

MATERIAL SPECIFICATIONS CELL

TECHNICAL SPECIFICATION

SINGLE PHASE PORTABLE ELECTRONIC
REFERENCE STANDARD SUB METER OF ACCURACY
CLASS 0.5S FOR TESTING OF ENERGY METERS



TECHNICAL SPECIFICATION NO.

CE/MMC/MSC-II/SP/ERSS,
Date: 31.03.2017 (Revised 22.05.2018)

Table of Contents

1.00	SCOPE	3
2.00	QUALIFYING REQUIREMENTS	3
3.00	APPLICATION	4
4.00	SERVICE CONDITIONS	5
5.00	APPLICABLE STANDARDS	5
6.00	GENERAL TECHNICAL REQUIREMENT	6
7.00	CONSTRUCTIONAL AND GENERAL REQUIREMENTS	7
8.00	DISPLAY	12
9.00	MEASUREMENT MODE	13
10.00	METER TESTING	13
11.00	OPERATING MODES	13
12.00	NAME PLATE DATA AND MARKING	14
13.00	SOFTWARE	14
14.00	TESTS	15
15.00	GUARANTEED TECHNICAL PARTICULARS	17
16.00	DEMONSTRATION	17
17.00	ACCESSORIES	17
18.00	TRAINING	18
19.00	GUARANTEE	18
20.00	AFTER SALES SERVICE	18
21.00	PRE-DESPATCH INSPECTIONS	19
22.00	QUALITY CONTROL	19
23.00	MINIMUM TESTING FACILITIES	19
24.00	PACKING	19
25.00	SCHEDULES	20
26.00	DOCUMENTATION	20
	SCHEDULE – “C”	22
	SCHEDULE – “F”	23
	ANNEXURE U-I	24
	SCHEDULE – “A”	25

1.00 SCOPE

This specification covers the general and standard requirement, technical data design, engineering, manufacturing, assembly, inspection & testing at manufacture's works, supply & delivery at stores of Single phase portable reference standard sub meter of class 0.5S with clamp on CT mode with complete accessories, operation and maintenance manual & training on operation for working in the range of 250 mA to maximum 60 Amps at site.

The ERSS meter must have micro-processor unit with software support suitable for on-line testing of all types of single phase energy meters at site. Computer software shall be such that final data shall be converted for further processing to generate inputs & reports.

The Single Phase ERSS meter shall be capable of testing electronic meters / electro mechanical energy meters of any latest version

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. 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 REQUIREMENTS.

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 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

The 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 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 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 standard 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 & IS15707. (iii) IEC 60736, (iv) other authoritative standards.

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

6.00 GENERAL TECHNICAL REQUIREMENT

The portable Electronic Reference Standard Sub shall comply with the following requirement.

6.01 Class of Accuracy

The accuracy of the ERSS shall be sufficient in any condition for testing kWh part of the single phase energy meters of class 1 confirming to IS: 13779 / 1999 (amended upto date). The accuracy of the portable Single Phase ERSS meter for power / energy measurement shall be 0.5S with clamp on CT for the current range of 250 mA to maximum 60 Amps.

6.02 Voltage & Current rating

- a) The voltage rating shall be 240 volts. The voltage range shall be $\pm 30\%$.
- b) The current measurement range shall be 250 mA to maximum 60 Amps.

6.03 Temperature

The specified operation range shall be -10°C to $+55^{\circ}\text{C}$

Limit range of operation shall be -25°C to $+60^{\circ}\text{C}$

Limit range for storage and transport -25°C to $+70^{\circ}\text{C}$

6.04 Power consumption

The 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 including clamp on CT & shall not be more than 10 VA in voltage circuit.

6.05 Frequency

The rated frequency shall be 50 Hz with a tolerance of $\pm 5\%$.

6.06 Power Factor

The meter shall work for Zero to unity PF (All lag or lead).

6.07 Measuring mode

Single Phase Two wire active.

6.08 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.

7.00 CONSTRUCTIONAL 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.

- 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 CTs which enable the testing without isolating or interrupting the supply of the consumer.
- 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 store total energy including harmonics .
- 7.13** All the display parameters indicated in clause no. 8.00 shall be obtained by pressing the push -button.
- 7.14** 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.

