Volume - I

Tender Notification for

RATE CONTRACT FOR SUPPLY OF 3 PHASE METER WITH BOX & WITHOUT BOX , LTCT METER, HT METER, GRID METER, PRODIGY METER & ABT METER

CMC/BR/25-26/FK/PR/MS/1234

Date : 14.01.2025

Due Date for Submission of Bids : 04.02.2025(15:30 Hrs)

BSES RAJDHANI POWER LTD (BRPL)
BSES Bhawan, Nehru Place, New Delhi-110019
Corporate Identification Number:
U74899DL2001PLC111527
Telephone Number: +91 11 3009 9999
Fax Number: +91 11 2641 9833
Website: www.bsesdelhi.com

BSES
RAJDHANI POWER LIMITED

SECTION - I

REQUEST FOR QUOTATION

Tender Notification : CMC/BR/25-26/FK/PR/MS/1234

RATE CONTRACT FOR SUPPLY OF 3 PHASE METER WITH BOX & WITHOUT BOX , LTCT METER, HT METER, GRID METER, PRODIGY METER & ABT METER

Date : 14.01.2025

BSES
RAJDHANI POWER LIMITED

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SECTION – I: REQUEST FOR QUOTATION

1.00 Event Information

BRPL invites Sealed tenders **RATE CONTRACT FOR SUPPLY OF 3 PHASE METER WITH BOX & WITHOUT BOX , LTCT METER, HT METER, GRID METER, PRODIGY METER & ABT METER**. The bidder must qualify the technical requirements as specified in clause 2.0 stated below.The sealed envelopes shall be duly superscribed as — **"RATE CONTRACT FOR SUPPLY OF 3 PHASE METER WITH BOX & WITHOUT BOX , LTCT METER, HT METER, GRID METER, PRODIGY METER & ABT METER vide TENDER NOTICE CMC/BR/25-26/FK/PR/MS/1234 DUE FOR SUBMISSION ON DT. 04.02.2025", 15:30 HRS.**

Sl. No.	Item Description	Specification	Requirement Total Qty. (Nos)	Estimated Cost
BRPL,DELHI				
1	MTR,PWR,3PH,20-100A	SECTION V	*18000*	*5.84 Cr*
2	LT CT Meter (3P-4W, 240Volts, CL-0.5s)		1000	
3	HT Meter (3P-4W, 63.5V, 5A, CL-0.5s)		*150*	
4	HT Meter (3P-4W, 63.5V, 1A, CL-0.2s)		*10*	
5	HT Meter 63.5V, 3PH, 4.0 0.5s; HVDS		20	
6	DT METER		1000	
7	Grid Meter /1A,3P 4W		500	
8	Grid Meter /5A,3P 4W		300	
9	MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 1 AMP)		10	
10	MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 5 Amp)		10	

Note:

- **Quantity may vary to any extent of +/- 30% of above mentioned total quantity.**
- **The rates quoted shall remain valid for one year from the date of LOI/RC.**

1.02 The schedule of specifications with detail terms & conditions can be obtained from address given below against demand draft/Pay Order of **Rs.1180/-**, drawn in favour of **BSES RAJDHANI POWER LTD,** payable at New Delhi. The sale of tender documents will be issued from 14.01.2025 onwards on all working days upto 04.02.2025. The tender documents can also be downloaded from the website **"www.bsesdelhi.com"**.

In case tender papers are downloaded from the above website, then the bidder has to enclose a demand draft covering the cost of bid documents as stated above in a separate envelope with suitable superscription —"Cost of Bid Documents: Tender **Notice Ref: CMC/BR/25-26/FK/PR/MS/1234 ".**This envelope should accompany the Bid Documents.

1.00 Offers will be received upto **15:30 Hrs. on dt. 14.01.2025**as indicated earlier and will be opened at the address given below dt **04.02.2025at 16:15 Hrs.** in the presence of authorized representatives of the bidders**.**. The schedule of specifications with detail terms & conditions are enclosed. It is the sole responsibility of the bidder to ensure that the bid documents reach this office on or before the due date.

HEAD OF THE DEPARTMENT,
1st FLOOR, 'C' BLOCK,
CONTRACTS & MATERIALS DEPARTMENT,
BSES RAJDHANI POWER LTD,
BSES BHAWAN,
NEHRU PLACE, NEW DELHI-110019.

1.04 BRPL reserves the right to accept/reject any or all Tenders without assigning any reason thereof and alter the quantity of materials mentioned in the Tender documents at the time of placing purchase orders. Tender will be summarily rejected if:

(i). Earnest Money Deposit (EMD) @ 2% (Two percent) of the Tender value i.e **Rs 5,85,000/-** is not deposited in shape of Bank Draft in favour of BSES RAJDHANI POWER LTD, payable at New Delhi or Bank Guarantee executed on favour of BSES RAJDHANI POWER LTD.

(ii). The offer does not contain "FOR, NEW DELHI price indicating break-up towards all taxes & duties"

(iii). Complete Technical details are not enclosed.

