KUSAM-MECO®

An ISO 9001:2015 Company

BENCH TYPE DIGITAL MULTIMETER WITH PC INTERFACE MODEL KM 8045

CONTENTS

1. GENERAL

This instrument is a high performance, 4½ digital bench multi-meter for measuring DC and AC voltage, DC & AC current, Resistance, Capacitance, Hz, hFE, Diodes and Continuity. The max. Voltage measuring can upto 1000V DC or AC peak value, resolution can be 10mV, and current measuring can upto 20A. It also has the function of polarity auto-change, backlight displaying and directly reading. For AC measuring, it is performed by high accuracy TRMS, can test the bandwidth of the frequency, & the TMS of any waveform can be accurately measured.

2. SPECIFICATION

1. GENERAL SPECIFICATION

- **Power supply :** 220V / 110V AC
- **Manual Range**
- **4½ digit large LCD display with backlight (displaying range :** 75 x 40mm), **max reading :** 19999.
- **Voltage measurement upto 1000V DC and 1000V AC.**
- **DC, AC current upto 20A.**
- **ACV frequency response :** 50kHz.
- **Frequency, resistance, capacitance measurement, triode, diode test and continuity test.**
- **Overload protection :** 250V rms.
- **Operation environment :** 0°C--40°C, <75% R.H.
- **Dimension :** 260 X 220 X 82 mm
- **Weight :** approx. 1kg.

2. TECHNICAL SPECIFICATION

Accuracy = ± (reading % + the lowest effective digit) preheating time : 30min.
Temperature for accuracy (23 ± 5)°C, R.H.<75%, one year warranted from the production date

DC VOLTAGE (DCV)

RANGE	ACCURACY	RESOLUTION
200 mV	± (0.05% rdg + 3dgts)	10 mV
2 V		100 mV
20 V		1 mV
200 V		10 mV
1000 V	± (0.1% rdg + 5dgts)	100 mV

Input resistance : 10MW for all ranges

Overload protection : 200mV range : 250V DC or AC peak value.

Other range : 1000VDC or AC peak value

Display : 1) TRUE RMS

2) part range maybe can not return to zero, it's normal & has no effect on the tested accuracy. This meter has the TRUE RMS function, and extended the frequency response, can accurately test the RMS of any voltage waveform. (able to test AC+DC).

AC VOLTAGE (ACV) TRUE RMS

RANGE	INPUT FREQUENCY	ACCURACY	RESOLUTION
200 mV	40Hz ~ 1kHz	± (0.7% rdg + 30 dgts)	10 mV
	1kHz ~ 10kHz	± (2% rdg + 30 dgts)	
	10kHz ~ 20kHz	± (3% rdg + 60 dgts)	
	20kHz ~ 50kHz	± (10% rdg + 250 dgts)	
2 V	40Hz ~ 1kHz	± (0.5% rdg + 30 dgts)	100 mV
	1kHz ~ 10kHz	± (2% rdg + 30 dgts)	
	10kHz ~ 20kHz	± (5% rdg + 60 dgts)	
20 V	40Hz ~ 1kHz	± (0.5% rdg + 30 dgts)	1 mV
	1kHz ~ 10kHz	± (2% rdg + 30 dgts)	
	10kHz ~ 20kHz	± (3% rdg + 60 dgts)	
200 V	40Hz ~ 1kHz	± (0.5% rdg + 30 dgts)	10 mV
	1kHz ~ 5kHz	± (2% rdg + 30 dgts)	
1000 V	40Hz ~ 200Hz	± (0.8% rdg + 10 dgts)	100 mV
	200Hz ~ 400Hz	± (1.2% rdg + 80 dgts)	

Input resistance : 2MW for all range.

Overload protection : 200mV range : 250V DC or AC peak value.

Other range : 1000VDC or AC peak value

Display : 1) TRUE RMS (applicable for range 10% or 100%)

2) Part range maybe can not return to zero, it's normal & has no effect on the tested accuracy.

