

LIST OF PRODUCTS

- * Digital Multimeter
- * AC Clamp Adaptor
- * Thermo Anemometer
- * Distance Meter
- * Network Cable Tester
- * Earth Resistance Tester
- * DC Power Supplies
- * Calibrators
- * Frequency Counter
- * Phasing Sticks
- * Waterproof Pen Testers
- * EMF Detector
- * Wood, Paper & Grain Moisture Meter
- * 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
- * Maximum Demand Controller/Digital Power Meter
- * Digital Hand Held Temperature Indicators
- * Digital AC & AC/DC Clampmeter
- * AC/DC Current Adaptor
- * Thermo Hygrometer
- * Digital Lux Meter
- * Power Factor Regulator
- * Digital Panel Meters
- * High Voltage Detector
- * Gas Analysers
- * Function Generator
- * Battery Tester
- * Solar Power Meter



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AN ISO 9001:2015 COMPANY

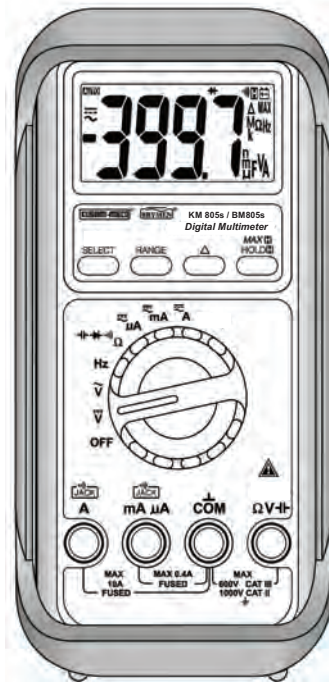
AUTORANGING DIGITAL MULTIMETER

MODEL - KM 805s

OPERATION MANUAL

KUSAM-MECO[®]

AUTORANGING DIGITAL MULTIMETER MODEL - KM 805s



KUSAM-MECO[®]

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I. SAFETY :

This manual contains information and warnings that must be followed for operating the meter safely and maintaining the meter in a safe operating condition. If the meter is used in a manner not specified by the manufacturer, the protection provided by the meter may be impaired. The meter is intended only for indoor use.

The meter protection rating, against the users, is double insulation per IEC/UL/EN61010-1 Ed. 3.0, IEC/EN61010-2-030 Ed. 1.0, IEC/EN61010-2-033 Ed. 1.0, IEC/UL/EN61010-031 Ed. 1.1 and CAN/CSA-C22.2 No. 61010-1-12 Ed. 3.0 to Category II 1000 Volts, CAT III 600Volts and CAT IV 300Volts AC & DC.

Terminals (to COM) measurement category:

V / A / mA μ **A**: Category II 1000V, Category III 600V and Category IV 300V AC & DC.

Per IEC61010-1 2nd Ed. (2001) Measurement Category

Measurement Category IV (CAT IV) is for measurements performed at the source of the low-voltage installation. Examples are electricity meters and measurements on primary over current protection devices and ripple control units.

Measurement Category III (CAT III) is for measurements performed in the building installation. Examples are measurements on distribution boards, circuit- breakers, wiring, including cables, bus-bars, junction boxes, switches, socket-outlets in the fixed installation, and equipment for industrial use and some other equipment, for example, stationary motors with permanent connection to the fixed installation.

Measurement Category II (CAT II) is for measurements performed on circuits directly connected to the low voltage installation. Examples are measurements on household appliances, portable tools and similar equipment.

Terms in this manual :

WARNING : Identifies conditions and actions that could result in serious injury or even death to the user.

CAUTION : Identifies conditions and actions that could cause damage or malfunction in the instrument.

WARNING :

To reduce the risk of fire or electric shock, do not expose this product to rain or moisture. To avoid electrical shock hazard, observe the proper safety precautions when working with voltages above 60 VDC or 30 VAC rms. These voltage levels pose a potential shock hazard to the user. Do not touch test lead tips or the circuit being tested while power is applied to the circuit being measured. Keep your fingers behind the finger guards of the test leads during measurement. Inspect test leads, connectors, and probes for damaged insulation or exposed metal before using the instrument. If any defects are found, replace them immediately. Do not measure any current that exceeds the current rating of the protection fuse(s). Do not attempt a current measurement to any circuit where the open circuit voltage is above the protection fuse(s) voltage rating(s). Suspected open circuit voltage should be checked with voltage functions. Never attempt a voltage measurement with the test lead inserted into the μ A/mA or A input jack. Only replace the blown fuse(s) with the proper rating as specified in this manual. Only use the test lead provided with the equipment or UL Listed Probe Assembly.