(iv). Tender is received after due time due to any reason**.**

1.05 BRPL reserves the right to reject any or all bids or cancel/withdraw the invitation for bids without assigning any reason whatsoever and in such case no bidder/intending bidder shall have any claim arising out of such action.time of placing purchase orders.

2.0 Qualification Criteria:-

The prospective bidder must qualify all of the following requirements to be eligible to participate in the bidding. Bidders who meet following requirements will be considered as successful bidder and management has a right to disqualify those bidders who do not meet these requirements.

1. The bidder must be a meter manufacturer of static meter.
2. The bidder shall either themselves be manufacturers of the equipment offered or accredited representatives of such manufacturers in India or of their Principals abroad with whom they may be having collaboration **Such accreditation should be at least of one year preferably last year as on date of tender.** Authority letter from manufacturer shall be attached along with bid.
3. Relevant documents in support of the above must be furnished along with undertaking of the manufacturers. If these documents are not furnished along with the tenders the offer will be rejected summarily.
4. Bidder should have supplied minimum 1000 meters each type of meters (except 3 phase whole current meters & Grid Meters) in last five years (from the date of technical bid opening) to Electricity Distribution Utility / Undertaking in India with electronic display and communication facility.
5. Bidder should have supplied atleast 50,000 nos. 3 phase whole current meters and minimum 500 nos Grid Meters in last five years(from the date of technical bid opening) to Electricity Distribution Utility / Undertaking in India with electronic display and communication facility.
6. Offered meters should be in successful operation minimum 2 year as on the date of opening of Bid.This should be supported by the copies of purchase orders and performance reports from the SEBs / Power utilities should be enclosed.
7. The bidder must possess valid ISO 9001:2000 certification for meter manufacturing and possess possess valid BIS Licence.
8. Firms who are debarred/blacklisted in other utilities in India will not be considered.
9. The Bidder should have average turnover of Rs.20 Crores in the last three financial years (i.e. 2020-21,2021-22 & 2023-2024) **.** Bidder should submit report on financial standing such as profit and loss statement, balance sheets for the last three years as an supporting documents.
10. Bidder should have complete volume of type test reports as per IS 13779 (Including latest amendments if any) and magnet test as per CBIP-88 from any NABL accredited lab. The type test report should not be older than 5 years as on the date of opening of tender.
11. The manufacturer should have following facility to meet both quality and quantity requirement of supplies :

a) **Computerized test bench**: The manufacturer should have sufficient nos of Computerized test benches. The benches should have electronic supply, Isolated CT/ PT system and data should be directly stored in central server.

b) **Seal tracking system:** The manufacturer has to put both his own seal and BSES seal on the meter. He should have a seal tracking software to ensure tracking of seal and no duplication of seals and meter nos.

c) **Meter Burn In system:** In order to ensure the reliability of components and that there is no drift in meter accuracy with time ; the manufacturer should have burn in facility --- Running meter with load at elevated temperature.

d) **Routine test data:** During lot acceptance,all routine test data should be made available to inspector In fact as per BIS , STI all test data should be offered to inspector for verification.Routine test report should be packed with each meter.

e) **Test benches :** During the lot acceptance , BSES inspector can test up to 5% of offered quantity .The manufacturer should agree to provide all test facility to do so . Further he should allow BSES inspector to check shop floor process.The place of inspection should be clearly marked in tender and same should be well equipped .

f) **Test equipments :** Since the meters has lot of anti theft features , the manufacturer should have test set up too check the working of all anti theft features.Same should be available during lot inspection , otherwise inspector has a wright to withdraw inspection.

g) **PCB assembly facility:-** The PCB facility should have auto- pick n place machine, in- circuit testor, Protection against static charge/ dust etc. and process to ensure no corrosion of solden points/ tracks. Incase service is taken from other vendor than bidder shall arrange inspection of facility. The bidder should be taking the service from the vendor since last two years and so far have procured & one million meter PCB from vendor.

The manufacturer should send the compliance of above mentioned parameters in technical offer and has to give an undertaking about ***No Objection*** to verify his manufacturing facility as a part of tender process. Further in relevance to above clauses vendor should submit details of facilities.

3.00 **Bidding and Award Process**

Bidders are requested to submit their questions regarding the RFQ or the bidding process after review of this RFQ. BSES RAJDHANI POWER LTD response to the questions raised by various bidders will be distributed to all participating bidders through an RFQ Update.

a.Time schedule of the bidding process

The bidders on this RFQ package should complete the following within the dates specified as under:

S. No.	Steps	Activity description	Due date
1	Technical Queries	▪ All Queries related to RFQ	On or before 04.02.2025
2	Technical Offer	• EMD of requisite amount • Non-refundable DD for Rs 1180/- in case tender documents downloaded from website • It include clause by clause commentary, GTP, Type test report from CPRI/NABL accredited independent test LAB (Not more than 5 year old), BIS report, Quality assurance plan, Deviation from the technical specifications,List of Plant and machinery, Testing facilities available at works and drawings, catalogues, manual etc. • Compliance of Qualification criterion (cl 2.0) and	04.02.2025, At 15:30 Hrs