3) Accuracy will be up ±(1%+150) under AC+DC measuring.

DC CURRENT (DCA)

RANGE	ACCURACY	RESOLUTION	LOAD VOLTAGE
200 mA	± (0.35% rdg + 10 dgts)	0.01 mA	1 mV/uA
2 mA		0.1 mA	101 mV/mA
20 mA		1 mA	11 mV/mA
200 mA		10 mA	1.5 mV/mA
2 A	± (0.8% rdg + 10 dgts)	100 mA	275 mV/A
20 A		1 mA	42 mV/A

Max. Input current : 20A (within 15s)
Overload Protection : 2A / 250V fuse, 20A / 250V fuse

AC CURRENT (ACA) TRUE RMS

RANGE	RANGE	ACCURACY	RESOLUTION	LOAD VOLTAGE
20 mA	40Hz ~ 400Hz	± (0.8% rdg + 80 dgts)	1 mA	11 mV/A
200 mA			10 mA	1.5 mV/A
2 A			100 mA	275 mV/A
20 A		± (1.0% rdg + 50 dgts)	1 mA	42 mV/A

Max. Input current : 20A (within 15s)
Overload Protection : 2A / 250V fuse, 20A / 250V fuse

RESISTNCE (Ω)

RANGE	ACCURACY	RESOLUTION	SHORT-CIRCUIT CURRENT	OPEN-CIRCUIT VOLTAGE
200 Ω	± (0.15% rdg + 20 dgts)	0.01 Ω	About 260uA	About 1V
2 kΩ	± (0.15% rdg + 5 dgts)	0.1 Ω		
20 kΩ		1 Ω	About 50uA	
200 kΩ		10 Ω	About 5uA	
2 MΩ		100 Ω	About 0.5uA	
20 MΩ	± (0.5% rdg + 5 dgts)	1 kΩ	About 0.05uA	

Overload protection : 250V DC or AC peak value. Measuring error is not including lead resistance

CAPACITANCE (CAP)

Range	Accuracy	Resolution
0nF ~ 10nF	±(3.5%rdg + 20dgts)	1 pF
10nF ~ 100nF		10 pF
100nF ~ 1㎌		100 pF
1㎌ ~ 10㎌		1 nF
10㎌ ~ 100㎌	±(5%rdg + 30dgts)	10 nF
100㎌ ~ 1mF		100 nF
1mF ~ 2mF		1 ㎌

Measuring Range of Accuracy :10%~100%; Large
Capacitance response time ≥1mF about 8s;
Measured error is not including lead distributed capacitance

FREQUENCY

Range	Accuracy	Resolution
20Hz ~ 200kHz	±(0.1%rdg + 3dgts)	0.01Hz ~ 0.1kHz
200kHz ~ 2MHz		0.1kHz ~ 0.001MHz
2MHz ~ 20MHz		0.001MHz ~ 0.01MHz

Input Sensitivity : 1.5V RMS ≤10V RMS, the reading value is zero for the signal below 3Hz

Overload Protection : 250V DC or AC peak value (within 15s)