- e. Instantaneous voltage, line current & active current.
 - f. Energy Logged/ Recorded by ERS during test.
 - g. Test duration in hour, minute, & seconds.(With time of commencement & completion) and all parameters shown in clause no. 8.00.
- 7.15** ERSS meter shall be capable of indicating the display for the following conditions by instantaneous values or warning message.
- Missing current
 - Reverse current, if any current is reverse.
 - Over current(*for current more than 120%*)
 - Over Voltage(*for voltage more than 130%*)
 - Low Voltage(*for voltage less than 70%*)
- 7.16** Mains power supply input shall be internally/externally connected to the test voltage.
- 7.17** 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)
- 7.18** ERSS meter shall be made functional by giving supply of 240 Volts $\pm 30\%$ AC through an adopter between phase to neutral for down loading the data to PC etc.
- 7.19** The ERSS meter shall measure and display a comprehensive analysis of single phase system showing instantaneous and integrated values of
- True RMS value for each phase voltage & current input.
 - Analysis of DC component and Harmonics contents
- 7.20** Auto range of Current and Voltage inputs shall be provided.
- 7.21** The ERSS meter shall display the error(s) of the meter under test automatically.
- 7.22** The ERSS meter shall have interface to an external printer through PC software.
- 7.23** 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.

- 7.24** There shall be a provision for input of scanning head and start / stop button on the ERSS unit. Also Snap Switch shall be acceptable in the form of extended cord.
- 7.25** The ERSS meter shall be of low weight, compact and of small size
- 7.26** The meter body shall be type tested for IP51 degree of protection as per IS/IEC 60529:2001 against ingress of dust, moisture & vermin. The type test certificate shall be submitted along with the offer.
- 7.27** ERSS meter shall have capability to indicate display for the following condition:
- Reverse current if any current is reverse.
- 7.28** 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.
- 7.29** Auto range of current and voltage input should be provided.
- 7.30** 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.
- 7.31** 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.
- 7.32** All the cords/ connectors/ accessories supplies along with ERSS must confirm IEC -1010-2-031 and international standards of safety. Adequate built in features to protect the instrument itself from over voltage shall be provided.

7.33 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-88. The RTC shall have Non rechargeable battery with long life (10 Years). Time synchronization should be possible with GPS

- 7.34** 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 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.

- 7.35** RS – 232/RJ 45 Ethernet port communication port shall be provided to download the data to the computer through the BCS, for portable printer connected to laptop for printing the test results at site.
- 7.36** The unit shall have LCD display of min 3” diagonally.
- 7.37** The unit shall be provided with 2 voltage inputs (one for phase and one for neutral) for 1 phase 2 wire voltage measurement and one socket for current clamps
- 7.38** Mains power supply input shall be internally connected to the test voltage.
- 7.39** There shall be a provision for input of scanning head and start / stop button on the ERSS unit.

7.40 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.

7.41 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 14697:1999 & CBIP publication 304.

- Fast transient burst Test may be applied to ERSS. It should not show any change in register of more than values shown in the relevant test specification IEC 801-4.
- The ERSS 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.

7.46 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.

8.00 DISPLAY

8.01 The unit shall have LCD display of min 3” diagonally in rectangular size shall be preferred to display various electrical parameters.

8.02 The ERSS shall show the calibration date and calibration due date on initial screen.

8.03 DISPLAY OF PARAMETERS

The device shall be able to display the following instantaneous parameter:

SR.NO.	PARAMETERS	RESOLUTIONS
(1)	True RMS value of voltage	xxx.xx Volts
(2)	True RMS value of current	xx.xxx Amps
(3)	Power factor	x.xxx
(4)	Frequency	xx.xx Hz
(5)	Active power	xxx.xxx kW
(6)	Calibration date of equipment and calibration due date	Bidder should specify.

8.04 During the test duration, the resolution of instantaneous load and the percentage error shall have resolution as follows -

SR.NO.	PARAMETER	RESOLUTION
(1)	Instantaneous Active Energy	xxx.xxxx Wh
(2)	Percentage Active Energy Error	xx.xx %

9.00 MEASUREMENT MODE

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

9.01 CLAMP ON (SPLIT CORE CURRENT TRANSFORMERS) MODE

One number clamp on type current transformer (CT) shall be provided along with suitable connecting cable length to measure from 250 mA to a maximum current of 60 Amps. It shall be possible to use the clamp on CT with cables having overall diameter not more than 10 mm. The accuracy class shall be 0.5S or better at UPF in this range.

