

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

OF

THREE PHASE PORTABLE ELECTRONIC
REFERENCE STANDARD SUB METER OF ACCURACY
CLASS 0.5S (0.5S FOR ACTIVE ENERGY AND 0.5S
FOR REACTIVE ENERGY) FOR TESTING OF
ENERGY METERS

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1.00 SCOPE

This specification covers the general and standard requirements, technical data, design, engineering, manufacturing, assembly, inspection and testing at manufacturer's works, supply and delivery at stores of universal type portable light-weight Electronic Reference Standard Sub meter (ERSS) with complete accessories of accuracy class 0.5S from 500 mA to 240 Amps at site as well as in Laboratory both for active and reactive energy.

A portable, universal type, light-weight, electronic, precision portable energy meter testing equipment shall be capable of testing of all types of LT single phase two wire, three phase four wire whole current static as well as electromechanical energy meters and CT operated static as well as electromechanical energy meters via split core transformers (current circuits) in the range of 500 mA to 240 Amps at lab as well as at site.

The ERSS meter must have micro-processor unit with software support suitable for on line testing of all types of energy meters described above at site having memory and capability of communication with the base computer. Computer software shall be such that final data shall be converted for further processing to generate inputs & reports.

The scope of the ERSS meter is not limited to following type of meters but it shall be capable of testing electronic meters / electro mechanical energy meters of any latest version including but not limited to the following types:

- Ferraris (Induction) Meters with rotating disc.
- Static Meters with flashing pulse output of LCD / LED.
- Single Phase Active, Apparent and Reactive energy Meters.
- Three Phase Active, Apparent and Reactive energy Meters.

The ERSS meter shall also be capable of performing the following functions:

- Verification of meter circuit connections using instantaneous parameters.
- Selection of measurement mode for total four wire active, reactive and apparent power / energy shall be provided for.

The ERSS meter shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation, in a manner acceptable to purchaser, who will interpret the meaning of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble free operation.

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Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in these specifications and / or the commercial order or not.

2.00 QUALIFYING REQUIREMENT

- 2.01 The bidder shall be an original manufacturer for the tendered item. Traders, Dealers & distributors bidding will not be considered.
- 2.02 The operating experience of the bidder shall be minimum one year for supplying and providing after sales support of similar or better equipment to NABL accredited laboratories / power utilities in India only. The bidder shall enclose necessary purchase order and relevant documents along with their bid to prove the same.
- 2.03 The manufacturer must have experience of minimum one year for supply of similar or better equipments to National / International accredited laboratories or power utilities in India. The manufacturer shall enclose necessary purchase order copies along with their bid to prove the same.
- 2.04 The bidder shall submit satisfactorily performance report copies of supplied similar tender equipment from other power utilities.
- 2.05 The bidder shall declare that the bidder or their principals have not ever been black listed / defaulter by any utility / ESCOMs / Distribution Company / Laboratories / Any department of State Government or Central Government on record of poor performance such as not properly completing the contract, inordinate delays in supply completion, not supplying the items as per commitment of contract etc.
- 2.06 Bidder or their principals shall have fully equipped technical support office / laboratory for facilities of testing, calibration, adjustment, diagnosis and repair of equipments in India itself. Bidder or their principals shall have technical support staff posted in India for technical support after sale.
- 2.07 The Bidder or their principals shall have their own service centers and trained engineers dedicated for trouble shooting and technical support permanently posted in India. The bidder shall enclose necessary proof that the firm / the manufacturer / the principal the bidder is participating for, has necessary facility to adjust and calibrate the offered measuring units within the country. The list of Plant and Machinery, tools and tackles to carry out services shall be submitted along with the offer.
- 2.08 The offers of Indian subsidiary company, whose parent company is located abroad fulfilling the qualifying requirements as above, shall be considered provided the Indian participant subsidiary company fulfils the minimum experience of one year of supply or manufacturing of similar or better equipments to National / International accredited laboratories or power utilities of India. However, the conditions of turnover and manufacturing

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of similar or better equipments to National / International accredited laboratories or power utilities as brought out elsewhere in tender documents can be fulfilled by the parent company located abroad on behalf of their Indian subsidiary company. The parent company shall furnish undertaking for accepting responsibility for supplying quality equipments as per specifications and execution of the contract on behalf of its India based subsidiary unit who has participated in the tender in Annexure U-I.

3.00 APPLICATION

Universal ERSS meter shall be suitable for use with phantom load at Meter Lab / site, even at consumer's load and loading conditions for testing of LT single phase two wire, LT three phase four wire static as well as electromechanical energy meters and CT operated static as well as electromechanical energy meters and shall be capable to measure the system parameters and to verify the accuracy of the energy meters in the laboratory and at site without disconnecting consumer's supply.

4.00 SERVICE CONDITIONS

The ERSS to be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions:

Environmental Conditions

- | | |
|--|-----------------------|
| a) Maximum ambient temperature | 55 ⁰ C |
| b) Maximum ambient temperature in shade | 45 ⁰ C |
| c) Minimum temperature of air in shade | 35 ⁰ C |
| d) Maximum daily average temperature | 40 ⁰ C |
| e) Maximum yearly weighted average temperature | 32 ⁰ C |
| f) Relative Humidity | 10 to 95 % |
| g) Maximum Annual rainfall | 1450 mm |
| h) Maximum wind pressure | 150 Kg/m ² |
| i) Maximum altitude above mean sea level | 1000 meters |
| j) Isoceraunic level | 50 days/year |
| k) Seismic level (Horizontal acceleration) | 0.3 g |
| l) Climate: Moderately hot and humid tropical climate conducive to rust and fungus growth. | |

5.00 APPLICABLE STANDARDS

The ERSS meter shall conform in all respects including performance and testing thereof to the latest relevant and applicable Indian / International

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Standards to be read with up to date and latest amendments / revisions thereof but not limited to

IEC: 60736 / 1982 - Testing equipment for electrical energy meters.

IS: 14697 / 1999 – AC Static Transformer operated watt-hour and VAR-hour meters, class 0.5S – specification.

IS: 12346 / 1999 – Testing, Evaluation, Installation and Maintenance of AC electricity meters – Code of Practice.

IS: 9000 – Basic Environmental testing procedures for electronic & electrical items.

IS: 15707 / 2006 Specification for Testing, evaluation, installation & maintenance of AC Electricity Meters - Code of Practice;

The equipment meeting with the requirements of other authoritative standards, which ensures equal or better quality than the standards mentioned above, also shall be considered.