CAUTION

Disconnect the test leads from the test points before changing functions. Always set the instrument to the highest range and work downward for an unknown value when using manual ranging mode.

CENELEC DIRECTIVES :

The instruments conform to CENELEC Low-voltage directive 2006/95/EC, Electromagnetic compatibility directive 2004/108/EC.

INTERNATIONAL ELECTRICAL SYMBOLS :

- ⚠ Caution ! Refer to the explanation in this Manual
- ⚡ Caution ! Risk of electric shock
- ≡ Earth (Ground)
- ◻ Double Insulation or Reinforced insulation
- ⊞ Fuse
- ~ AC--Alternating Current
- == DC--Direct Current

SPECIAL FEATURES :

- **Basic Accuracy :** 0.5% DCV
- 25ms Max Hold
- Fully Autoranging
- Auto power off
- Data Hold & Relative Zero Mode
- Beep-Jack™ input warning
- Diode Test & Fast audible Continuity Test
- Fire retarded case
- Splash proof construction.

IV. GENERAL SPECIFICATIONS :

- * **Sensing :** Average sensing
- * **Display :** 3-3/4 digits 4000 counts backlight large easy to read LCD display.
- * **Update Rate :** 3 per second nominal
- * **Polarity :** Automatic
- * **Operating Temperature :** 0°C to 40°C
- * **Relative Humidity :** Maximum 80% R. H. For temperature upto 31°C decreasing linearly to 50% Relative Humidity at 40°C
- * **Altitude :** Operating below 2000m
- * **Pollution degree :** 2

- * **Storage Temperature :** -20°C to 60°C, < 80% R.H. (With battery removed)
- * **Temperature Coefficient :** nominal 0.15 x (specified accuracy) / °C @ (0°C--18°C or 28°C--40°C), or otherwise specified
- * **Low Battery :** Below approx 2.4V
- * **Power supply :** Standard 1.5V AAA Battery x 2.
- * **Power Consumption :** 3.2mA typical
- * **Sleep mode Timing :** Idle for 30 minutes
- * **Sleep mode Consumption :** 300µA typical
- * **Dimension :** 186(L) x 87(W) x 35.5(H)mm;
198(L) x 97(W) x 55(H) mm with Holster.
- * **Weight :** Approx. 296 gms; 396gm with holster.

SAFETY :

- The meter protection rating, against the users, is double insulation per IEC/UL/EN61010-1 Ed.3.0, IEC/EN61010-2-030 Ed.1.0, IEC/EN61010-2-033 Ed. 1.0, IEC/UL/EN61010-031 Ed. 1.1 & CAN/CSA C22.2 No. 61010-1-12 Ed. 3.0 to Category II 1000V, CAT III 600V & CAT IV 300V AC & DC.
- **Transient Protection :** 6kV (1.2/50µs surge)
- **Terminals (to COM) Measurement Category :**
V / A / mAµA : CAT II 1000V, CAT III 600V & CAT IV 300V AC & DC.
- **Overload Protection :**
µA & mA : 0.4A/1000V DC/AC rms, IR 30kA @ 1000V DC/AC rms
A : 11A/1000V DC/AC rms, IR 20kA @ 1000V DC/AC rms
V : 1100V DC/ACrms
Hz, Ohm & Other : 1000V DC/AC rms.

- **EMC** : Meets EN61326-(1997, 1998/A1), EN61000-4-2(1995), & EN61000-4-3(1996).

In an RF field of 3V/m :

Capacitance function is not specified

AC 4.000V range : Total Accuracy = Specified Accuracy + 700 dgts

AC 400.0μA range : Total Accuracy = Specified Accuracy + 300 dgts

Other function ranges : Total Accuracy = Specified Accuracy + 40 dgts

Performance above 3V/m is not specified.