S. No.	Steps	Activity description	Due date
		Documentary evidence in support of qualifying criterion as per format attached in Annexure V. • Acceptance of delivery, commercial terms and conditions. • Deviation from the General Conditions of the contract/commercial terms and condtions. • Original Tender documents duly stamped and signed on each page as token of acceptance	
3	Commercial Officer	• Price for Meter. • Break up regarding basic price and taxes as per format enclosed vide Annexure III A & B • Delivery commitment	04.02.2025, At 15:30 Hrs
4	Samples (3 nos.of each type)	• **Submission of Sample with meter routine report as per bidder offer.** • **Samples will be submitted at BRPL Laboratory Near substation no .15 , sector – 7 , Pushpa Vihar , Saket ,New Delhi – 110017 on or before the due date.** • **Sample of optical cord to be submitted with meter – 2 nos.** • **Optical cord to be demonstrated for mechanical fixing & downloading.**	04.02.2025, At 15:30 Hrs
5	Performance gaurantee quality system report	• As per RFQ	Only for successful bidders.
6	Opening of technical bid	• As per RFQ	04.02.2025, At 16:15 Hrs

This is a two part bid process.Bidders are to submit the bids a) Technical Bid b) Financial Bid. Both these parts should be furnished in separate sealed covers superscribing specification no. validity etc, with particulars as **Part-I Technical Particulars & Commercial Terms & Conditions** and **Part-II "Financial bid"** and these sealed envelopes should again be placed in another sealed cover which shall be submitted before the due date & time specified.

Bidders are requested to submit the bid in one Original plus one copy in duplicate

The Part – I Eligibility and Technical Bid should not contain any cost information whatsoever. In case of Bids where the qualification requirements, technical suitability and other requirements are found to be inadequate, Part-II "Financial Bid' will be returned unopened.
b). Qualified bidders will be intimated after technical evaluation of all the bids is completed.

Part –II Financial Bid: This envelope will be opened after techno commercial evaluation and only of the qualified bidders. The date and time of same shall be intimated in due course to the qualified bidders.
Not withstanding anything stated above, the Purchaser reserves the right to assess biddrs capability to perfom the contrct, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

Part –III : E- Bidding and Reverse Auction through SAP-SRM Module

Purchase reserves the right to use the reverse auction through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are techno-commercial qualified on the basis of tender requirements shall participate in reverse auction.

Not withstanding anything stated above, the Purchaser reserves the right to assess bidders capability to perform the contract, should the circumstances warrant such assessment in the overall interest of the purchaser. In this regard the decision of the purchaser is final.

4.00Award Decision

Purchaser intends to award the business on a lowest bid basis, so suppliers are encouraged to bid competitively. The decision to place purchase order / letter of acceptance solely depends on purchaser on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that Purchaser may deem relevant.

The purchaser reserves all the rights to award the contract to one or more bidders so as to meet the delivery requirement or nullify the award decision without any reason.

BSES reserves the right to split the tender quantity amongst techno commercially qualified bidders on account of delivery requirement in tender,quantity under procurement etc.

Spilitting of tender quantity amongst more than one bidder shall be governed by below mentioned guidelines:

- If the quantity is to be split among 2 bidders, it will be done in the ratio of **70:30 on L1 price**.
- If the quantity is to be split among 3 bidders, it will be done in the ratio of **60:25:15 on L1 price**.
- In case quantity needs to be distributed and order splitting is required,distribution of quantity shall be maximum among three(3) bidders.

In the event of your bid being selected by purchaser (and / or its affiliates) and your subsequent DEFAULT on your bid; you will be required to pay purchaser (and / or its affiliates) an amount equal to the difference in your bid and the next lowest bid on the quantity declared in RFQ.

In case any supplier is found unsatisfactory during the delivery process, the award will be cancelled and BRPL reserves the right to award other suppliers who are found fit.

Qty Variation : The purchaser reserves the rights to vary the quantity by +/- 30% of the tender quantity.

Repeat Order : BRPL reserves the right to place repeat order at the same rates & terms and conditions as per this tender against additional requirement subject to mutual agreement between BRPL & supplier.

5.00 Market Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the Terms & Conditions. Bidders must agree to these rules prior to participating.In addition to other remedies available, we reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the Terms & Condition. Bidders who violate the marketplace rules or engage in behavior that disrupts the fair execution of the marketplace restricts a bidder to length of time, depending upon the seriousness of the violation. Examples of violations include, but are not limited to:

- Failure to honor prices submitted to the marketplace.
- Breach of the terms of the published in Request For Quotation.

6.00 Supplier Confidentiality

All information contained in this RFQ is confidential and may not be disclosed, published or advertised in any manner without written authorization from BSES RAJDHANI POWER LTD. This includes all bidding information submitted .All RFQ documents remain the property of BSES RAJDHANI POWER LTD and all suppliers are required to return these documents to BSES RAJDHANI POWER LTD upon request.

Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

7.0 Contact Information

All communication as regards this RFQ shall be made (i) in English, (ii) in writing and (iii) sent by mail, facsimile to

	Technical	Commercial
Contact Name	Mr. Manish Jain Copy to Mr. Gopal Nariya	Ms. Mohini Sharma Copy to Mr. Pankaj Goyal
Address	2nd Floor , E-Block, BSES Bhawan Nehru Place , New Delhi -111019	1st Floor , D-Block, BSES Bhawan Nehru Place , New Delhi -111019
Email Id	Manish.Jain@relianceada.com gopal.nariya@relianceada.com	Mohini.Sharma@relianceada.com Pankaj.goyal@relianceada.com

Note: Those who are downloading tender notice from website. It is advisable to inform BRPL technical Deptt, so as they can be contacted in case of any amendment in tender.

SECTION – II

INSTRUCTION TO BIDDERS (ITB)

RATE CONTRACT FOR SUPPLY OF 3 PHASE METER WITH BOX & WITHOUT BOX , LTCT METER, HT METER, GRID METER, PRODIGY METER & ABT METER

CMC/BR/25-26/FK/PR/MS/1234

Date : 14.01.2025

Due Date for Submission of Bids : 04.02.2025

A. GENERAL

1.0 BSES RAJDHANI POWER LTD, hereinafter referred to as the Purchaser"are desirous of implementing the various Systems Improvement/Repair & Maintenance works at their respective licensed area in Delhi The Purchaser has now floated this tender for procurement of different types of Meter's as notified earlier in this bid Document.

2.0 SCOPE OF WORK

The scope shall include Design, Manufacture,Testing at works conforming to the Technical Specifications enclosed along with Packing, Forwarding, Freight and Unloading and proper stacking at Purchaser's stores.

3.0 DISCLAIMER

3.01 This Document includes statements, which reflect various assumptions, which may or may not be correct. Each Bidder/Bidding Consortium should conduct its own estimation and analysis and should check the accuracy,reliability and completeness of the information in this Document and obtain independent advice from appropriate sources in their own interest.

3.02 Neither Purchaser nor its employees will have any liability whatsoever to any Bidder or any other person under the law or contract, the principles of restitution or unjust enrichment or otherwise for any loss, expense or damage whatsoever which may arise from or be incurred or suffered in connection with anything contained in this Document,any matter deemed to form part of this Document, provision of Services and any other information supplied by or on behalf of Purchaser or its employees, or otherwise a rising in anyway from the selection process for the Supply.

3.03 Though adequate care has been taken while issuing the Bid document,the Bidder should satisfy itself that Documents are complete in all respects. Intimation of any discrepancy shall be given to this office immediately.

3.04 This Document and the information contained herein are Strictly Confidential and are for the use of only the person(s) to whom it is issued. It may not be copied or distributed by the recipient to third parties (other than in confidence to the recipient's professional advisors).

4 COST OF BIDDING

The Bidder shall bear all cost associated with the preparation and submission of its Bid and Purchaser will in no case be responsible or liable for those costs. **Further the Purchaser has a right to get Sample Meter's tested by any reputed independent lab like CPRI/ERDA/NABL (approved by BRPL) at the cost of bidder.**

B. **BIDDING DOCUMENTS**

5.0 **BIDDING DOCUMENTS**

5.01 The Scope of Work, Bidding Procedures and Contract Terms are described in the Bidding Documents. In addition to the covering letter accompanying Bidding Documents, the Bidding Documents include:

Volume -I

(a) Request for Quotation (RFQ) - Section - I
(b) Instructions to Bidders (ITB) - Section – II
(c) General Conditions of Contract - Section -III
(d) Quantity and delivery requirement - Section –IV
(e) Technical Specifications (TS) - Section –V

Volume - II

(a) Acceptance form for Reverse Auction - Annexure –A
(b) Bid Form - Annexure –I
(c) Bid Format - Annexure -II
(d) Price Schedule - Annexure –III
(e) Commercial Terms & Conditions - Annexure -IV
(f) No Deviation Sheet - Annexure –V
(g) Qualification Criterion - Annexure –VI

5.02 The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms,Term and Specifications. Failure to furnish all information required by the Bidding documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.

6.00 **AMENDMENT OF BIDDING DOCUMENTS**

6.01 At any time prior to the deadline for submission of Bids,the Purchaser may for any reasons,whether at its own initiative or in response to a clarification requested by a prospective Bidder, modify the Bidding Documents by Amendment.

6.02 The Amendment shall be part of the Bidding Documents,pursuant to Clause 5.01,and it will be notified in writing by Fax/e-mail to all the Bidders who have received the Bidding Documents and confirmed their participation to Bid,and will be binding on them .

6.03 In order to afford prospective Bidders reasonable time in which to take the Amendment into account in preparing their Bids, the Purchaser may, at its discretion, extend the deadline for the submission of Bids.

C. **PREPARATION OF BIDS**

7.0 **LANGUAGE OF BID**

The Bid prepared by the Bidder,and all correspondence and documents relating to the Bid exchanged by the Bidder and the Purchaser,shall be written in the English Language.Any printed literature furnished by the Bidder may be written in another Language,provided that this literature is accompanied by an English translation, in which case,for purposes of interpretation of the Bid,the English translation shall govern.

