respectively. (shown in figure 5).

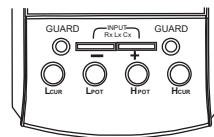


Figure 4

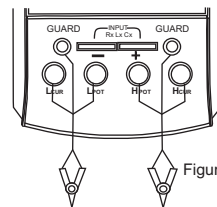


Figure 5

- 3) Press **CAL** key and the 30-second countdown will be shown on LCD panels. If the open calibration is finished, the PASS or FAIL symbol will be shown on the primary display. Press **CAL** key again to save the calibration data and enter into the short calibration mode.
- 4) In short calibration mode, the secondary display will show "Srt". There are two ways for short state input:
  - a) When using square terminals, insert the short socket to the square terminal and make  $L_{CUR}/L_{POT}/H_{POT}/H_{CUR}$  terminals hang in the air (shown in figure 6);
  - b) When using  $L_{CUR}/L_{POT}/H_{POT}/H_{CUR}$  terminals insert the black and red testing lines with alligator clip into the "L<sub>CUR</sub>", "L<sub>POT</sub>", terminal and "H<sub>CUR</sub>", "H<sub>POT</sub>". terminal respectively. Connect the mouth of clips (shown in figure 7).

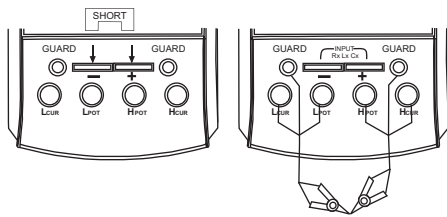


Figure 6

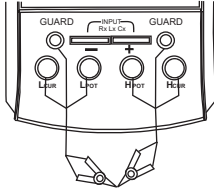


Figure 7

- 5) Press **CAL** key and the 30-second countdown will be shown on LCD panels. If the short calibration is finished, the PASS or FAIL symbol will be shown on the primary display. Press **CAL** key again to save the calibration data.

- Note:**
- 1) To get the better accuracy, the open / short calibration should be done before measurement.
  - 2) The purpose of open / short calibration is to reduce the parasitic effect of the test fixture.
  - 3) Open or short circuit, is selected automatically according to the measurement terminal.
  - 4) In short calibration, there may be FAIL situations, which may be caused by not using the low resistance short line or unreliable contact, please try again after reliable short - circuit

### 7. Equivalent Circuit

When any L/C/R functional mode is selected, the default measurement in series or parallel mode is auto selected and the AUTO segment will be shown on LCD display. It depends on the total equivalent impedance measured.

If the impedance is larger than 10KΩ, parallel mode is set and Lp/Cp/Rp is shown on the display.

If it is less than 10KΩ, series mode is set and Ls/Cs/Rs is shown on the display. When SEL/PAL key is pressed, the impedance measurement will be set in series mode on in parallel mode sequentially.

**Note** :- The actual capacitance, inductance and resistance is not ideal component of pure reactance and pure resistance. Usually the resistance and reactance exist simultaneously. A practical impedance can be simulate by the ideal resistors and ideal reactor (inductor or capacitor) in series or parallel form.

### 8. Sorting mode

The sorting mode could help the user to make a quick sort for a bunch of components. The setting step as following:

- 1) Accordings to the component type, press **FUNC**, key to select L, C or R measurement mode.
- 2) Insert the standard component into the input terminal, Press **SORTING** key to enter into the sorting mode and the "Sorting" symbol appears on LCD. If the LCD reading is OL or less than 200 counts, the **SORTING** key is not available.



- 3) When sorting mode is active, press **SETUP** key to modify the range, reference value and the tolerance settings sequentially.
- 4) "Range" symbol is flashing when setting the range. Press **D/Q/ESR** (←) key to shift the decimal point, unit to left and press **SER/PAL** (←) key to right. Press **ENTER** key to confirm and enter into the reference value setting mode automatically. At this time, "Range" symbol disappear.
- 5) When setting the reference value, press **D/Q/ESR** (←) key and **SER/PAL** (→) key to shift the bit to left and right respectively. Press **PCLINK** (↑) key and **REL %** (↓) key to make the digit +1 or -1. The flashing bit is the current setting bit. The reference value setting is available from 20 to 1999 counts. Press **ENTER** key to confirm and enter into the tolerance setting mode automatically.
- 6) When setting the tolerance, press **D/Q/ESR** (←) key & **SER/PAL** (→) key to select tolerance range :  
± 0.25% → ± 0.5% → ± 1% → ± 2% → ± 5% → ± 10%  
→ ± 20% → ± 80% - 20%. The default tolerance is ± 1%. Press **ENTER** key to confirm.
- 7) After setting the parameters, remove the standard component and insert the component to be measured. If the impedance measured does not exceed tolerance range, the primary display will show "PASS", otherwise show "FAIL". The current measurement result will be shown on the secondary display.