Accessories : Test lead (pair), Holster, Battery, User Manual & Carrying case.

ELECTRICAL SPECIFICATIONS :

Accuracy is ± (%readings digits + number of digits) or otherwise specified, at 23°C ± 5°C & less than 75% R.H.

Maximum Crest Factor <1.75:1 at full scale & <3.5:1 at half scale, & with frequency components within the specified frequency bandwidth for non-sinusoidal waveforms.

DC VOLTAGE

Range	Resolution	Accuracy
400.0 mV	100 μV	±(0.3%rdg + 4dgts)
4.000 V	1 mV	±(0.5%rdg + 3dgts)
40.00 V	10 mV	±(0.5%rdg + 3dgts)
400.0 V	100 mV	±(0.5%rdg + 3dgts)
1000 V	1 V	±(1.0%rdg + 4dgts)

NMRR : >50dB @ 50/60Hz

CMRR : >120dB @ DC, 50/60Hz, Rs=1kΩ

Input Impedance : 10MΩ, 30pF nominal
(1000MΩ for 400.0 mV range)

AC VOLTAGE

Range	Resolution	Accuracy
50Hz ~ 500Hz		
400.0 mV*	100 μV	±(4.0%rdg + 5dgts)
4.000 V	1 mV	±(1.5%rdg + 5dgts)
40.00 V	10 mV	±(1.5%rdg + 5dgts)
400.0 V	100 mV	±(1.5%rdg + 5dgts)
1000 V	1 V	±(4.0%rdg + 5dgts)

CMRR : >60dB @ DC to 60Hz, Rs=1kΩ

Input Impedance : 10MΩ, 30pF nominal

* Selection by RANGE Button manually, and is specified from AC 10mV & up.

DC CURRENT

Range	Resolution	Accuracy	Burden Voltage
400.0μA	0.1 μA	±(2.0%rdg + 5dgts)	0.15mV/μA
4000μA	1 μA	±(1.2%rdg + 3dgts)	0.15mV/μA
40.00mA	10 μA	±(2.0%rdg + 5dgts)	3.3mV/mA
400.0mA	100 μA	±(1.2%rdg + 3dgts)	3.3mV/mA
4.000A	1 mA	±(2.0%rdg + 5dgts)	0.03V/A
10.00A*	10 mA	±(1.2%rdg + 3dgts)	0.0V/A

*10A continuous, >10A to 20A for 30 seconds max with 5 minutes cool down interval.

AC CURRENT

Range	Resolution	Accuracy ¹⁾	Burden Voltage
50Hz – 500Hz			
400.0μA	0.1 μA	±(2.0%rdg + 6dgts)	0.15mV/μA
4000μA	1 μA	±(1.5%rdg + 4dgts)	0.15mV/μA
40.00mA	10 μA	±(2.0%rdg + 6dgts)	3.3mV/mA
400.0mA	100 μA	±(1.7%rdg + 4dgts)	3.3mV/mA
4.000A	1 mA	±(2.0%rdg + 6dgts)	0.03V/A
10.00A*	10 mA	±(1.8%rdg + 4dgts)	0.03V/A

*10A continuous, >10A to 20A for 30 seconds max with 5 minutes cool down interval.

RESISTANCE

Range	Resolution	Accuracy
400.0 Ω	100 mΩ	±(0.8%rdg + 6dgts)
4.000 KΩ	1 Ω	±(0.6%rdg + 4dgts)
40.00 KΩ	10 Ω	
400.0 KΩ	100 Ω	
4.000 MΩ	1 kΩ	±(1.0%rdg + 4dgts)
40.00 MΩ	10 kΩ	±(2.0%rdg + 4dgts)

Open Circuit Voltage : 0.4VDC typical.

CAPACITANCE

Range*	Resolution	Accuracy**
500.0nF	0.1 nF	3.5%*** + 6dgts
5.000μF	1 nF	
50.00μF	10 nF	
500.0μF	100 nF	
3000μF	1 μF	

* Additional 50.00nF range accuracy is not specified

** Accuracies with film capacitor or better

*** Specified with battery voltage above 2.8V (approximately half full battery). Accuracy decreases gradually to 12% at low battery warning voltage of approximately 2.4V.