In case the bidder wishes to offer material conforming to the other authoritative standards, salient points of difference between the standards adopted and the specific standards shall be clearly brought out in relevant schedule. Copy of such standards with authentic English Translations, shall be furnished along with the offer.

In case of conflict related with other parts of the specification, the order of priority shall be – (i) this technical specification (ii) IS: 12346 amended upto date & IS: 15707. (iii) IEC 60736 IS: 14697 amended upto date (iii) other authoritative standards.

In case of any difference between provisions of these standards, the provisions of this specification shall prevail.

6.00 GENERAL TECHNICAL REQUIREMENTS

6.01 ACCURACY

The accuracy of the ERSS meter shall be sufficient in any condition for testing kWh and kVArh parts of the energy meters of class 1 confirming to IS: 13779 / 1999 (amended upto date) or IEC 61036 in case of LT whole current meters; class 0.5S conforming to IS: 14697 / 1999 (amended upto date) for Tri-vector energy meters.

The accuracy class of the ERSS meter shall be 0.5S with clamp on CT from 500 mA to 240 Amps for consumers under all conditions of testing at site / Lab with clamp on CT mode.

6.02 SUPPLY SYSTEM

Sl. No.	Particulars	For LT application	
		Three Phase Meter	Single Phase Meter
1	Supply voltage	415V _{+30%} (phase to phase) three phase four wire	240V _{+30%} (Phase to neutral)
2	Frequency	50 Hz \pm 5%	50 Hz \pm 5%
3	Working range	500 mA to 240 Amps	500 mA to 240 Amps
4	PF range	0 Lag-Unity-0 lead	0 Lag-Unity-0 lead
5	Energy Recorded	Total Energy	Total Energy

6.03 POWER CONSUMPTION

The apparent power consumption of the ERSS meter at a reference voltage, frequency, temperature and rated current shall not be more than 1 VA in current circuit (with CT) and 10 VA in voltage circuit per phase. The auxiliary power consumption of the device shall be less than 25 VA when powered with auxiliary power supply.

6.04 Global Positioning System (GPS) and General Packet Radio Service (GPRS) feature:

ERSS meter should have GPS feature to give GPS co-ordinates of location. Also the meter should be GPRS enabled to submit test results online.

6.05 MEASUREMENT RANGES

Test Voltage Range	168 V to 312 V (Phase to Neutral)
Test Voltage resolution	0.01V
Test Voltage Accuracy	0.2 %
Test Current range	Working range: 500 mA to 240 Amps and measurement range: 500 mA to 240 Amps with clamp on CT.
Test Current resolution	0.001 A

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Test Current accuracy	< 0.2 % (500 mA ... 240 Amps)
Phase Angle measurement range	0 to 360 deg.
Power / energy measurement error (Same for Active, Reactive and Apparent)	0.5% (from 500 mA to 240 Amps)
Power / energy measurement temperature drift	< 100 PPM / deg C
Power / energy measurement stability	< 500 PPM
Error in phase angle measurement	0.2 deg or better
Frequency range	50 Hz \pm 5%
Frequency Resolution	0.01 Hz

7.00 CONSTRUCTIONAL FEATURES AND GENERAL REQUIREMENTS

- 7.01 The ERSS meter shall be designed and constructed in such a way as to avoid introducing any danger in normal use and under normal conditions, so as to ensure especially:
- (a) personal safety against electric shock;
 - (b) personal safety against effects of excessive temperature;
 - (c) protection against spread of fire;
 - (d) protection against penetration of solid objects, dust & water in meter.
- 7.02 All parts that are likely to develop corrosion under normal working condition shall be effectively protected against corrosion by suitable method to achieve durable results. Any protective coating shall not be liable to damage by ordinary handling nor damage due to exposure to air, under normal working conditions.
- 7.03 The ERSS shall be manufactured using SMT (Surface Mount Technology)
- 7.04 The ERSS meter shall have Alpha – numeric keyboard to operate the equipment for software programme and to enter basic details like Consumer number, Meter number, Meter constant etc.
- 7.05 The ERSS meter shall have scanner or optical sensor head along with detachable lead to be used to count revolutions of the disc in Ferraris Wheel meters and LED pulses in static meters as well as for LCD pulses in static meters.

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- 7.06 The ERSS meter shall be provided with a sensor head clamp to hold the scanner properly in front of the LED / LCD output or revolving disc.
- 7.07 The ERSS meter shall also have a snap switch along with detachable lead to be used as an alternative to scanner / sensor head.
- 7.08 The ERSS meter shall be provided with electronic compensated clamp-on set of CTs which enable the testing without isolating or interrupting the supply of the consumer. The equipment shall have facility to interchange the clamp on CTs without affecting the accuracy.
- 7.09 The voltage leads with injection type crocodile clips / any other suitable clamping arrangement with insulated leads shall be provided on ERSS meter.
- 7.10 All the cords / accessories supplied along with the instrument must conform to the international standards of safety. Adequate built in features to protect the instrument itself from over-voltage shall be provided.
- 7.11 While in use, indication that ERSS meter is in correct active mode shall be provided on ERSS by means of LED / LCD screen or otherwise.
- 7.12 ERSS meter shall have facility to display and store total active, reactive and apparent energy including harmonics.
- 7.13 ERSS meter shall have facility to display meter connections.
- 7.14 The ERSS meter shall have facility to select the calculation of apparent power geometrically for individual phases and for summation of all three phases.
- 7.15 All the display parameters indicated in clause no. 8.00 shall be obtained by pressing the push -button.
- 7.16 The ERSS meter shall have a facility to store minimum 300 test results along with following instantaneous parameters. The ERSS meter shall have memory to record the test data. The error data up to at least 300 test shall be stored in ERSS memory and these can be downloaded to computer using communication cord/port(RS232) so that print out can be taken out with software. The test data stored in the memory of ERS shall not be lost by roll over mode but after the memory is exhausted it should flash a message on LCD display or it has some other arrangement for such indication. ERSS meter Shall have capacity to store minimum 300 test results with following data:
- a. Serial no of meter under test.
 - b. Consumer Identification
 - c. Meter Constant of MUT
 - d. No of revolution / pulses for which test is being carried out.