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 device shall allow to use start/ stop button integrated on device 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 options to start and stop the test.

11.02 AUTO MODE

A scanner shall be provided along with the equipment to test electromechanical meter 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 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.

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. 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 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 :

Sl. No. of Reference standard :

Consumer Details

Consumer No :

Consumer's Name & Address :

MUT Details

Make :

Sr.No. :

Type :

Class :

MUT Constant :

Test revolutions / pulses per kWh :

Instantaneous Electrical parameters

Voltage	:
Current	:
Active power	:
Frequency	:
Average Power Factor	:
Active Energy logged by ERSS & MUT	:
%Error	:
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 type test certificates of the offered instrument for all the tests as relevant Indian (14697:1999) amended upto date / International standards. 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. If the firm does not submit any type test report in the tender then it shall be rejected.

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.

TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.

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, Material Management Cell, 1st Floor, Prakashgad, Mumbai – 400051 prior to commencement of supply.

The tenderer who have supplied the offered instrument to MSEDCL against order from Material Management Cell of MSEDCL shall be exempted from submission of type test certificates against this tender provided that,

- i) The offered instruments are already fully type tested at Laboratories accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL) within five years prior to the date of opening of the tender.
- ii) There is no change in the design of type tested instruments and those offered against this tender.
- iii) Such tenderer complying with (i) & (ii) above, shall furnish an undertaking in the format schedule 'F' enclosed herewith & shall take approval / waiver of type test from the Chief Engineer, MSEDCL, Material Management Cell, Prakashgad, Bandra (E), Mumbai – 400051 prior to commencement of supply.

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 ACCEPTANC & ROUTINE TESTS

All acceptance tests as per IS: 12346 shall be carried out on the equipment. All acceptance tests certificates, routine test certificates, 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 Single 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 and neutral leads with insulated crocodile clips.
- 1 no clamp on CT 60 Amps along with cable
- 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 standard calibration report.
- Data download software to read out the module for transfer and presentation of data.
- Spares:
 - One set of scanning head shall be supplied along with every 10 nos. of equipment.
- One carry bag.

This shall be ergonomically and aesthetically designed instrument case which can withstand the usual handling of field personnel and normal transportation.

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 certificate 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

**TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE
STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.**

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 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.

Schedule C – Tenderer's experience.

Schedule F – Proforma undertaking.

The tenderer shall submit the list of orders for similar type of equipment, executed or under execution during the last three years, with full details in the schedule of tenderer's experience (Schedule - C) to enable the purchaser to evaluate the tender.

26.00 DOCUMENTATION

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

**TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE
STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.**

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

SCHEDULE – “C”

TENDERER’S EXPERIENCE

Tenderer shall furnish here list of similar orders executed / under execution for supplying Single Phase ERSS Meters by him to whom a reference may be made by purchaser in case he considers such a reference necessary.

Sr. No.	Name of client	Order No. & date	Qty. ordered	Qty. supplied
------------	----------------	------------------	--------------	------------------

NAME OF FIRM _____

NAME & SIGNATURE _____

DESIGNATION _____

DATE _____

SCHEDULE – “F”

PROFORMA OF UNDERTAKING

We hereby confirm that Single Phase Electronic Reference Standard Sub (ERSS) Meter offered by us against this tender are of the same design and type as have been supplied to MSEDCL against earlier order No. _____ dtd. _____ and all the type test certificates thereof were approved by Chief Engineer, Material Management Cell vide letter No. _____, dtd. _____ (Copy enclosed).

We further confirm that the said type tests have been carried out at the laboratories accredited by NABL within five years prior to the date of opening of present tender.