Hz FREQUENCY

Range*	Accuracy**
50.00Hz	0.5% + 4d
500.0Hz	
5.000kHz	
50.00kHz	
500.0kHz	
1.000MHz	

* Additional 5.000Hz range accuracy & sensitivity are not specified.

** Accuracy is specified at <20VAC rms

Input Signal : Square wave with duty cycle > 40% & <70%, or Sine wave Vrms AC.

Sensitivity :

10Hz--20Hz : > Sine 0.9Vrms ;
 20Hz--500kHz : > 2.6Vp; or Sine 1.9Vrms
 500kHz--1MHz : > 4.2Vp; or Sine 3Vrms
 Update Rate : 2 per second nominal.

AUDIBLE CONTINUITY TESTER

Audible Threshold
between 10Ω and 120Ω

DIODE TESTER

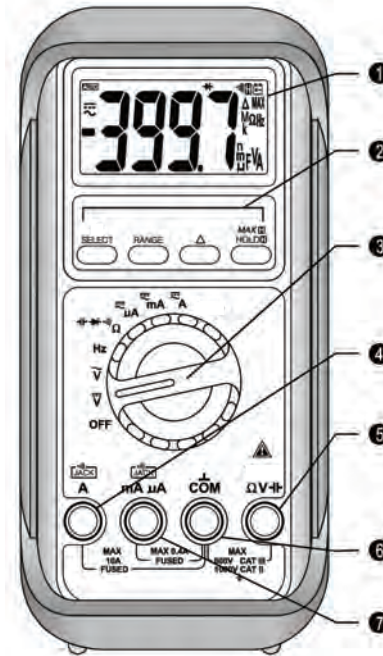
Test Current (Typical)	0.25mA
Open Circuit Voltage	<1.6V DC

MAX HOLD (Voltage & Current)

Specified accuracy ± 50 digits for changes >25ms in duration

V. PRODUCT DESCRIPTION :

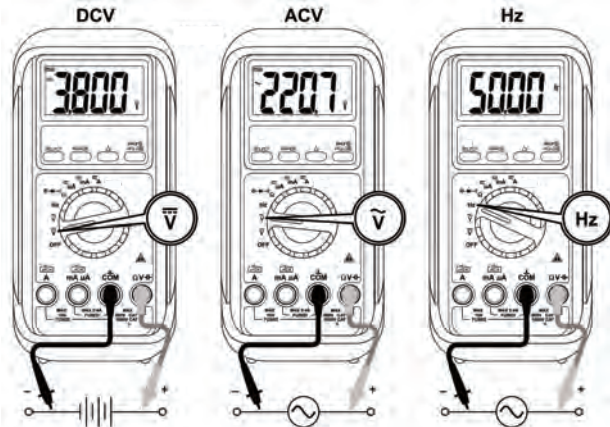
This user's manual uses only representative model for illustrations.



- 1) 3-3/4 digits 4000 counts LCD display
- 2) Push-buttons for special functions & features
- 3) Selector to turn the Power On or Off and select a function
- 4) Input Jack (+) for 10A (20A for 30sec) current function
- 5) Input Jack (+) for all functions EXCEPT current (μA, mA, A) function
- 6) Common (Ground reference) Input Jack(-) for all functions
- 7) Input Jack (+) for milli-amp and micro-amp functions

VI. OPERATION :

DC Voltage, AC Voltage, & Hz Frequency functions



CAUTION

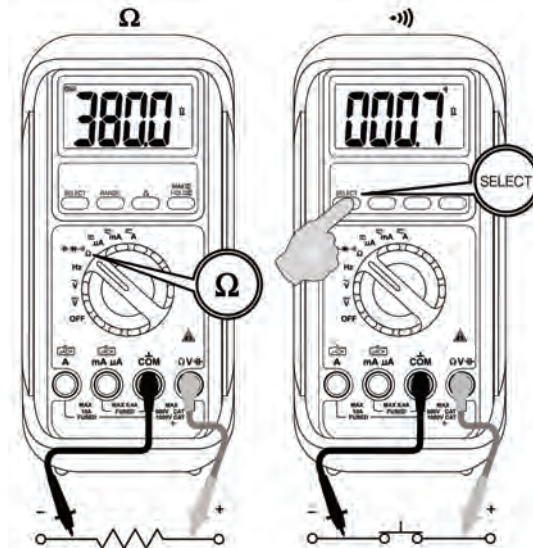
Before and after hazardous voltage measurements, test the voltage function on a known source such as line voltage to determine proper meter functioning.