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- e. Instantaneous voltage, line current, active current & reactive current of each phase.
- f. Energy Logged/ Recorded by ERSS during test.
- g. Test duration in hour, minute, & seconds.(With time of commencement & completion) and all parameters shown in clause no. 8.00.
- 7.17 ERSS meter shall be capable of indicating the display for the following conditions by instantaneous values or warning message.
- Missing Potential
 - Missing current
 - Reverse current, if any current is reverse.
 - Phase sequence, if forward or reverse.
 - Over current (*for current more than 120%*)
 - Over Voltage (*for voltage more than 130%*)
 - Low Voltage (*for voltage less than 70%*)
 - Wiring / correct association of voltage and current.
 - Detection of circuit connection faults.
- 7.18 Mains power supply input shall be internally/externally connected to the test voltage.
- 7.19 The ERSS meter shall have a test output in the form of frequency on BNC/ Suitable socket/LED pulse for its own calibration. (General arrangement drawing of Equipment shall be submitted along with bid which indicates the above mention outputs)
- 7.20 The unit shall be powered up through adopter/mains supply which can get supply either from the measuring circuit or from auxiliary single phase supply. However, the ERSS meter shall be made functional by giving supply of 240 Volts $\pm 30\%$ AC through adopter/mains supply between phase to neutral for down loading the data to PC etc.
- 7.21 The ERSS meter shall measure and display a comprehensive analysis of three phase system showing instantaneous and integrated values of each Voltage and Current Input.
- 7.22 Auto range of Current and Voltage inputs shall be provided.
- 7.23 The ERSS meter shall display the error(s) of the meter under test automatically.
- 7.24 The ERSS meter shall have interface to an external printer through PC software.
- 7.25 All the cords / connectors / accessories supplied along with the instrument must conform to the international standards of safety.

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Adequate built in features to protect the instrument itself from over-voltage shall be provided.

- 7.26 The ERSS meter shall be manufactured as per latest state of the art technology for obtaining sustained accuracy, flawless long lasting service. It shall be rugged enough to undergo handling in field conditions while being carried from place to place. It shall therefore be convenient to carry and immune to vibrations or shocks due to transportation or handling. It shall also be immune to external electrical and magnetic fields.
- 7.27 There shall be a provision for input of scanning head and start / stop button on the ERSS unit.
- 7.28 The ERSS meter shall be of low weight, compact and of small size.
- 7.29 The ERSS meter shall be type tested for IP 51 degree of protection as per IS/IEC 60529:2001 against ingress of dust, moisture & vermin.
- 7.30 ERSS meter shall have capability to indicate display for the following conditions:
- Reverse current if any current is reverse.
 - Wrong/correct association of voltage & current.
- 7.31 Self diagnose feature LCD/LED test is required to be provided on meter's display to indicate the healthiness of all segments of LCD display.
- 7.32 The meter shall measure and display a comprehensive analysis of three phase system showing instantaneous and integrated values of
- True RMS value for each phase voltage & current input.
 - Analysis of DC component and Harmonics contents
- 7.33 The choice of following visual display to give a graphical analysis of the system under test shall be provided.
- Vectorial display of system parameters.
 - Wave form display of voltage, current and power.
 - Frequency / Time spectrum display in line, log or relation mode.
- 7.34 Auto range of current and voltage input should be provided.
- 7.35 The meter shall capable for accuracy test of kWh register of Energy Meter and display the % error as well as energy logged/recorded by ERSS meter automatically on ERSS display.
- 7.36 The meter shall be packed in an ergonomically and aesthetically designed instrument case which can with stand the usual handling of field personnel and normal transportation.
- 7.37 All the cords/ connectors/ accessories supplies along with ERS must confirm IEC -1010 and international standards of safety. Adequate built

in features to protect the instrument itself from over voltage shall be provided.

7.38 REAL TIME INTERNAL CLOCK (RTC)

The real time quartz clock shall be used in the ERSS meter for maintaining time (IST) and calendar. The RTC shall be non - rechargeable and shall be pre-programmed for 30 years calendar of date and time without any necessity for correction. The time accuracy shall be as per provisions of CBIP-Tech-Report-325. The RTC shall have Non rechargeable battery with long life (10 Years).

7.39 The ERSS shall have the facility to record and store minimum 300 test results along with various instantaneous parameters in Non Volatile memory (NVM) memory. The life of NVM shall be minimum 10 years. The error data up to at least 300 tests shall be stored in meter memory and give flashing alarm when 90% of memory is used and these can be down loaded to computer using communication cord / port (RS-232) so that print-outs of test results can be taken out with compatible software. The test data stored in the memory of the ERSS meter shall not be lost by roll over mode; but after the memory is exhausted, it shall flash the message on the LCD display or it shall have some other arrangement for such indication.

7.40 RS - 232 /RJ-45 Ethernet communication port shall be provided to download the data to the computer through the BCS for printing the test results.

7.41 The equipment shall have facility to view / monitor system parameters during performing the Error testing, Dial testing without interrupting the on-going testing.

7.42 ADDITIONAL INDICATIONS

Provision shall be made for the following additional indications:

(a) The Energy flow direction.

(b) Warning for over load beyond the limits specified in the voltage & current circuits.

7.43 AUXILIARY POWER SOURCE

The unit can be powered either from the measuring circuit or from an auxiliary single phase supply with the help of dc power adopter/mains supply. In any case auxiliary power consumption of the device shall be less than 25 VA.

7.44 ELECTROMAGNETIC COMPATIBILITY

The ERSS meter will be required to work accurately in the field so that stray Electromagnetic disturbances or Electrostatic discharge may not

influence the ERSS meter. Similarly the field generated by ERSS meter may influence the MUT. The composition of the ERSS meter should, therefore such that it's functioning is immune to these forces of external origin and it does not create electromagnetic field, which affects the working or the meteorological functioning of meter under test. The equipment shall be fully protected against electromagnetic interferences, introduced through the connection cables, through capacitive or inductive coupling or by radiated electromagnetic interference. ERSS shall comply all EMC condition and requirement within the limits specified in IS 14697 & CBIP publication 325.

- Fast transient burst Test may be applied to ERS. It should not show any change in register of more than values shown in the relevant test specification IEC 61000-4-4.
- The ERS should not produce any Electromagnetic field which may affect working of MUT confirming to the IEC & IS as per mentioned in clause no. 5.00 of Specification.
- It should not produce any conducted or radiated noise, which can interfere with other equipment & MUT.

7.45 SHOCK AND VIBRATION PROTECTION

The equipment must be immune to Vibration and dumping due to transport. Suitable ergonomically and aesthetically designed transportation instrument case shall be provided along with the equipment. The equipment shall be immune to impact, vibration and bumping due to transport. It shall be within the limits specified in IS 14697:1999

7.46 DIELECTRIC STRENGTH

The equipment shall be capable to withstand between circuits and between circuits and case 2 kV AC 50 HZ for one minute.

7.47 DLMS PROTOCOL

ERSS Meter shall be capable to interface with all types of Meters including meters having DLMS protocol as per IS 15959:2011 and smart meters as per IS 16444.