8.0 **DOCUMENTS COMPRISING THE BID**

The Bid prepared and submitted by the Bidder shall comprise the following components:

(a) Bid Form ,Price & other Schedules (STRICTLY AS PER FORMAT)and Technical Data Sheets completed in accordance with Clause 9.0, 10.0, 11.0 and Technical Specification ;

(b) All the Bids must be accompanied with the required EMD as mentioned in the Section-I against each tender.

(c) Power of attorney indicating that the person signing the bid have the authority to sign the Bid and thus the Bid is binding upon the Bidder during the full period of its validity, in accordance with clause 12.0.

9.0 **BID FORM**

9.01 The Bidder shall complete an ”Original‘ and another one ”Copy‘of the Bid Form and the appropriate Price & Other Schedules and Technical Data Sheets.

9.02 **EMD**

Pursuant to Clause 8.0(b) above,the bidder shall furnish,as part of its bid, a EMD amounting to 2% of the total bid value(FOR Destination) i.e **Rs 5,85,000/**. The EMD is required to protect the Purchaser against the risk of Bidder's conduct which would warrant the security's forfeiture.

The EMD shall be denominated in the currency of the bid,and shall be in the following form **:**

(a) A bank guarantee issued by any scheduled bank strictly as per the form at enclosed and shall be valid for a period of thirty (30)days beyond the validity of the bid

(b) Bank Draft in favour of BSES RAJDHANI POWER LTD,payable at Delhi.

Unsuccessful bidders' EMD will be discharged or returned as promptly as possible but not later than thirty (30) days after the expiration of the period of bid validity.

The successful bidder's EMD will be discharged upon furnishing the performance security.The EMD may be forfeited :

(a) If the Bidder:

(i) withdraws its bid during the period of bid validity specified by the Bidder in the Bid Form ; or

(b) In the case of a successful Bidder, if the Bidder fails:

(i) to sign the Contract,or

(ii) to furnish the required performance security.

10.0 **BID PRICES**

10.01 Bidders shall quote for the entire Scope of Supply with a break-up of prices for individual items.The total Bid Price shall also cover all the Supplier's obligations mentioned in or reasonably to be inferred from the Bidding Documents in respect of Design, Supply,Transportation to site,all in accordance with the requirement of Bidding Documents The Bidder shall complete the appropriate Price Schedules included herein , stating the Unit Price for each item & total Price.

10.02 The prices offered shall be inclusive of all costs as well as Duties,Taxes and Levies paid or payable during execution of the supply work , breakup of price constituents, should be there.

Prices quoted by the Bidder shall be—Firm "and not subject to any price adjustment during the performance of the Contract. A Bid submitted with an adjustable price quotation will be treated as non -responsive and rejected.

11.0 **BID CURRENCIES**

Prices shall be quoted **in Indian Rupees (RS) Only.**

12.0 **PERIOD OF VALIDITY OF BIDS**

12.01 Bids shall remain valid for **120 days** post bid date.

12.02 Notwithstanding Clause12.01 above,the Purchaser may solicit the Bidder's consent to an extension of the Period of Bid Validity.The request and the responses thereto shall be made in writing by Fax/e-mail.

13.0 **ALERNATIVE BIDS**

Bidders shall submit Bids, which comply with the Bidding Documents. Alternative Bids will not be considered. The attention of Bidders is drawn to the provisions of Clause 22.03 & 22.04 regarding

the rejection of Bids, which are not substantially responsive to the requirements of the Bidding Documents.

14.0 **FORMAT AND SIGNING OF BID**

14.01 The original Bid Form and accompanying documents(as specified in Clause9.0),clearly marked "Original Bid",plus one duplicate copy must be received by the Purchaser at the date, time and place specified pursuant to Clauses15.0 and 16.0. In the event of any discrepancy between the original and the copies,the original shall govern.

14.02 The original and copy of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. Such authorization shall be indicated by written Power-of-Attorney accompanying the Bid.

14.03 The Bid shall contain no interlineations, erasures or overwriting except as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

D. SUBMISSION OF BIDS

15.0 **SEALING AND MARKING OF BIDS**

15.01 Bid submission: One original & one duplicate Copy (hard copies) of all the Bid Documents shall be sealed and submitted to the Purchaser before the closing time for submission of the bid.

15.02 The Technical Documents and the EMD shall be enclosed in a sealed envelope and the said envelope shall be superscribed with —**Technical & EMD**". The Financial bid shall be inside another sealed envelope with superscription — **Financial Bid** ".Both these envelopes shall be sealed inside another big envelope.All the envelopes should bear the Name and Address of the Bidder and marking for the Original and Copy.The envelopes should be superscribed with —**"Tender Notice No, Due date of submission, Tender opening date**.

15.03 The Bidder has the option of sending the Bids in person.Bids submitted by Telex/Telegram /Fax will not be accepted.No request from any Bidder to the Purchaser to collect the proposals from Airlines/Cargo Agents etc shall be entertained by the Purchaser.