- 8) Press **SORTING** key again to exit the sorting mode.

**Note:** In AUTO LCR mode, the SORTING key is not available.

#### 9. PC-LINK mode

Press **PCLINK** key "USB" symbol appear on LCD. Connect the instrument to PC through USB interface, and the measured data can be recorded, analyzed, processed and printed by PC. Press **PCLINK** key again to cancel the data transmission. Then USB symbol disappears.

Due to the power consumption in data transmission, please exit USB mode when there is no need to transmit data.

#### Operating step

##### 1. Inductance measurement

- 1) Turn on the power.
- 2) There are two ways for inductance input:
  - a. Insert the inductance to be measured into the input terminal directly (shown in figure-8);
  - b. Connect the alligator clips to the ends of the inductance to be measured (shown in figure-9).
- 3) The default test mode is Auto LCR mode, the inductance value will be shown on primary display and the quality factor Q will shown on secondary display. In Auto LCR mode, the **D/Q/ESR** key, **SEL / PAL** key, **SORTING** key and **REL%** key are not available

- 4) Press **FUNC.** key to select Auto-L-mode. The primary LCD display will show the quality factor Q. The equivalent resistance ESR/Rp, phase angle  $\theta$  or dissipation factor D can also be shown by pressing the **D/Q/ESR** key.
- 5) Press **FREQ** key to select frequency value: 100/120 /1K/10K/100KHz.
- 6) Press **SER/PAL** key to select series or parallel mode.

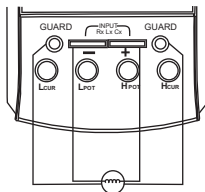


Figure 8

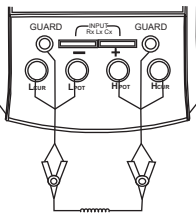


Figure 9

## 2. Capacitance measurement

- 1) Turn on the power.
- 2) If voltage exists in the capacitor connect the two ends of the capacitors for a short time to discharge.
- 3) There are two ways for capacitance input:
  - a. Insert the positive polarity of capacitance into the positive terminal and its negative polarity into the negative terminal (shown in figure 10);
  - b. Insert the black and red testing lines with alligator clip into the "Lcur", "Lpot", terminals and "Hcur", "Hpot", terminal respectively. Connect the alligator clips to the ends of capacitance corresponding to its polarity (shown in the figure 11).

- 4) The default test mode is Auto LCR mode, the capacitance value will be shown on primary display and the dissipation factor D will be shown on secondary display. In Auto LCR mode, the **D/Q/ESR** key, **SEL/PAL** key, **SORTING** key and **REL%** key are not available.
- 5) Press **FUNC.** key twice to select Auto-C mode. The primary LCD display will show the capacitance value. The secondary LCD display will show the dissipation factor D. The quality factor Q, equivalent resistance ESR/Rp or phase angle  $\theta$  can also be shown by pressing the **D/Q/ESR** key.
- 6) Press **FREQ** key to select frequency value: 100/120 /1K/10K/100KHz.
- 7) Press **SER/PAL** key to select series or parallel mode.

**Note :-** 1) When Auto-LCR mode is active, the secondary parameter will show the equivalent resistance in parallel mode (Rp) to replace the D factor if the C measured value is less than 5pF.

**2) In order to avoid damaging the instrument, the capacitance requires discharge before measuring**

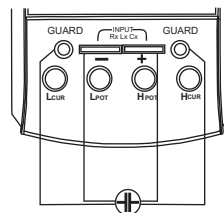


Figure 10

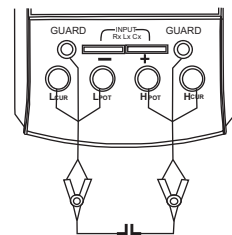


Figure 11

**3. Resistance measurement**

- 1) Turn on the power.
- 2) There are two ways for resistance input:
  - a. Insert the resistance to be measured into the input terminal directly (shown in figure-12);
  - b. Connect the alligator clips to the ends of the resistance to be measured (shown in figure-13).
- 3) The default test mode is Auto LCR mode, the resistance value will be shown on primary display and the phase angle  $\theta$  will be shown on secondary display. In Auto LCR mode, the **D/Q/ESR** key, **SEL/PAL** key, **SORTING** key and **REL %** key are not available
- 4) Press **FUNC.** key three times to select Auto-R (ACR) mode, The primary LCD display will show the resistance value. The secondary parameter is omitted and the **D/Q/ESR** key. is not available.
- 5) Press **FREQ** key to select frequency value: 100/120 /1K/10K/100KHz.
- 6) Press **SER / PAL** key to select series or parallel mode.
- 7) Press **FUNC.** key four times to select DCR mode. The primary LCD display will show the resistance value. The secondary parameter is omitted and the **D/Q/ESR** key, **SEL/PAL** key and **FREQ** key are not available.