7.48 INTERCHANGEABLE ELECTRONIC COMPENSATED CLAMP ON CT

It is essential to have Interchangeable Electronic Compensated Clamp on CT in ERSS meter.

8.00 DISPLAY

- 8.01 The ERSS shall show the calibration date and calibration due date on initial screen.
- 8.02 The unit shall have the LCD display of min 3" diagonally in rectangular size shall be preferred to display various electrical parameters. The parameters

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to be displayed shall be selectable though front panel switch. However, the ERSS meter shall display the following parameters.

Sr.No.	Instantaneous Parameters
1.00	Real Time & Date (DD:MM:YYYY, HH:MM)
2.00	R phase Voltage (V_r)
3.00	Y phase Voltage (V_y)
4.00	B phase Voltage (V_b)
5.00	Phase to Phase voltage (V_{RY})
6.00	Phase to Phase voltage (V_{YB})
7.00	Phase to Phase voltage (V_{RB})
8.00	Line current R phase (I_r)
9.00	Line current Y phase (I_y)
10.00	Line current B phase (I_b)
11.00	Frequency
12.00	Three phase Active power
13.00	Three phase Reactive power
14.00	Three phase Apparent power
15.00	Active power R phase
16.00	Active power Y phase
17.00	Active power B phase
18.00	Reactive power R phase
19.00	Reactive power Y phase
20.00	Reactive power B phase
21.00	Apparent power R phase
22.00	Apparent power Y phase
23.00	Apparent power B phase

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24.00	Three phase average Power Factor
25.00	Power factor R phase
26.00	Power factor Y phase
27.00	Power factor B phase
28.00	Phase Sequence
29.00	Error in Percentage
30.00	Calibration date of equipment and calibration due date

8.03 Results of normal tests (results of active energy and reactive energy) shall be in following format.

- Date & Time of testing
- Sr. No. of ERSS
- **Consumer Details**
Consumer Number
Consumer's Name & Address
- **MUT details**
 - ✓ Serial Number
 - ✓ Make
 - ✓ Type
 - ✓ Class
 - ✓ Connected CT /PT ratio
 - ✓ Meter constant
 - ✓ No. of revolutions / pulses for which test is being carried out.
- **Instantaneous Electrical parameters**
 - ✓ Phase to Phase voltages and Phase to Neutral Voltages
 - ✓ Current of each phase
 - ✓ Phase angle between voltage
 - ✓ Phase angle between voltage and current
 - ✓ Continuous updating of energy as per selected measuring mode during error testing using scanner or snap switch
 - ✓ Energy logged / recorded by ERSS during test.
 - ✓ Power Factor of each phase
 - ✓ Average Power Factor

- ✓ Active, Reactive and Apparent Power of each phase
- ✓ Total Active, Reactive and Apparent power
- ✓ Frequency
- ✓ Phase sequence
- ✓ % Error
- ✓ Test duration in hour, minute and seconds (with time of commencement of test and completion).
- ✓ Energy flow direction.

8.04 **DISPLAY RESOLUTION**

The Minimum Resolution for various parameters shall be as follows:

(1)	Voltage with resolution	0.00 Volts
(2)	Current with resolution	0.0000 Amps
(3)	Power Factor with resolution	0.000
(4)	Energy Measurement with resolution of (WH/VARH/VAH)	0.000 (minimum)
(5)	Frequency Measurement with resolution	0.00 Hz
(6)	Indication of utilization of the memory	To be provided
(7)	Instantaneous load (kW/kVAr/kVA)	0.000
(8)	Percentage error	00.00 %

9.00 **MEASUREMENTS MODE**

The ERSS shall have the following measurement modes to test LT CT operated meters and direct connected (whole current) meters.

9.01 **CLAMP-ON (SPLIT CORE CURRENT TRANSFORMERS) MODE**

Three Clamp-On type split core current transformers (CTs) for 500 mA to 240 Amps conforming to class 0.5S shall be provided along with equipment to test direct connected (whole current) meters in primary side and CT operated energy meters in primary as well as in secondary side without disconnecting them from the circuit.

The clamp on CTs shall be compensated for measurement in all four quadrants i.e. for Active, reactive and Apparent mode.

10.00 METER TESTING

- 10.01 The ERSS shall be able to test the meter under test by entering the MUT constant, number of test revolutions. The meter constant of MUT may also be imp / kWh. The device shall provide flexibility to enter meter constant upto 6 digits.
- 10.02 The testing of MUT shall be performed by using common scanning head, suitable for sensing of rotor mark of ferrari meter or LED / LCD blinking of electronic meters. The scanning head shall be supplied along with mounting arrangement and connection cable.
- 10.03 The ERSS shall allow to use start / stop button integrated on ERSS to start and stop the error test.

11.00 OPERATING MODES

11.01 MANUAL MODE

The equipment shall have facility to test in manual mode using snap switch along with detachable lead as well as inbuilt snap switch to start and stop the test.

11.02 AUTO MODE

A scanner shall be provided along with the equipment to test electromechanical meters by sensing the rotor mark and static (electronic) meters by sensing the LED / LCD pulses. The scanner shall be provided with vacuum type fixing arrangement or any other arrangement suitable to test the meter in laboratory as well as at site. Scanner shall be able to read correctly even in case of its alignment is deviating upto an angle of 15 degree of the axes of optical port.

- 11.03 The equipment shall have facility to select measuring mode for total power / energy for three phase four wire active, reactive and apparent measurements.

12.00 NAME PLATE DATA AND MARKING

The equipment shall have a name plate clearly visible, effectively secured against removal and indelibly and distinctly marked with all essential particulars as per relevant standards. Sr.No. of the equipment along with date of manufacturing as well as other technical details shall invariably be mentioned on the equipment as well as on the Hand bag / carrying case. Serial number on sticker will not be allowed. Name plate data and marking shall be embossed. In addition, following shall be marked on the name plate.

- Purchase order No & date
- Month and Year of manufacture
- Name of purchaser, i.e. MSEDCL

- Guarantee Five Years

13.00 SOFTWARE

13.01 Each ERSS meter shall be supplied along with base computer software (BCS). The software shall be suitable for downloading the test results into compatible PC / Laptop computer using serial interface data transfer (RS-232 port/RJ-45 Ethernet). The equipment shall be compatible to outside printer. The software shall have facility to generate the test report for individual testing and summary report of all test reports.

13.02 The software shall have facility to generate the test report and print the test report in the following format.

Date and Time of testing

Sr. No. of ERSS

Consumer Details

Consumer No.