15.04 **The Bidder, along with the bid documents has to submit two samples along with detailed GTP & Drawings. The sample should clearly indicate (i) Name of the bidder (ii)TenderNo.,(iii) Group & Item Sr.N o.etc. Samples will be submitted at BRPL Laboratory Near substation no .15 , sector – 7 , Pushpa Vihar , Saket ,New Delhi – 110017 on or before the due date of tender submission. The samples shall not be returned back to the bidder.**

16.0 **DEADLINE FOR SUBMISSION OF BIDS**

16.01 The original Bid,together with the required copies, must be received by the Purchaser at the address specified at **15:30 Hrs on 04.02.2025**

16.02 The Purchaser may,at its discretion,extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with Clause9.0,in which case all rights and obligations of the Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

17.0 **ONE BID PER BIDDER**

Each Bidder shall submit only one Bid either by itself, or as a partner in a Joint Venture. A Bidder who submits or participates in more than one Bid will cause all those Bids to be rejected.

18.0 **LATE BIDS**

Any Bid received by the Purchaser after the deadline for submission of Bids prescribed by the Purchaser,pursuant to Clause 16.0, will be declared "Late" and rejected and returned unopened to the Bidder.

19.0 **MODIFICATIONS AND WITHDRAWAL OF BIDS**

19.01 The Bidder is not allowed to modify or withdraw its Bid after the Bid's submission.

E. EVALUATION OF BID

20.0 **PROCESS TO BE CONFIDENTIAL**

Information relating to the examination,clarification,evaluation and comparison of Bids and recommendations for the award of a contract shall not be disclosed to Bidders or any other persons not officially concerned with such process. Any effort by a Bidder to influence the Purchaser's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

21.0 **CLARIFICATION OF BIDS**

To assist in the examination,evaluation and comparison of Bids,the Purchaser may,at its discretion,ask the bidder for a clarification of its Bid.All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought,offered or permitted.

22.0 **PRELIMINARY EXAMINATION OF BIDS / RESPONSIVENESS**

22.01 Purchaser will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order.

22.02 Arithmetical errors will be rectified on the following basis. If there is a discrepancy between the unit price and the total price per item that is obtained by multiplying the unit price and quantity,the unit price shall prevail and the total price per item will be corrected.If there is a discrepancy between theTotal Amount and the sum of the total price per item , the sum of the total price per item shall prevail and the Total Amount will be corrected.

22.03 Prior to the detailed evaluation, Purchaser will determine the substantial responsiveness of each Bid to the Bidding Documents including production capability and acceptable quality of the Goods offered. A substantially responsive Bid is one, which conforms to all the terms and conditions of the Bidding Documents without material deviation.

22.04 Bid determined as not substantially responsive will be rejected by the Purchaser and/or the Purchaser and may not subsequently be made responsive by the Bidder by correction of the non - conformity.

23.0 **EVALUATION AND COMPARISON OF BIDS**

23.01 The evaluation of Bids shall be done based on the delivered cost competitiveness basis.

23.02 The evaluation of the Bids shall be a stage-wise procedure. The following stages are identified for evaluation purposes: In the first stage, the Bids would be subjected to a responsiveness check.TheTechnical Proposals and the Conditional ties of the Bidders would be evaluated.

Subsequently, the Financial Proposals along with Supplementary Financial Proposals, if any, of Bidders with Techno-commercially Acceptable Bids shall be considered for final evaluation .

23.03 The Purchaser's evaluation of a Bid will take into account,in addition to the Bid price,the following factors, in the manner and to the extent indicated in this Clause:

(a) Supply Schedule

(b) Deviations from Bidding Documents

Bidders shall base their Bid price on the terms and conditions specified in the Bidding Documents. The cost of all quantifiable deviations and omissions from the specification , terms and conditions specified in Bidding Documents shall be evaluated.The Purchaser will make its own assessment of the cost of any deviation for the purpose of ensuring fair comparison of Bids.

23.04 Any adjustments in price,which result from the above procedures,shall be added for the purposes of comparative evaluation only to arrive at an "Evaluated Bid Price".Bid Prices quoted by Bidders shall remain unaltered.

F. AWARD OF CONTRACT

24.0 **CONTACTING THE PURCHASER**

24.01 From the time of Bid submission to the time of contract award, if any Bidder wishes to contact the Purchaser on any matter related to the Bid, it should do so in writing.

24.02 Any effort by a Bidder to influence the Purchaser and/or in the Purchaser‘s decisions in respect of Bid evaluation, Bid comparison or Contract Award, will result in the rejection of the Bidder‘s Bid.

25.0 **THE PURCHASER ’S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS**

The Purchaser reserves the right to accept or reject any Bid and to annul the Bidding process and reject all Bids at anytime prior toaward of Contract,without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the grounds for the Purchaser‘s action.

26.0 **AWARD OF CONTRACT**

The Purchaser will award the Contract to the successful Bidder whose Bid has been Determined to be the lowest-evaluated responsive Bid, provided further that the Bidder has been determined to be qualified to satisfactorily perform the Contract. Purchaser reserves the right to award order other bidders in the tender, provided it is required for progress of project & provided he agrees to come to the lowest rate.

27.0 **THE PURCHASER ’S RIGHT TO VARY QUANTITIES**

The Purchaser reserves the right to vary the quantity i.e.increase or decrease the numbers/quantities without any change in tems and conditions during the execution of the Order.