**Note :** The phase angle  $\theta$  will show on secondary display only in Auto- LCR mode. During Auto-R mode or DCR mode, the secondary parameter is not available.

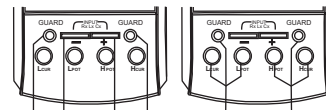


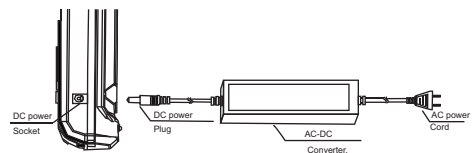
Figure 12

Figure 13

**To use Adapter** (Under external power adapter, the automatic power off function is not available).

**Connecting the power adapter:**

- 1) Connect the AC power cord to the AC-DC converter
- 2) Plug the AC power cord into an electrical outlet (100V-240V).
- 3) Plug the DC power plug of the convertor into DC power socket of the meter



**AC/DC adapter information:**

Input : 100V-240VAC, 50-60Hz 1.8A

Output : DC 12V **==** 2A MAX

Polarity :  $\oplus$   $\ominus$


**WARNING:**

- 1) Please use the original AC power adapter, using other AC power adapter may damage your instrument.
- 2) The AC power adapter can only be used indoors.
- 3) Please plug the AC power cord into an electrical outlet first and then firmly insert DC plug into DC input end in the right of the meter. When unplugged, firstly pull out the DC plug perpendicular to DC input end and then unplug the AC plug from the electrical outlet.
- 4) Do not use the AC power adapter in other equipment except this instrument.
- 5) In use, it is a normal phenomenon that the AC power adapter will be hot.
- 6) Do not demolish the AC power adapter. Otherwise, it may be dangerous
- 7) Do not use the AC power adapter in a high temperature or wet place.
- 8) Please make the AC power adapter avoid a strong bump.
- 9) It is normal when the AC power adapter make some noise in use.

**MAINTENANCE**

**Cleaning :-** Periodically wipe the case with a damp cloth do not use abrasives or solvents.

**Calibration :-** Calibrate your instrument once a year to ensure that it performs according to its specifications.

**Replacing the Battery :-** Please change the battery when the battery symbol  is less than one segment.

Turn off the power of the instrument. When you change the battery, and screw off the breechblock on the battery cabinet cover, then take off it and replace with fresh battery.

**ACCESSORIES**

- |  |           |
|--|-----------|
| ● User manual.                         | One piece |
| ● AAA batteries                        | Six piece |
| ● Shielding clip line                  | One piece |
| ● Kelvin 4-terminal measure line       | One piece |
| ● Short socket                         | One piece |
| ● USB line (USB model only)            | One piece |
| ● PC-Link software CD (USB model only) | One piece |

If there are some changes in accessories, please refer to the real products as standard.

Note : To get the better accuracy, when using L<sub>CUR</sub>/L<sub>POT</sub>/ H<sub>POT</sub>/H<sub>CUR</sub>/ terminal measured with the alligator clip-testing lines, Please insert the open socket to the square terminals (shown in figure 14).

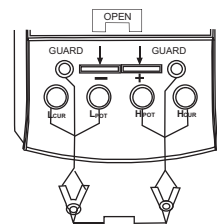


Figure 14



MUMBAI

## TEST CERTIFICATE

### Multifunction LCR

This Test Certificate warrants that the product has been inspected and tested in accordance with the published specifications.

MODEL NO. KM 520B

SERIAL NO. \_\_\_\_\_

DATE: \_\_\_\_\_

ISO 9001  
REGISTERED



### WARRANTY

Each "KUSAM-MECO" product is warranted to be free from defects in material and workmanship under normal use & service. The warranty period is one year (12 months) and begins from the date of despatch of goods. In case any defect occurs in functioning of the instrument, under proper use, within the warranty period, the same will be rectified by us free of charges, provided the to and fro freight charges are borne by you.

This warranty extends only to the original buyer or end-user customer of a "KUSAM-MECO" authorized dealer.

This warranty does not apply for damaged IC's, burnt PCB's, fuses, disposable batteries, carrying case, electrodes probes, cables or to any product which in "KUSAM-MECO's" opinion, has been misused, altered, neglected, contaminated or damaged by accident or abnormal conditions of operation or handling.

"KUSAM-MECO" authorized dealer shall extend this warranty on new and unused products to end-user customers only but have no authority to extend a greater or different warranty on behalf of "KUSAM-MECO".

"KUSAM-MECO's" warranty obligation is limited, at option, free of charge repair, or replacement of a defective product which is returned to a "KUSAM-MECO" authorized service center within the warranty period.

THIS WARRANTY IS BUYER'S SOLE AND EXCLUSIVE REMEDY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. "KUSAM-MECO" SHALL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OR LOSSES, INCLUDING LOSS OF DATA, ARISING FROM ANY CAUSE WHATSOEVER.

All transactions are subject to Mumbai Jurisdiction.