Consumer's Name & Address

MUT Details

Make

Sr. No.

Type

Class

MUT Constant

CT / PT ratio

Test revolutions / pulses per kWh

Instantaneous Electrical parameters

Phase to phase Voltages

Phase to neutral voltages

Phase wise Currents

Phase wise Power Factor

Phase wise Active, reactive, apparent power / energy

Frequency

Average Power Factor

Phase wise Power Factor

Energy logged / recorded in ERSS & MUT during test

%Error

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Test duration and test time

Remarks

- 13.03 The offered software shall have facility to convert all stored test results in ASCII file format or similar non-editable format as required. The offered software shall be user friendly & menu driven. The supplier shall impart necessary training regarding installation and use of the above software.
- 13.04 The ERSS meter shall have ASCII or similar support i.e. provision for converting data into ASCII or other popular and commonly available computer software programmes such that the data can be integrated with the meter management system of the utility for ensuring error test record and periodical meter testing.

14.00 TESTS

14.01 TYPE TESTS

The tenderer shall furnish detailed accuracy tests certificates (calibration certificate) of the offered instrument as per relevant Indian amended up to date / International standards.

For the equipments manufactured in India, all the type tests shall be carried out on complete one set of sample at laboratories which are accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL) of Government of India as per relevant Indian standards to prove that the instruments offered meet the requirements of this specification. Type Test Certificates conducted in manufacturers own laboratory and certified by testing institute shall not be acceptable.

For the equipments manufactured abroad and being imported, all the type tests shall be carried out on complete one set of sample at the concerned nation's government accredited laboratories as per relevant international standards. These type test certificates shall be submitted along with the offer. If some of the type test reports are not available with the manufacturer/supplier at the time of submitting offer, the same type test reports shall be submitted before commencement of supply whereas the bidder has to submit confirmation regarding the same along with the offer.

However in the event of placement of supply order, at least one of the equipment to be supplied as per this technical specifications and shall be got calibrated from any National Accreditation Board for Testing and Calibration Laboratories (NABL) of Government of India as per relevant standards to prove that the instrument offered meets the requirements of this specification before commencement of supply.

This calibration certificate shall be got approved from the Chief Engineer, MSEDCL, Testing & Quality Control Cell, 1st Floor, Prakashgad, Mumbai – 400051 prior to commencement of supply.

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The Purchaser reserves the right to demand repetition of some or all the type tests in presence of purchaser's representative at purchaser's cost. For this purpose, the tenderer shall quote unit rates for carrying out each type test. However, such unit rates will not be considered for evaluation of the offer. In case the unit fails in type test, the complete supply shall be rejected & expenditure incurred shall be recovered from the tenderer from his deposit.

14.02 ACCEPTANCE & ROUTINE TEST CERTIFICATES

All acceptance tests as per IS: 12346 shall be carried out on the equipment. All acceptance test certificate, routine test certificate, calibration certificate & operation manual must be provided along with each equipment in the form of CD (Compact Disc) as well as a hard copy.

14.03 CALIBRATION CERTIFICATES OF ERSS

The ERSS shall be supplied along with the calibration certificate as per relevant standards. The calibration certificate shall be issued by NABL labs / International Recognized Laboratories.

15.00 GUARANTEED TECHNICAL PARTICULARS

The tenderer shall furnish the particulars giving specific required details of meters in schedule 'A' attached. The offers without the details in Schedule 'A' stand rejected.

16.00 SAMPLE SUBMISSION & DEMONSTRATION

One sample of Three phase ERSS meter along with operating manual, BCS software & all necessary accessories as per technical specification shall be submitted free of cost to S.E.(TQA),Pune OFFICE & Demonstration shall be carried out within 10 days from the date of Tender opening. Those bidders who will failed to submit the sample & Live demonstration their offer shall be liable for rejection against the tender.

17.00 ACCESSORIES

Each universal ERSS reference meter shall be supplied along with the following accessories:

- One common / separate optical sensor (scanning head) for automatic testing, which can be used to sense disc revolutions in electromechanical meter as well as indicating LED / LCD in static meter including clamp on device and connection cable and scanning head carriage.
- Mounting arrangement (clamp) for the optical sensor.
- A set of voltage leads with insulated clips.

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- Serial communication cord with RS-232 connector/RJ-45 Ethernet port to retrieve stored data from the equipment and download the same on PC / laptop.
- Snap switch along with detachable lead as well as in built snap switch.
- Operating Manual in English.
- One adopter set with omega clip.
- One Mains cable.
- One standard calibration report.
- Data download software to read out the module for transfer and presentation of data.
- One set of 3 pieces split core error compensated Clamp On current transformers (CT) of 240 Amps confirming to class 0.5S complete with connection cable for on-line testing.
- Any other accessories which may be required for complete and successful utilization of the equipment as per this specification shall also be supplied.
- Spares:
 - One set of scanning head shall be supplied along with every 10 nos. of equipment.
 - One set of clamp on current transformers (CT) of 240 Amps confirming to class 0.5S shall be supplied along with every 10 nos. of equipments. This spare clamp on CTs can be used with any of equipment without changing in the accuracy.

18.00 TRAINING

The successful bidder shall depute their representative to educate Engineers of purchaser as and when they will be called for at no extra cost.

19.00 GUARANTEE

The ERSS shall be guaranteed for a period of 5 years from the date of commissioning or five and half years from the date of receipt whichever is earlier. The equipment found defective within above guarantee period shall be replaced / repaired / rectified by the supplier free of cost, within one month of receipt of intimation. After the replacement / repairs / rectification, the accuracy shall not be affected. Test report and calibration certificate shall invariably be submitted after rectification / repairs. If defective equipment is not replaced / repaired / rectified within the specified period as above, the Company shall recover an equivalent amount plus 15% supervision charges from any of the bills of the supplier.

20.00 AFTER SALES SERVICE

The bidder has to indicate clearly the after sales service to be provided by the supplier within guarantee period and outside guarantee period and Addresses of Sales Service Centre, details of Engineers, etc. shall be submitted along with the offer.

21.00 PRE-DESPATCH INSPECTIONS

The successful bidder shall offer universal ERSS meters at their works for inspection before dispatch. For imported equipments, the supplier / tenderer shall offer the equipments at the authorized service center / works of the original manufacturer in India or at the supplier's works / testing center. The offered lot shall be tested for acceptance tests and any other test as per relevant IS / IEC as required by inspecting officers.

During inspection, if the instrument does not meet the required specification & test results found not satisfactory then it shall be liable for rejection. Calibration Certificates of all associated equipments shall be furnished at the time of factory inspection.

