

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

DIGITAL MULTIMETER

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1.0 SCOPE

This specification covers the design, engineering, manufacture, testing at manufacturer's works before dispatch, packing, supply and delivery of Hand held **DIGITAL MULTIMETER** suitable for measurement of various electrical parameters.

2.0 CLIMATIC CONDITION

The Measuring Instrument should work in following climate.

- | | |
|-------------------------------------|---------------------------|
| i) Maximum Ambient Air Temperature | 55°C |
| ii) Minimum Ambient Air Temperature | 05°C. |
| iii) Maximum Relative Humidity | Upto 95% (non-condensing) |
| iv) Storage Temperature | -20°C to 70°C |
| v) Storage Humidity | Upto 95% (non condensing) |
| vi) Max. Altitude | 1000 meter |

3.0 GENERAL & CONSTRUCTION REQUIREMENT

- 3.01 The equipment should be of extremely rugged construction suitable for field use.
- 3.02 It should have robust and sturdy casing.
- 3.03 High-impact over mold case- Integrated over molded protection providing superior impact protection for meter.
- 3.04 The display will show readings relative to the stored reference value.
- 3.05 It should have Overload Protection on all ranges.
- 3.06 It should have continuity check & diode test function.
- 3.07 The temperature measurement should be available and general purpose thermocouple probe should be provided with the Multimeter.
- 3.08 It should have Auto shut down if ideal for 05 minute or more.
- 3.09 After sales support: The after – sales service support / warranty services has to be provided.
- 3.10 Technical evaluation: Technical evaluation of offer of the equipment shall be carried out
- 3.11 Documentation- Sufficient no. of Operating/Service Manuals shall be provided along with supplied material

4.0 APPLICABLE STANDARDS

- i) EN 61010-1:2001, 61010-031 CAT III 600V for Safety requirement for electrical equipment for measurement, control & laboratory use
- ii) EN 61326-1:2006 for EMI & EMC requirement for electrical equipment for measurement, control & laboratory use.
- iii) IEC 60529 for Ingress Protection (IP 54 Required).
- iv) CISPR 16-1 and 16-2 for Radiated emission for enclosure
- v) IEC 61000-4-2 for Electrostatic Discharge (ESD)
- vi) IEC 61000-4-3 RF Electromagnetic Field
- vii) IEC 60068-2-2/IS 9000 Part 3/Sec3 for Dry Heat Test
- viii) IEC 60068-2-78/IS 9000 Part 4 for for Steady State Damp Test

- ix) IEC 60068-2-14/IS 9000 Part 14/Sec 1 for Change of temperature
- x) IEC 60068-2-6/IS 9000 Part 8 for Vibration test
- xi) IEC 60068-2-29/IS 9000 Part 7/Sec 2 for Bump Test
- xii) IEC 60068-2-27/IS 9000 Part 7/Sec 1 for Mechanical Shock test

5.0 GENERAL FEATURES

- The meter should have 4 ½ Digits LCD Display
- Digital Display 6000 counts,
- Analog Bar graph Display
- Hand Held Type
- True-rms AC voltage and current measurement for accurate readings on all waveforms
- HOLD & Auto HOLD
HOLD: to freeze the display at the push of a button
Auto HOLD: to hold present reading until detecting new stable input
- Minimum, maximum, and average reading memory
Manual or auto ranging in auto range, the meter should select the range with the best resolution for the present measurement value
- Fast continuity/open detection - The beeper sounding for continuity at resistance $< 20 \Omega$
- Diode testing
- Temperature measurement should be available and general purpose thermocouple probe should be provided with the multimeter
- Test lead alert - The message "LEAD" appearing briefly on the display when the rotary switch is moved to or from any A (Amps) position
- Backlight for measurements in low visibility environments
- Power-up options - (1) Turn on all LCD segments, (2) Disable beeper, (3) Disable sleep mode, (4) Enable smoothing,
- Probe holders -The instrument should have built-in probe holders for probe storage and for convenience when making measurements
- Battery access door Battery replacement without voiding calibration
- High-impact over mold case - Integrated over molded protection providing superior impact protection for the meter
- Warranty – Minimum 5 years warranty
- Safety Compliance – 61010, Over Voltage Category III, 600V
- Maximum Voltage between any terminal & Earth ground -1000V AC or DC
- Measurement Band width -- 20 KHz
- Auto power OFF
- Low Battery Indication

- Operating Temp. - 10 °C to 55°C
- Over voltage input warning
- Duty Cycle measurement
- The multimeter shall have safety compliance standard of EN61010-1CAT III 1000V
- The multimeter shall be supplied with measuring test leads
- The multimeter shall have Anti-high voltage circuit design
- Instrument shall be shock proof
- Ingress protection: IP 54