28.0 **LETTER OF INTENT/ NOTIFICATION OF AWARD**

The letter of intent/ Notification of Award shall be issued to the successful Bidder whose bids have been considered responsive, techno-commercially acceptable and evaluated to be the lowest (L1). The successful B idder shall be required to furnish a letter of acceptance with in 7 days of issue of the letter of intent /Notification of Award by Purchaser.

29.0 **PERFORMANCE BANK GUARANTEE**

The successful Bidder shall furnish the Performance Bank Guarantee for an amount of **10%** (Ten percent) of the Contract Price in accordance with the format provided. The Performance Bond shall be valid for a period of Sixty months **(60)** from the date of the commissioning or Sixty six months **(66)** from the last date of receipt of material (last consignment) at site/stores which ever is earlier plus 3 months towards claim period. Upon submission of the performance security, the EMD shall be released.

30.0 **CORRUPT OR FRADULENT PRACTICES**

30.01 The Purchaser requires that the Bidders observe the highest standard of ethics during the procurement and execution of the Project. In pursuance of this policy, the Purchaser:

(a) Defines, for the purposes of this provision , the terms set forth below as follows:

(i) "Corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them ,or induce others to do so,by misusing the position in which they are placed, and it includes the offering, giving, receiving, orsoliciting of anything of value to influence the action of any such official in the procurement process or in contract execution;and

(ii) "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or
the execution of a contract to the detriment of the Purchaser, and includes collusive practice among Bidders(prior to or after Bid submission) designed to establish Bid prices at artificial non -competitive levels and to deprive the Purchaser of the benefits of free and open competition .

(b) Will reject a proposal foraward if it determines that the Bidder recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question ;

(c) Will declare a firm ineligible, either indefinitely or for a stated period of time, to be awarded a contract if it at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for,or in executing, a contract.

30.02 Furthermore, Bidders shall be aware of the provision stated in the General Conditions of Contract.

SECTION- III

GENERAL CONDITIONS OF CONTRACT (GCC)

RATE CONTRACT FOR SUPPLY OF 3 PHASE METER WITH BOX & WITHOUT BOX , LTCT METER, HT METER, GRID METER, PRODIGY METER & ABT METER

CMC/BR/25-26/FK/PR/MS/1234

Date : 14.01.2025

GENERAL TERMS AND CONDITION

1.0 General Instructions

1.01 All the Bids shall be prepared and submitted in accordance with these instructions.

1.02 Bidder shall bear all costs associated with the preparation and delivery of its Bid, and the Purchaser will in no case shall be responsible or liable for these costs.

1.03 The Bid should be submitted by the Bidder in whose name the bid document has been issued and under no circumstances it shall be transferred/sold to the other party.

1.04 The Purchaser reserves the right to request for any additional information and also reserves the right to reject the proposal of any Bidder, if in the opinion of the Purchaser, the data in support of RFQ requirement is incomplete.

1.05 The Bidder is expected to examine all instructions, forms, terms & conditions and specifications in the Bid Documents. Failure to furnish all information required in the Bid Documents or submission of a Bid not substantially responsive to the Bid Documents in every respect may result in rejection of the Bid. However, the Purchaser's decision in regard to the responsiveness and rejection of bids shall be final and binding without any obligation, financial or otherwise, on the Purchaser.

2.0 Definition Of Terms

2.01 "Purchaser" shall mean BSES RAJDHANI POWER LTD Limited, on whose behalf this bid enquiry is issued by its authorized representative / officers.

2.02 "Bidder" shall mean the firm who quotes against this bid enquiry issued by the Purchaser. "Supplier" or "Supplier" shall mean the successful Bidder and/or Bidders whose bid has been accepted by the Purchaser and on whom the "Letter of Acceptance" is placed by the Purchaser and shall include his heirs, legal representatives, successors and permitted assigns wherever the context so admits.

2.03 "Supply" and " shall mean the Scope of Contract as described.

2.04 "Specification" shall mean collectively all the terms and stipulations contained in those portions of this bid document known as RFQ, Commercial Terms & Condition, Instructions to Bidders, Technical Specifications and the Amendments, Revisions, Deletions or Additions, as may be made by the Purchaser from time to time.

2.05 "Letter of Acceptance" shall mean the official notice issued by the Purchaser notifying the Supplier that his proposal has been accepted and it shall include amendments thereto, if any, issued by the Purchaser. The "Letter of Acceptance" issued by the Purchaser shall be binding on the "Supplier" The date of Letter of Acceptance shall be taken as the effective date of the commencement of contract.

2.06 "Month" shall mean the calendar month and "Day" shall mean the calendar day.

2.07 "Codes and Standards" shall mean all the applicable codes and standards as indicated in the Specification.

2.08 "Offer Sheet" shall mean Bidder's firm offer submitted to BSES RAJDHANI POWER LTD in accordance with the specification.

2.09 "Contract" shall mean the "Letter of Acceptance" issued by the Purchaser.

2.10 "Contract Price" shall mean the price referred to in the "Letter of Acceptance".

2.11 "Contract Period" shall mean the period during which the "Contract" shall be executed as agreed between the Supplier and the Purchaser in the Contract inclusive of extended contract period for reason beyond the control of the Supplier and/or Purchaser due to force majeure.