The manufacturer shall offer to the inspector representing the purchaser all the reasonable facilities, free of charge, for inspection and testing, to satisfy him that the material is being supplied in accordance with this specification.

The MSEDCL's representative / Engineer attending the above testing shall carry out testing as per relevant IS / IEC & as per this technical specification and issue test certificate approval to the manufacturer and give clearance for dispatch.

The ERSS meters shall be inspected jointly by the Executive Engineer, Testing Division & the Executive Engineer, Inspection Wing.

22.00 QUALITY CONTROL

The purchaser may send a team of experienced engineers for assessing the capability of the bidder or their principals for manufacturing of ERSS meters as per this specification. The team shall be given all assistance and co-operation for inspection and testing at the bidder's works.

Three tender samples shall be kept ready for assessing and testing. The tenderer has to give all facilities for carrying out the testing of these samples.

23.00 MINIMUM TESTING FACILITIES

The bidder or their principals / manufacturer shall have the necessary minimum testing facilities for carrying out various acceptance and routine tests. A list of machinery / equipment and testing facility available at their Works shall also be furnished along with the offer.

24.00 PACKING

24.01 The ERSS meter shall be suitably packed 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 cartoon may be suitably sealed.

A suitable number of sealed cartons may be packed in a case of 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.

24.02 The following information shall be furnished with the consignment :

- Name of consignee
- Details of consignment
- Destination
- Total Weight of consignment.
- Sign showing upper / lower side of the crate
- Sign showing fragility of the material.
- Handling and unpacking instructions.
- Bill of Materials indicating contents of each package and spare materials.

25.00 SCHEDULES

The tenderer shall fill in the following schedules which are part and parcel of the tender specification and offer. If the schedules are not submitted duly filled in with the offer, the offer shall be liable for rejection. The order copies of the order executed mentioned in the list of order shall be invariably enclosed along with the offer. Only those orders mentioned in the list shall be considered whose order copies shall be enclosed with the offer.

Schedule A – Guaranteed and technical particulars.

26.00 DOCUMENTATION

Two sets of following documents shall be supplied along with each test system.

- Operating manual
- Service manual
- Calibration certificate of reference standard

ANNEXURE U-I

“INDEMNITY BOND”

UNDERTAKING TO BE SUBMITTED BY THE PARENT COMPANY SITUATED ABROAD IN CASE OF THE PARTICIPANT BIDDER WHO IS AN INDIAN BASED SUBSIDIARY ON GENERAL STAMP OF `200.00.

The Chief Engineer,
Maharashtra State Electricity Distribution Co. Ltd.,
Material Management Cell,
1st Floor, Prakashgad, Bandra (E),
Mumbai – 400 056.

Dear Sir:

Sub: Undertaking against Tender No. _____ for procurement of _____

We, M/s. _____ having registered office at _____ are the Parent Company of M/s. _____ who have participated against your tender no. _____ for procurement of _____.

We have carefully read and have thoroughly understood and agree to the terms and conditions of the subject tender.

We hereby undertake that in case of placement of order against the subject tender on our subsidiary company, M/s. _____, in the event of we accept all the responsibilities and liabilities for supply of quality equipments as per specification of the tender and execution of the contract. We further hereby undertake that we shall be responsible for any liability arising out of the contract placed on M/s. _____ and to pay MSEDCL on demand the sum of rupees as per agreement in the event of any breach of condition of the purchase order, loss and damage of the material till expiry of guarantee period as stipulated in the order.

Our liability here under shall not be impaired or discharged by extension of time or variation or alteration made with or without our knowledge or consent by or between the parties to the said contract. This undertaking shall be valid and binding on us upto and including the execution and guarantee period of the order and shall not be terminable by notice or change in the constitution of any of the companies. In case of any dispute arising out of or in connection with this tender or contract, if concluded, the same shall be subject to the exclusive jurisdiction of the **“Court in Mumbai (India).”**

Yours faithfully,
(Authorised Signatory)
For _____

SCHEDULE - "A"

GUARANTEED TECHNICAL PARTICULARS

ITEM NAME	PORTABLE THREE PHASE ELECTRONIC REFERENCE STANDARD (ERSS) METER OF ACCURACY 0.5S WITH 240 Amps CLAMP ON CTs FOR TESTING OF ENERGY METERS	
SR. NO.	PARTICULARS	GTP VALUES
(1)	MANUFACTURER NAME & ADDRESS	TO BE FILLED BY MANUFACTURER
(2)	COUNTRY OF MANUFACTURE	TO BE FILLED BY MANUFACTURER
(3)	TYPE / MODEL DETAILS OF THE EQUIPMENT	TO BE FILLED BY MANUFACTURER
(4)	OPERATING EXPERIENCE OF THE BIDDER	TO BE FILLED BY MANUFACTURER
(5)	MANUFACTURER HAS EXPERIENCE OF MINIMUM ONE YEAR FOR SUPPLY OF SIMILAR OR BETTER EQUIPMENTS TO NATIONAL / INTERNATIONAL ACCREDITED LABORATORIES OR POWER UTILITIES IN INDIA.	YES
(6)	NECESSARY PURCHASE ORDER COPIES ENCLOSED IN SUPPORT OF ABOVE (4) & (5)	YES
(7)	PURCHASE ORDER NOS. & IN SUPPORT OF ABOVE (4) & (5)	TO BE FILLED BY MANUFACTURER
(8)	SATISFACTORILY PERFORMANCE REPORT FROM NABL LABS / POWER UTILITY IS ENCLOSED?	YES
(9)	DECLARATION AS PER CL NO 2.05 OF TECH SPECS ENCLOSED.	YES
(10)	NAME & ADDRESS OF BIDDERS OR THEIR PRINCIPALS TESTING FACILITIES IN INDIA ENCLOSED WITH OFFER	YES
(11)	NAME & ADDRESS OF BIDDERS OR THEIR PRINCIPALS OWN SERVICE CENTRE IN INDIA	TO BE FILLED BY

**TECHNICAL SPECIFICATION OF PORTABLE THREE PHASE ELECTRONIC REFERENCE STANDARD
METER OF ACCURACY 0.5S OR TESTING OF ENERGY METERS**