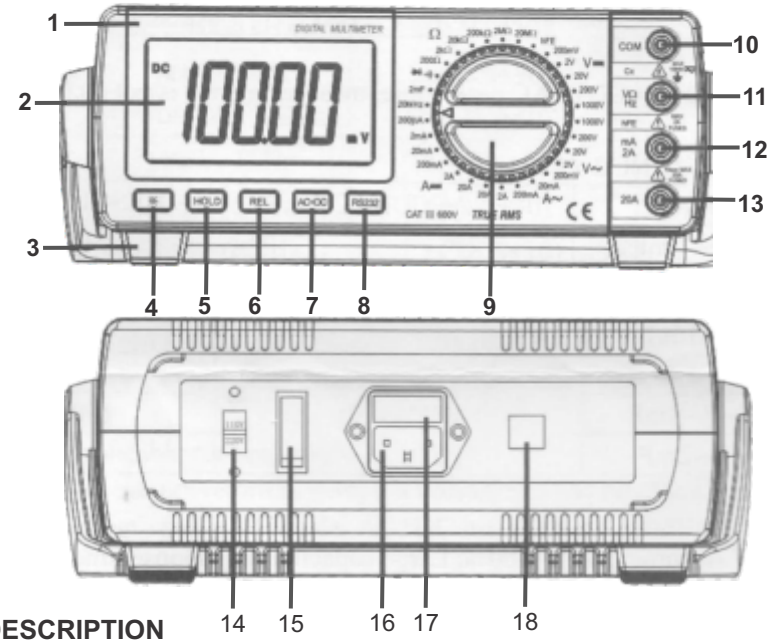
hFE MEASURING

Range	Displaying	Test Condition
hFE NPN or PNP	0 ~ 1000.0	Basic current is approx. 10mA, Vce is approx. 3V

DIODE AND CONTINUITY TEST

RANGE	DISCRIPTION	TEST CONDITION
	The measuring value is the approx. Value for forward voltage drop, when the resistance under tested is less than 50 W± 20 W, buzzer sounds and display the approx. Value. The open voltage is approx. 3V.	Forward DCA is approx. 1mA, backward DCV is less than 3V

Overload protection : 250V DC and AC peak value.



3. PANEL DESCRIPTION

SEE THE FIG.

1. MODEL Display
2. LCD display
3. Holder
4. Backlight button
5. Hold button
6. Relative value button
7. AC+DC selection button
8. Communication button
9. Rang Knob
10. COM input terminal
11. V / W/ Hz / Cx input terminal
12. (0~2) A input terminal
13. (2~20)A input terminal
14. 110V / 220V switch
15. Power switch
16. Power socket
17. Fuse
18. USB interface

4. OPERATION

The meter is driven by 220V / 110V AC, when operating, connect the power socket to power plug firstly then turn on the power.Each meter is equipped with one pair of testleads as standard attachment, to insert the proper jack in front panel is banana plug, connect the pointed end of the testlead to the circuit under test. The input terminal in front panel can make measurement upto 1000V, 20A and 20MW. Note : before connecting the circuit under measured, be sure that the measured value should not be over the limit specified in front panel.

4.1 DCV

1. Connect the black test lead to “COM” terminal and the red one to “V WHz” terminal.
2. Set the knob to DCV range, connect the test leads across to the circuit under measured, the polarity will be displayed with the voltage reading value.

NOTE :

1. If the voltage under measured is unknown, start from the highest range then the proper range.
2. If only MSD display “OL”, it means overrange, should set to a higher range.
3. Do not input a voltage over 1000V, or, the circuit might be damaged.
4. Be careful when measuring high voltage circuit.

4.2 ACV

1. Connect the red test lead to VΩHz terminal and the black one to “COM” terminal.
2. Set the knob to ACV range, connect the test leads across to the circuit under measured.

NOTE :

1. See DCV measuring NOTE 1,2,4.
2. Do not input a voltage over 1000V rms, in this case, reading is workable but the circuit might be damaged.
3. To get more accuracy, it’s better that the more than 10% of full range when selecting the range.
4. The meter might be not zero at ACV range, it’s normal and has no effect on the reading.

4.3 DCA:

1. Connect the Black test lead to “COM” terminal and the red one to “mA” terminal (max.2A) or “20A” terminal.
2. Set the knob to DCA range, connect the test leads across to the circuit under measured, the polarity will be displayed with the voltage reading value.

4.4 ACA :

1. Connect the black test lead to “COM” terminal and the red one to “mA” terminal (max.2A) or “20A” terminal.
2. Set the knob to ACA range, connect the test leads across to the circuit under measured, the polarity will be displayed with the voltage reading value.
3. The meter might be not zero at ACA range, it’s normal and has no effect on the reading.

NOTE :

1. See DCA measuring NOTE 1 ~ 4
2. To get more accuracy, when selecting range, it’s better to select the range which the reading is more than 10% of full range.