Note:

- 1) AC 400.0mV range selection is by RANGE button manually, and is specified from AC 10mV and up.
- 2) DC 400.0mV range is designed with 1000MΩ high input impedance for least current drain in measuring small signals, and can cope better with most commercially available voltage output transducers and adapters. The non-zero display reading is normal when the meter inputs are open circuit, which will not affect actual measurement accuracy. Open input is actually a floating condition, which is not a zero-volt-input condition. The meter will show zero or close to zero reading when the inputs are shorted.

Ω Resistance, and •)) Continuity functions

Defaults at Ω . Press **SELECT** button momentarily to select •)) Continuity function which is convenient for checking wiring connections and operation of switches. A continuous beep tone indicates a complete wire.



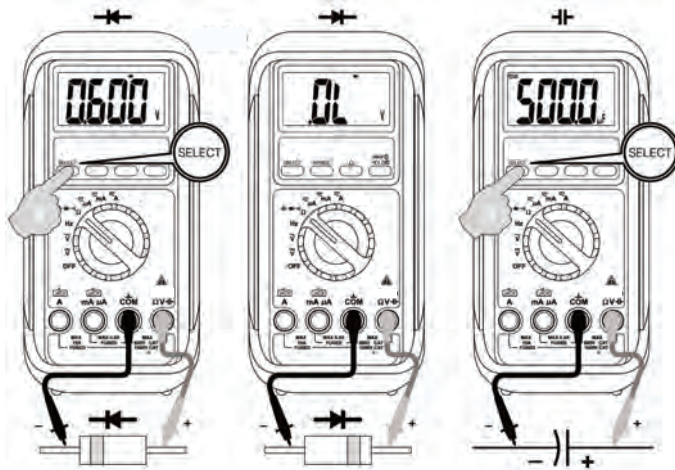
CAUTION

Using Resistance, Continuity, Diode or Capacitance function in a live circuit will produce false results and may damage the instrument. In many cases the suspected component must be disconnected from the circuit to obtain an accurate measurement reading.

→ Diode Test, ⇄ Capacitance Function

Defaults at Ω . Press **SELECT** button momentarily 2 times to select → Diode test function. Normal forward voltage drop (forward biased) for a good silicon diode is between 0.400V to 0.900V. A reading higher than that indicates a leaky diode (defective). A zero reading indicates a shorted diode (defective). An OL indicates an open diode (defective). Reverse the test leads connections (reverse biased) across the diode. The digital display shows OL if the diode is good. Any other readings indicate the diode is resistive or shorted (defective).

Defaults at Ω . Press **SELECT** button momentarily 3 times to select ⇄ Capacitance function. Relative zero Δ mode can be used to zero out the parasitic capacitance of the leads and the internal protection circuitry of the meter when measuring low capacitance in the order of Pico Farad (pF).

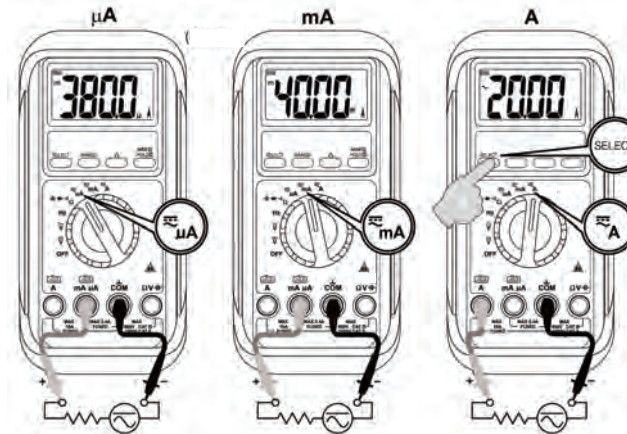


CAUTION

Discharge capacitors before making any measurement. Large value capacitors should be discharged through an appropriate resistance load .

μ A, mA, and A Current functions

Default at DC. Press **SELECT** button momentarily to select AC.