NAME OF FIRM _____

NAME & SIGNATURE _____

DESIGNATION _____

DATE _____

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 AND TECHNICAL PARTICULARS

ITEM NAME	SINGLE PHASE PORTABLE ELECTRONIC REFERENCE STANDARD SUB (ERSS) METER OF ACCURACY CLASS 0.5S	
SR. NO.	PARTICULARS	GTP VALUES
(1)	MANUFACTURER NAME & ADDRESS	TEXT
(2)	COUNTRY OF MANUFACTURE	TEXT
(3)	TYPE / MODEL DETAILS OF EQUIPMENT	TEXT
(4)	OPERATING EXPERIENCE OF THE BIDDER	TEXT
(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.	TEXT
(6)	NECESSARY PURCHASE ORDER COPIES ENCLOSED IN SUPPORT OF ABOVE (4) &(5)	BOOLEAN
(7)	PURCHASE ORDER NOS. & DATES IN SUPPORT OF ABOVE (4) &(5)	TEXT
(8)	SATISFACTORILY PERFORMANCE REPORT SUBMITTED FROM NABL LABS/ POWER UTILITY ENCLOSED WITH OFFER	BOOLEAN
(9)	DECLARATION AS PER CL NO 2.05 OF TECH SPECS ENCLOSED.	BOOLEAN
(10)	NAME & ADDRESS OF BIDDERS TESTING FACILITIES IN INDIA ENCLOSED WITH OFFER	TEXT
(11)	NAME & ADDRESS OF BIDDERS OR THEIR PRINCIPALS OWN SERVICE CENTRE IN INDIA ENCLOSED WITH OFFER	TEXT
(12)	LIST OF PLANT AND MACHINERY, TOOLS AND TACKLES TO CARRY OUT SERVICE ENCLOSED ALONG WITH OFFER.	TEXT

TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.

(13)	ACCURACY CLASS OF ERSS METER 0.5S WITH CLAMP ON CT FROM 250 mA TO MAXIMUM 60 A	BOOLEAN
(14)	VOLTAGE RATING	TEXT
(15)	VOLTAGE RANGE	TEXT
(16)	POWER CONSUMPTION IN VOLTAGE CIRCUIT	TEXT
(17)	FREQUENCY RANGE	TEXT
(18)	PF RANGE	TEXT
(19)	ERSS HAS ALPHA - NUMERIC KEYBOARD WITH ARROW & ENTER KEYS	BOOLEAN
(20)	ERSS HAS SCANNER OR OPTICAL SENSOR HEAD ALONG WITH DETACHABLE LEAD	BOOLEAN
(21)	SENSOR HEAD CLAMP TO HOLD SCANNER PROPERLY IN FRONT OF LED / LCD OUTPUT OR REVOLVING DISC IS PROVIDED	BOOLEAN
(22)	SNAP SWITCH ALONG WITH DETACHABLE LEAD PROVIDED	BOOLEAN
(23)	ELECTRONIC COMPENSATED CLAMP-ON CTS TO ENABLE TESTING WITHOUT ISOLATING OR INTERRUPTING SUPPLY OF CONSUMER IS PROVIDED	BOOLEAN
(24)	ERSS PROVIDED WITH ELECTRONIC COMPENSATED CLAMP-ON CT	TEXT
(25)	VOLTAGE LEADS WITH INJECTION TYPE CROCODILE CLIPS / ANY OTHER SUITABLE CLAMPING ARRANGEMENT WITH INSULATED LEADS ARE PROVIDED ON ERSS METER.	BOOLEAN
(26)	ALL CORDS / ACCESSORIES SUPPLIED ALONG WITH ERSS CONFORM TO INTERNATIONAL STANDARDS OF SAFETY	BOOLEAN
(27)	ADEQUATE BUILT IN FEATURES TO PROTECT THE ERSS ITSELF FROM OVER-VOLTAGE PROVIDED.	BOOLEAN

**TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE
STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.**

(28)	ERSS DISPLAYS ERROR(S) OF METER UNDER TEST AUTOMATICALLY	BOOLEAN
(29)	ERSS HAS FACILITY TO STORE TOTAL ENERGY INCLUDING HARMONICS	BOOLEAN
(30)	ERSS HAS INTERFACE TO AN EXTERNAL PRINTER THROUGH BCS	BOOLEAN
(31)	TYPE OF INDICATION PROVIDED TO DISPLAY CONDITIONS OF CL. 7.16 OF TECH SPECS	TEXT
(32)	ERSS TYPE TESTED FOR IP-51 DEGREE OF PROTECTION AS PER IS: 12063	BOOLEAN
(33)	WHETHER IP-51 TYPE TEST CERTIFICATE ENCLOSED ALONG WITH THE OFFER	BOOLEAN
(34)	IP-51 TYPE TEST CERTIFICATE NO. & DATE	TEXT
(35)	RTC IS USED IN ERSS FOR MAINTAINING TIME (IST) AND CALENDAR.	BOOLEAN
(36)	RTC IS NON-RECHARGEABLE & IS PRE-PROGRAMMED FOR 30 YEARS DAY / DATE WITHOUT ANY NECESSITY FOR CORRECTION.	BOOLEAN
(37)	TIME ACCURACY OF RTC AS PER PROVISIONS OF CBIP-TECH-REPORT-88.	BOOLEAN
(38)	NON-RECHARGEABLE BATTERY OF RTC HAS LONG LIFE OF 10 YEARS	BOOLEAN
(39)	ERSS HAS FACILITY TO RECORD AND STORE MINIMUM 300 TEST RESULTS IN NON VOLATILE MEMORY (NVM).	BOOLEAN
(40)	MINIMUM LIFE OF NVM IN YEARS.	TEXT
(41)	ERSS GIVES FLASHING ALARM WHEN 90% OF MEMORY IS USED	BOOLEAN
(42)	DATA IN ERSS CAN BE DOWN LOADED TO COMPUTER USING COMMUNICATION CORD / RS-232 PORT / /RJ-45 ETHERNET THROUGH COMPATIBLE	BOOLEAN

TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.

	SOFTWARE.	
(43)	PROVISION TO NOT LOOSE TEST DATA STORED IN MEMORY OF ERSS BY ROLL OVER MODE IS MADE	BOOLEAN
(44)	RS - 232 COMMUNICATION//RJ-45 ETHERNET PORT PROVIDED TO DOWNLOAD DATA TO COMPUTER THROUGH BCS	BOOLEAN
(45)	THE SIZE OF LCD DISPLAY DIAGONALLY.(In INCHES)	TEXT
(46)	ERSS IS PROVIDED WITH 2 VOLTAGE INPUTS (ONE FOR PHASE AND ONE FOR NEUTRAL)	BOOLEAN
(47)	MAINS POWER SUPPLY INPUT IS INTERNALLY CONNECTED TO TEST VOLTAGE.	BOOLEAN
(48)	PROVISION FOR INPUT OF SCANNING HEAD AND START / STOP BUTTON IS MADE	BOOLEAN
(49)	ERSS IS IMMUNE TO VIBRATION AND DUMPING DUE TO TRANSPORT.	BOOLEAN
(50)	ERGONOMICALLY AND AESTHETICALLY DESIGNED INSTRUMENT TRANSPORTATION CASE IS PROVIDED	BOOLEAN
(51)	DISPLAY OF PARAMETERS AS PER TECHNICAL SPECIFICATION	BOOLEAN
(52)	RESOLUTION OF INSTANTANEOUS LOAD AND PERCENTAGE ERROR AS PER TECHNICAL SPECIFICATION	BOOLEAN
(53)	ERSS SHOWS CALIBRATION DATE AND CALIBRATION DUE DATE ON INITIAL SCREEN.	BOOLEAN
(54)	ONE NUMBER CLAMP ON TYPE CURRENT TRANSFORMER (CT) IS PROVIDED ALONG WITH SUITABLE CONNECTING CABLE LENGTH TO MEASURE FROM 250 MA TO A MAXIMUM CURRENT OF 60 AMPS.	BOOLEAN
(55)	IT IS POSSIBLE TO USE CLAMP ON CT WITH CABLES HAVING OVERALL DIAMETER NOT MORE THAN 10 mm.	BOOLEAN
(56)	FLEXIBILITY TO ENTER METER CONSTANT UPTO 6	BOOLEAN

TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.