4.5 RESISTANCE MEASURING

1. Connect the red test lead to “VWHz” terminal, the black one to “COM” terminal.
2. Set the knob to W range, connect the test leads across to the resistance under measured.

NOTE :

1. If the resistance is larger than the max. Value of selected range, “OL” displays. Set the knob to a higher range. When the resistance is 1MW or larger than 1MW, it will take a few seconds to be stable, it’s normal in high resistance measuring.
2. When the input terminal is under open circuit, OL displays.
3. When measuring resistance in-line, be sure that power of the circuit under measured is turned off and all capacitors are released completely.
4. Low range for open voltage is about 1V ; the high range is 2V.

4.6 DIODE AND CONTINUITY TEST

1. Connect the red test lead to “VWHz” terminal, the black one to “COM” terminal (note: the polarity of the red lead is +).
2. Set the knob to diode range, connect the test leads across to the diode or circuit under measured.
3. When measuring diode, the reading is forward voltage drop, if making continuity test, buzzer sounds when the resistance between the test leads is less than approx. 50W± 20W.

NOTE :

1. If the current under measure is unknown beforehand, start from the highest range and work down.
2. If only the MSD displays “OL”, it means overrange, should set to a higher range.
3. The max. Input current is 2A for “mA” and 20A for “20A”, large current will blow the fuse. Be careful when measuring 20A range, large current will make the circuit heat, even make the circuit damaged.
4. Max. measuring voltage drop is 200mV.

NOTE :

1. When input terminals is in open circuit, overload displays “OL”.
2. There is 1mA current flows through the diode under test.
3. The meter displays the forward voltage drop in mili-volts and overload when the diode is reversed.

4.7 FREQUENCY MEASURING

1. Connect the test leads or shielded cable to “VΩHz” and COM terminal.
2. Set the knob to frequency range, connect test leads or cable across to the signal source or load under tested.

NOTE :

1. Do not input voltage over 250Vrms, when input is over 10Vrms, reading is workable but the accuracy might be overrange.
2. In noisy environment, it is preferable to use shielded cable for measuring small signal.
3. Be careful when measuring high voltage circuit.

4.8 CAPACITANCE MEASURING

1. Connect the test leads or shielded cable to “VΩHz” and COM terminal.
2. Set the knob to capacitance range, connect the test leads across to the resistance under test
3. If zero is not displayed in the LCD, Just press “REL” key.

NOTE :

1. Do not input voltage or current signal at Capacitance range.
2. Release the capacitor completely to avoid damaging the meter.
3. It should take a few time to be stable when input at 200nF range.
4. The meter may not return to zero at capacitance range, it's normal and has no effect on the accuracy.

4.9 TRIODE hFE MEASURING

1. set the knob to hFE range.
2. Verifying the type of triode is NPN type or PNP type, insert emitter, base electrode and collector to proper jack.

5. MAINTENANCE

It is a accurate meter, do not change the circuit.

1. Before replacing any parts of the meter, remove the input signal and AC power line, and replace fuse according to the following :

1. Power fuse : slow-blow 200mA / 250V
2. Fuse for measuring current : fast-blow 2A / 250V and 20A / 250V.
   These two fuses are in the main circuit, must be replaced by qualified personal.

2. NOTE :

1. Be careful of waterproof, dustproof and anti-falling.
2. Do not store or operate the meter in high temperature or strong magnetic place.
3. Do not use the abrasives or solvents like alcohol to clean the meter.

6.ACCESSORIES :

Test Leads, USB cable, Software CD, Operating Manual, Adapter, Power cord.

MUMBAI

TEST CERTIFICATE

BENCH TYPE DIGITAL MULTIMETER WITH PC INTERFACE

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

The instrument has been calibrated by using equipment which has already been calibrated to standards traceable to national standards.

MODEL NO. KM 8045

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, fuses, disposable batteries, carrying case, test leads, 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 transaction are subject to Mumbai Jurisdiction.

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