CAUTION

When measuring a 3-phase system, special attention should be taken to the phase-to-phase voltage which is significantly higher than the phase-to-earth voltage. To avoid exceeding the voltage rating of the protection fuse(s) accidentally, always consider the phase-to-phase voltage as the working voltage for the protection fuse(s).

Beep-Jack™ Input Warning

The meter beeps to warn the user against possible damage to the meter due to improper connections to the μ A, mA, or A input jacks when other function (like voltage function) is selected.

Relative zero Δ mode

Relative zero Δ mode allows the user to offset the meter consecutive measurements with the displaying reading as the reference value. The display will now show readings relative to the stored reference value. That is, display = reading - stored value. Press the Δ button momentarily to activate or to exit relative zero mode.

Manual or Auto-ranging

Press the **RANGE** button momentarily to select manual-ranging mode, and the meter will remain in the range it was in, the LCD annunciator **AUTO** turns off. Press the button momentarily again to step through the ranges. Press and hold the button for 1 second or more to resume auto-ranging mode.

Note : Manual ranging mode feature is not available in Hz & Cx functions.

HOLD

The hold feature freezes the display for later view. Press the **HOLD** button momentarily to activate or to exit the hold feature.

MAX

The max feature compares and displays the measured maximum value as fast as 25ms in a single range, and with automatic up range capability. Press the **MAX** button for 1 second or more to activate or to exit the max feature in the voltage or current functions.

Sleep Mode

The meter will enter a low power consumption sleep mode automatically to extend battery life after approximately 30 minutes of no rotary-switch or push button operations. To wake up the meter from sleep mode, press any button momentarily or turn the rotary-switch to an adjacent position. Always set the rotary-switch to the OFF position manually when the meter is not in use.

MAINTENANCE :**WARNING :**

To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input jacks and turn OFF the meter before opening the case.

Cleaning and Storage :

Periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents. If the meter is not to be used for periods of longer than 15 days, remove the battery and store it separately.

Trouble Shooting :

If the instrument fails to operate, check batteries and test leads, etc., and replace as necessary. Double check operating procedure as described in this manual.

If the instrument voltage-resistance input terminal has subjected to high voltage transient (caused by lightning or switching surge to the system) by accident or abnormal conditions of operation, the series fusible resistors will be blown off (become high impedance) like fuses to protect the user and the instrument. Most measuring functions through this terminal will then be open circuit. Refer to the LIMITED WARRANTY section for obtaining warranty or repairing service.

Battery and Fuse replacement :**Battery use :**

Standard 1.5V AAA Size (NEDA 24A or IEC LR03) battery X 2

Fuses use :

Fuse (FS1) for μAmA Current input :

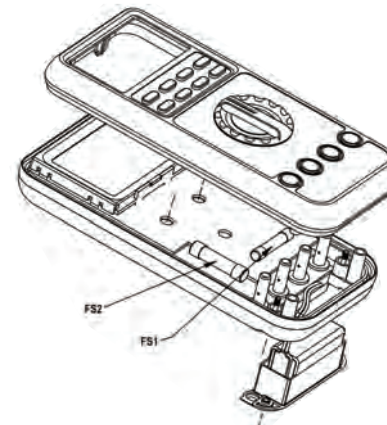
0.4A/1000V ac & dc, IR 30kA, F Fuse or better

Dimension : 6 x 32 mm

Fuse (FS2) for A Current input :

11A/1000V ac & dc, IR 20kA, F Fuse or better

Dimension : 10 x 38 mm

***Battery replacement with battery access door:***

Loosen the 2 screws from the battery access door of the case bottom. Lift the battery access door and thus the battery compartment up. Replace the battery. Re-fasten the screws.

Fuse replacement (and also Battery replacement for splash proof version without battery access door):

Loosen the 4 screws from the case bottom. Lift the end of the case bottom nearest the input jacks until it unsnaps from the case top. Replace the blown fuse(s) and/or the battery.

Replace the case bottom, and ensure that all the gaskets are properly seated and the two snaps on the case top (near the LCD side) are engaged. Re-fasten the screws.



MUMBAI

TEST CERTIFICATE

AUTORANGING DIGITAL MULTIMETER

This Test Certificate warrants 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 805s**

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, burnt PCB's, 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.