	ENCLOSED WITH OFFER	MANUFACTURER
(12)	LIST OF PLANT AND MACHINERY, TOOLS AND TACKLES TO CARRY OUT SERVICE ENCLOSED ALONG WITH OFFER.	YES
(13)	ACCURACY CLASS OF ERSS	0.5S FOR ACTIVE ENERGY AND 0.5S FOR REACTIVE ENERGY
(14)	SUPPLY SYSTEM FOR THREE PHASE METERS	415V \pm 30% (PHASE TO PHASE) THREE PHASE FOUR WIRE
(15)	SUPPLY SYSTEM FOR SINGLE PHASE METERS	240V \pm 30% (PHASE TO NEUTRAL)
(16)	FREQUENCY	50 Hz \pm 5%
(17)	WORKING RANGE FOR THREE PHASE METERS	500 mA TO 240 AMPS
(18)	WORKING RANGE FOR SINGLE PHASE METERS	500 mA TO 240 AMPS
(19)	PF RANGE	0 LAG-UNITY-0 LEAD
(20)	POWER CONSUMPTION IN CURRENT CIRCUIT	SHALL NOT BE MORE THAN 1 VA IN CURRENT CIRCUIT (WITH CT)
(21)	POWER CONSUMPTION IN VOLTAGE CIRCUIT	SHALL NOT BE MORE THAN 10 VA IN VOLTAGE CIRCUIT PER PHASE
(22)	AUXILIARY POWER CONSUMPTION	SHALL BE LESS THAN 25 VA
(23)	TEST VOLTAGE RANGE	168 V TO 312 V (PHASE TO NEUTRAL)
(24)	TEST VOLTAGE RESOLUTION	0.01V
(25)	TEST VOLTAGE ACCURACY	0.2 %
(26)	TEST CURRENT RANGE	WORKING RANGE: 500 MA TO 240 AMPS AND MEASUREMENT RANGE: 500 MA TO 240 AMPS WITH CLAMP ON

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		CT.
(27)	TEST CURRENT RESOLUTION	0.001 A
(28)	TEST CURRENT ACCURACY	< 0.2 % (500 MA ... 240 AMPS)
(29)	PHASE ANGLE MEASUREMENT RANGE	0 TO 360 DEG.
(30)	POWER / ENERGY MEASUREMENT ERROR (SAME FOR ACTIVE, REACTIVE AND APPARENT)	0.5% (FROM 500 MA TO 240 AMPS)
(31)	POWER / ENERGY MEASUREMENT TEMPERATURE DRIFT	< 100 PPM / DEG C
(32)	POWER / ENERGY MEASUREMENT STABILITY	< 500 PPM
(33)	ERROR IN PHASE ANGLE MEASUREMENT	0.2 DEG OR BETTER
(34)	FREQUENCY RANGE	50 Hz \pm 5%
(35)	FREQUENCY RESOLUTION	0.01 Hz
(36)	METER HAS ALPHA – NUMERIC KEYBOARD WITH ARROW & ENTER KEYS	YES
(37)	METER HAS SCANNER OR OPTICAL SENSOR HEAD ALONG WITH DETACHABLE LEAD	YES
(38)	SENSOR HEAD CLAMP TO HOLD THE SCANNER PROPERLY IN FRONT OF THE LED / LCD OUTPUT OR REVOLVING DISC IS PROVIDED	YES
(39)	SNAP SWITCH ALONG WITH DETACHABLE LEAD PROVIDED	YES
(40)	ELECTRONIC COMPENSATED CLAMP-ON CTs TO ENABLE TESTING WITHOUT ISOLATING OR INTERRUPTING THE SUPPLY OF THE CONSUMER IS PROVIDED	YES
(41)	EQUIPMENT HAS FACILITY TO INTERCHANGE CLAMP ON CT WITHOUT AFFECTING ACCURACY	YES
(42)	RATING OF CT	500 MA TO 240 AMPS
(43)	ACCURACY OF CT	0.5S

**TECHNICAL SPECIFICATION OF PORTABLE THREE PHASE ELECTRONIC REFERENCE STANDARD
METER OF ACCURACY 0.5S OR TESTING OF ENERGY METERS**

(44)	VOLTAGE LEADS WITH INJECTION TYPE CROCODILE CLIPS / ANY OTHER SUITABLE CLAMPING ARRANGEMENT WITH INSULATED LEADS ARE PROVIDED ON ERSS METER.	YES
(45)	ALL ACCESSORIES SUPPLIED CONFORM TO INTERNATIONAL SAFETY STANDARDS	YES
(46)	ADEQUATE BUILT IN FEATURES TO PROTECT INSTRUMENT ITSELF FROM OVER-VOLTAGE PROVIDED & COMPLIES WITH OVERVOLTAGE CATEGORY II (300V).	YES
(47)	TYPE OF INDICATION PROVIDED ON ERSS THAT ERSS METER IS IN CORRECT ACTIVE MODE	TO BE FILLED BY MANUFACTURER
(48)	ERSS HAS FACILITY TO SELECT THE CALCULATION OF APPARENT POWER GEOMETRICALLY FOR INDIVIDUAL PHASES AND FOR SUMMATION OF ALL THREE PHASES.	YES
(49)	INDICATION TO DISPLAY MISSING / REVERSE / OVER CURRENT / VOLTAGE BY INSTANTANEOUS VALUES OR WARNING MESSAGE IS PROVIDED	YES
(50)	AUTO RANGE OF CURRENT AND VOLTAGE INPUTS IS PROVIDED.	YES
(51)	ERSS DISPLAYS ERROR(S) OF THE METER UNDER TEST AUTOMATICALLY.	YES
(52)	ERSS METER HAS INTERFACE TO AN EXTERNAL PRINTER	YES
(53)	PROVISION FOR INPUT OF SCANNING HEAD AND START / STOP BUTTON ON ERSS	YES
(54)	METER TYPE TESTED FOR IP 51 DEGREE OF PROTECTION AS PER IS: 12063	YES
(55)	IP-51 TYPE TEST REPORT NO. & DATE	TO BE FILLED BY MANUFACTURER
(56)	WHETHER IP-51 TYPE TEST REPORT ENCLOSED ALONG WITH THE BID	YES

**TECHNICAL SPECIFICATION OF PORTABLE THREE PHASE ELECTRONIC REFERENCE STANDARD
METER OF ACCURACY 0.5S OR TESTING OF ENERGY METERS**