6.0 TECHNICAL SPECIFICATIONS

FUNCTION	RANGES	RESOLUTION	ACCURACY
Volt DC	100 mV to 750 V selectable	0.1 mV for lowest range	± 0.3 % of Reading
Volt AC	100 mV to 1000V selectable	0.1 mV for lowest range	± 0.4 % of Reading
Current DC	10 mA to 10 A selectable	0.01A for lowest range	± 0.6 % of Reading
Current AC	10 mA to 10 A selectable	0.01A for lowest range	± 1.0 % of Reading
Resistance	100 Ω to 50.00M Ω	0.1 Ω for lowest range	± 0.05 % of Reading
Capacitance	100nF to 9999μF	1nF for lowest range	± 1.0 % of Reading
Frequency	50 Hz to 99.99KHz	0.01Hz for lowest range	± 0.02 % of Reading
Temperature	-40°C to 400°C	0.1°C for lowest range	± 1.0 % of Reading

7.0 CALIBRATION CERTIFICATE

The calibration of equipment shall be carried out at approved laboratory by National Board of Accrediation of Laboratories (NABL).

The manufacturers calibration certificates for all other equipment under supply with report from NABL approved laboratory shall be submitted for approval of C.E. (Testing & QC) before commencement of supply. Validity of calibration certificate shall be one year.

The equipment shall be type tested for IP 54 degree of protection as per IS: 12063/ IEC 60529 against ingress of dust, moisture & vermin. The type test certificate shall be submitted along with the offer

8.0 ACCESORIES

- i. Pair of leads
- ii. Battery (Installed)
- iii. Carrying Case
- iv. Pair of small test leads.

- v. Suitable thermocouple probe for temperature measurement.

9.0 NAME PLATE & MARKING

Equipment shall have name plate clearly visible, effectively secured against removal and indelibly and distinctly marked with all essential particulars as per relevant standards. Following details shall be marked on the Name Plate

Manufacturer's name & address:

Serial no.

Purchase Order No.

Month and Year of manufacture

Name of purchaser: MSEDCL

Guarantee: Five Years

ISI mark if applicable

10.0 GUARANTEE

The offered equipment shall be guaranteed for the period of five years from the date of commissioning or five and half year from the date of dispatch, whichever is earlier.

11.0 PACKING

The instrument shall be suitably packed in order to avoid damage or disturbance during transit or handling. Each instrument may be suitably packed in the first Instance to prevent ingress of moisture and dust and then placed in a cushioned carton of a suitable material to prevent damage due to shocks during transit. The lid of the carton may be suitably sealed. A suitable number of sealed cartons may be packed in a case adequate strength with extra cushioning if considered necessary. The cases may then be properly sealed against accidental opening in transit. The packing cases may be marked to indicate the fragile nature of the contents.

The following information shall be furnished with the consignment:

- i) Name of consignee.
- ii) Details of consignment
- iii) Destination
- iv) Total Weight of consignment.
- v) Sign showing upper / lower side of the crate.
- vi) Sign showing fragility of the material.
- vii) Handling and unpacking instructions

12.0 TRAINING OF ENGINEERS:

The successful supplier shall train Engineers of MSEDCL free of charge at their works for familiarization of design, operation and maintenance of testing equipments

GUARANTEED TECHNICAL PARTICULARS OF MULTIMETERS

Sr. No.	Technical Parameters	REQD	
1.	Manufacturer's Name & Country of Manufacture.		
2.	Type/Model details of Equipment.		
3.	Applicable Indian/International Standard to which the equipment conforms	As per clause no. 4.00	
4.	The equipment is Hand Held Type, Battery operated, with Digital Display of 20000 counts, recording True-rms AC voltages and currents.	Yes	
5.	The equipment is provided with manual/auto range selection, Hold & autohold facility & suitable Minimum, maximum, and average reading memory, Temperature measurement facility, Analog Bar graph Display, Auto power OFF, Low Battery Indication, etc.	Yes	
6.	The equipment is provided with, Power-up options such as (1) Turn on all LCD segments, (2) Disable beeper, (3) Disable sleep mode, (4) Enable smoothing, & diode testing facility, easy battery replacement without voiding calibration.	Yes	
7.	Operating temperature	- 10°C to 55°C	
8.	Equipment is internally protected against over voltages and over currents & Over voltage input warning	Yes	
9.	Type of Display is LCD with backlight viewable in bright sunlight	Yes	
10.	Equipment is warranted for minimum period	5 years.	
11.	Measuring Range as per clause no. 6.00	Yes	
12.	Accuracy Range A) Volt DC - ± 0.3 % of Reading B) Volt AC - ± 0.4 % of Reading C) Current DC - ± 0.6 % of Reading D) Current AC - ± 1.0 % of Reading E) Resistance - ± 0.05 % of Reading F) Capacitance - ± 1.0 % of Reading G) Frequency - ± 0.02 % of Reading H) Temperature - ± 1.0 % of Reading	Yes	
13.	Equipment is tested in STQC laboratory for safety Testing complying IEC 61010.& for EMI/EMC Testing complying IEC/EN 61326	Yes	
14.	Accessories to be provided 1. Testing leads min. 3 RMT 2. High-impact over mould case for equipment	Yes	