	DIGITS IS PROVIDED IN ERSS	
(57)	SCANNING HEAD IS SUPPLIED ALONG WITH MOUNTING ARRANGEMENT & CONNECTION CABLE	BOOLEAN
(58)	START / STOP BUTTON INTEGRATED ON DEVICE TO START AND STOP ERROR TEST IS PROVIDED	BOOLEAN
(59)	ERSS HAS 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.	BOOLEAN
(60)	SCANNER IS PROVIDED WITH VACUUM TYPE FIXING ARRANGEMENT OR ANY OTHER ARRANGEMENT SUITABLE TO TEST THE METER AT SITE.	BOOLEAN
(61)	SCANNER IS ABLE TO READ CORRECTLY EVEN IN CASE OF ITS ALIGNMENT IS DEVIATING UPTO AN ANGLE OF 15 DEGREE OF AXES OF OPTICAL PORT.	BOOLEAN
(62)	CLEARLY VISIBLE, EFFECTIVELY SECURED AGAINST REMOVAL & INDELIBLY AND DISTINCTLY MARKED WITH ALL ESSENTIAL PARTICULARS AS PER RELEVANT STANDARDS NAME PLATE IS PROVIDED	BOOLEAN
(63)	EACH ERSS IS SUPPLIED ALONG WITH BASE COMPUTER SOFTWARE (BCS).	BOOLEAN
(64)	BCS IS SUITABLE FOR DOWNLOADING TEST RESULTS INTO COMPATIBLE PC / LAPTOP COMPUTER USING SERIAL INTERFACE DATA TRANSFER (RS-232 PORT//RJ-45 ETHERNET).	BOOLEAN
(65)	ERSS IS COMPATIBLE TO EXTERNAL PRINTER.	BOOLEAN
(66)	SOFTWARE HAS FACILITY TO GENERATE TEST REPORT FOR INDIVIDUAL TESTING AND SUMMARY REPORT OF ALL TEST REPORTS.	BOOLEAN
(67)	ERSS HAS ASCII OR SIMILAR SUPPORT FOR CONVERTING DATA INTO ASCII OR OTHER POPULAR AND COMMONLY AVAILABLE NON-EDITABLE COMPUTER SOFTWARE PROGRAMMES TO BE INTEGRATED WITH METER MANAGEMENT SYSTEM OF	BOOLEAN

**TECHNICAL SPECIFICATIONS OF SINGLE PHASE PORTABLE ELECTRONIC REFERENCE
STANDARD SUB METER OF ACCURACY CLASS 0.5S FOR TESTING OF ENERGY METERS.**

	UTILITY	
(68)	SUPPLIER AGREES TO IMPART NECESSARY TRAINING REGARDING INSTALLATION AND USE OF SOFTWARE.	BOOLEAN
(69)	WHETHER ERSS IS TYPE TESTED	BOOLEAN
(70)	TYPE TEST / CALIBRATION CERTIFICATE SUBMITTED ALONG WITH OFFER	BOOLEAN
(71)	TYPE TEST / CALIBRATION CERTIFICATE NOS. & DATE	TEXT
(72)	SUPPLIER AGREES TO SUPPLY ERSS WITH ALL ACCESSORIES AS PER TECHNICAL SPECIFICATION	BOOLEAN
(73)	SUPPLIER AGREES TO DEPUTE THEIR REPRESENTATIVE TO EDUCATE ENGINEERS OF PURCHASER AS AND WHEN THEY WILL BE CALLED FOR AT NO EXTRA COST	BOOLEAN
(74)	GUARANTEE OF ERSS AS PER CLAUSE NO. 19.00 OF THIS SPECIFICATION	TEXT
(75)	DETAILS OF AFTER SALES SERVICE WITHIN GUARANTEE PERIOD ENCLOSED WITH OFFER	TEXT
(76)	DETAILS OF AFTER SALES SERVICE OUTSIDE GUARANTEE PERIOD ENCLOSED WITH OFFER	TEXT
(77)	ADDRESSES OF SALES SERVICE CENTRE, DETAILS OF ENGINEERS ENCLOSED WITH OFFER	TEXT
(78)	DETAILS OF NECESSARY MINIMUM TESTING FACILITIES FOR CARRYING OUT VARIOUS ACCEPTANCE AND ROUTINE TESTS SUBMITTED ALONG WITH OFFER.	BOOLEAN
(79)	LIST OF MACHINERY / EQUIPMENT AND TESTING FACILITY AVAILABLE AT SUPPLIER'S WORKS IS FURNISHED ALONG WITH OFFER.	BOOLEAN