(57)	ERSS HAS FACILITY TO RECORD & STORE MINIMUM 300 TEST RESULTS WITH VARIOUS INSTANTANEOUS PARAMETERS IN NON VOLATILE MEMORY (NVM)	YES
(58)	LIFE OF NVM	MINIMUM 10 YEARS
(59)	ERSS GIVES FLASHING ALARM WHEN 90% OF MEMORY IS USED	YES
(60)	PROVISION TO NOT LOSE TEST DATA STORED IN MEMORY OF ERSS BY ROLL OVER MODE IS MADE	YES
(61)	DATA IN ERSS CAN BE DOWN LOADED TO COMPUTER USING COMMUNICATION CORD/ RS-232/RJ-45 ETHERNET PORT PROVIDED ON ERSS THROUGH COMPATIBLE SOFTWARE.	YES
(62)	INDICATION FOR ENERGY FLOW DIRECTION & WARNING FOR OVERLOAD IS MADE ON ERSS	YES
(63)	ERSS IS IMMUNE TO VIBRATION AND DUMPING DUE TO TRANSPORT.	YES
(64)	ERSS SHOWS CALIBRATION DATE AND CALIBRATION DUE DATE ON INITIAL SCREEN	YES
(65)	ERSS HAS LCD DISPLAY OF MIN 3" DIAGONALLY	YES
(66)	ANY SUITABLE RECTANGULAR SIZE WITH 3" DIAGONAL LENGTH SHALL BE PREFERED TO DISPLAY VARIOUS ELECTRICAL PARAMETERS	YES
(67)	PARAMETERS TO BE DISPLAYED ARE SELECTABLE THOUGH FRONT PANEL SWITCH	YES
(68)	DISPLAY OF PARAMETERS AS PER TECHNICAL SPECIFICATION	YES
(69)	MINIMUM RESOLUTION FOR VARIOUS PARAMETERS IS AS PER SPECIFICATION	YES
(70)	THREE CLAMP-ON TYPE SPLIT CORE CURRENT TRANSFORMERS (CTs) FOR 500 MA TO 240 AMPS CONFIRMING TO CLASS 0.5S PROVIDED	YES

**TECHNICAL SPECIFICATION OF PORTABLE THREE PHASE ELECTRONIC REFERENCE STANDARD
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(71)	CLAMP ON CTs COMPENSATED FOR MEASUREMENT IN ALL FOUR QUADRANTS	YES
(72)	ERSS HAS FLEXIBILITY TO ENTER METER CONSTANT UPTO 6 DIGITS.	YES
(73)	SCANNING HEAD IS SUPPLIED ALONG WITH MOUNTING ARRANGEMENT & CONNECTION CABLE	YES
(74)	START / STOP BUTTON INTEGRATED ON ERSS	YES
(75)	EQUIPMENT HAS FACILITY TO TEST IN MANUAL MODE	YES
(76)	EQUIPMENT HAS FACILITY TO TEST IN AUTO MODE	YES
(77)	EQUIPMENT HAS FACILITY TO SELECT MEASURING MODE FOR TOTAL POWER / ENERGY	YES
(78)	CLEARLY VISIBLE, EFFECTIVELY SECURED AGAINST REMOVAL & INDELIBLY AND DISTINCTLY MARKED WITH ALL ESSENTIAL PARTICULARS AS PER RELEVANT STANDARDS NAME PLATE IS PROVIDED	YES
(79)	ERSS IS SUPPLIED ALONG WITH BCS	YES
(80)	SOFTWARE IS SUITABLE FOR DOWNLOADING THE TEST RESULTS INTO COMPATIBLE PC / LAPTOP COMPUTER USING SERIAL INTERFACE DATA TRANSFER (RS-232 /RJ-45 ETHERNET PORT).	YES
(81)	ERSS IS COMPATIBLE TO EXTERNAL PRINTER.	YES
(82)	SOFTWARE HAS FACILITY TO GENERATE TEST REPORT FOR INDIVIDUAL TESTING AND SUMMARY REPORT OF ALL TEST REPORTS.	YES
(83)	ERSS HAS ASCII OR SIMILAR SUPPORT FOR CONVERTING DATA INTO ASCII OR OTHER POPULAR AND COMMONLY AVAILABLE NON-EDITABLE COMPUTER SOFTWARE PROGRAMMES	YES

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METER OF ACCURACY 0.5S OR TESTING OF ENERGY METERS**

(84)	MAINS POWER SUPPLY INPUT IS INTERNALLY CONNECTED TO TEST VOLTAGE.	YES
(85)	PROVISION FOR INPUT OF SCANNING HEAD AND START / STOP BUTTON IS MADE	YES
(86)	ERGONOMICALLY AND AESTHETICALLY DESIGNED INSTRUMENT TRANSPORTATION CASE IS PROVIDED ALONG WITH THE EQUIPMENT.	YES
(87)	SCANNER IS ABLE TO READ CORRECTLY EVEN IN CASE OF ITS ALIGNMENT IS DEVIATING UPTO AN ANGLE OF 15 DEGREE OF THE AXES OF OPTICAL PORT.	YES
(88)	WHETHER ERSS IS TYPE TESTED	YES
(89)	TYPE TEST / CALIBRATION REPORT SUBMITTED ALONG WITH OFFER	YES
(90)	TYPE TEST / CALIBRATION REPORT NOS. & DATE	TO BE FILLED BY THE MANUFACTURER
(91)	SUPPLIER AGREES TO IMPART NECESSARY TRAINING REGARDING INSTALLATION AND USE OF SOFTWARE.	YES
(92)	SUPPLIER AGREES TO SUPPLY ERSS WITH ALL ACCESSORIES AS PER TECHNICAL SPECIFICATION	YES
(93)	SUPPLIER AGREES TO DEPUTE THEIR REPRESENTATIVE TO EDUCATE ENGINEERS OF PURCHASER AS AND WHEN THEY WILL BE CALLED FOR AT NO EXTRA COST	YES
(94)	GUARANTEE OF ERSS AS PER CLAUSE NO. 19.00	YES
(95)	DETAILS OF AFTER SALES SERVICE TO BE PROVIDED BY SUPPLIER WITHIN GUARANTEE PERIOD	YES
(96)	DETAILS OF AFTER SALES SERVICE TO BE PROVIDED BY SUPPLIER OUTSIDE GUARANTEE PERIOD	YES

**TECHNICAL SPECIFICATION OF PORTABLE THREE PHASE ELECTRONIC REFERENCE STANDARD
METER OF ACCURACY 0.5S OR TESTING OF ENERGY METERS**

(97)	ADDRESSES OF SALES SERVICE CENTRE, DETAILS OF ENGINEERS	TO BE FILLED BY MANUFACTURER
(98)	DETAILS OF NECESSARY MINIMUM TESTING FACILITIES FOR CARRYING OUT VARIOUS ACCEPTANCE AND ROUTINE TESTS SUBMITTED ALONG WITH OFFER.	TO BE FILLED BY MANUFACTURER
(99)	A LIST OF MACHINERY / EQUIPMENT AND TESTING FACILITY AVAILABLE AT THEIR WORKS IS FURNISHED ALONG WITH OFFER.	YES