2.12 "Acceptance" shall mean and deemed to include one or more of the following as will be stipulated in the specification:

a) The written acceptance of material by the inspector at suppliers works to ship the materials.
b) Acceptance of material at Purchaser site stores after its receipt and due inspection/ testing and release of material acceptance voucher.
c) Where the scope of the contract includes supplyg, acceptance shall mean issue of necessary equipment / material takeover receipt after installation & commissioning and final acceptance.

3.0 Contract Documents & Priority

3.01 Contract Documents: The terms and conditions of the contract shall consist solely of these RFQ conditions and the offer sheet.

3.02 Priority: Should there be any discrepancy between any term hereof and any term of the Offer Sheet, the terms of these RFQ shall prevail.

4.0 Scope Of Supply -General

4.01 The "Scope of Supply" shall be on the basis of Bidder's responsibility, completely covering the obligations, responsibility and supplies provided in this Bid enquiry whether implicit or explicit.

4.02 Bidder shall have to quote for the Bill of quantities as listed in Section – IV of this RFQ.

4.03 Quantity variation and additional requirement if any shall be communicated to successful bidder during project execution.

4.04 All relevant drawings, data and instruction manuals.

5.0 Quality Assurance and Inspection

5.01 Immediately on award of contract, the bidder shall prepare detailed quality assurance plan / test procedure identifying the various stages of manufacture, quality checks performed at each stage, raw material inspection and the Customer hold points. The document shall also furnish details of method of checking, inspection and acceptance standards / values and get the approval of Purchaser before proceeding with manufacturing. However, Purchaser shall have right to review the inspection reports, quality checks and results of suppliers in house inspection department which are not Customer hold points and the supplier shall comply with the remarks made by purchaser or his representative on such reviews with regards to further testing, rectification or rejection, etc.

5.02 Witness and Hold points are critical steps in manufacturing, inspection and testing where the supplier is obliged to notify the Purchaser in advance so that it may be witnessed by the Purchaser. Final inspection is a mandatory hold point. The supplier to proceed with the work past a hold point only after clearance by purchaser or a witness waiver letter from **BSES RAJDHANI POWER LTD.**

5.03 The performance of waiver of QA activity by Purchaser at any stage of manufacturing does not relieve the supplier of any obligation to perform in accordance with and meet all the requirements of the procurement documents and also all the codes & reference documents

mentioned in the procurement document nor shall it preclude subsequent rejection by the purchaser.

5.04 On completion of manufacturing the items can be dispatched only after issue of shipping release by the Purchaser.

5.05 All testing and inspection shall be done with out any extra cost.

5.06 Purchaser reserve the right to send any material out of the supply to any recognized laboratory for testing and the cost of testing shall be borne by the Purchaser. In case the material is found not in order with the technical requirement / specification, the charges along with any other penalty which may be levied is to be borne by the bidder. To avoid any complaint the supplier is advised to send his representative to the stores to see that the material sent for testing is being sealed in the presence of bidders representative.

5.07 Bidder has to sign quality agreement before supply of the material.

6.0 Packing, Packing List & Marking

6.01 **Packing:** Supplier shall pack or shall cause to be packed all Commodities in boxes and containers and otherwise in such a manner as shall be reasonably suitable for shipment by road or rail to BSES RAJDHANI POWER LTD without undue risk of damage in transit.

6.02 **Packing List:** The contents of each package shall be itemized on a detailed list showing the exact weight and the extreme outside dimensions (length, width and eight) of each container or box. One copy of the packing list shall be enclosed in each package delivered. There shall also be enclosed in one package a master packing list identifying each individual package, which is part of the shipment. On any packaging where it is not feasible to place the packing list inside the container, all pertinent information shall be stenciled on the outside and will thus constitute a packing list.

7.01 Prices basis for supply of materials

Bidder to quote their prices on Landed Cost Basis .

For Supply to BSES RAJDHANI POWER LTD Delhi the price shall be inclusive of packing, forwarding, Freight & Godds and Service Tax (GST).

The above supply prices shall also **include unloading** at site stores.
Transit and storage insurance will be arranged by BSES RAJDHANI POWER LTD, however bidder to furnish required details in advance for arranging the same by BSES RAJDHANI POWER LTD.

8.0 Variation in taxes, duties & levies:

8.01 The total order value shall be adjusted on account of any variations in Statutory Levies imposed by Competent Authorities by way of fresh notification(s) within the stipulated delivery period only. However, incase of reduction in taxes, duties and levies, the benefits of the same shall be passed on to BUYER.

8.02 No other Taxes, Duties & Levies other than those specified above will be payable by BUYER except in case of new Levies, Taxes & Duties imposed by the Competent Authorities by way of fresh notification(s) subsequent to the issue of PURCHASE ORDER but within the stipulated delivery period.

8.03 Notwithstanding what is stated above, changes in Taxes, Duties & Levies shall apply only to that portion of PURCHASE ORDER not executed on the date of notification by Competent Authority.

Further, changes in taxes, Duties & Levies after due date of Delivery shall not affect PURCHASE ORDER Terms and value.

8.04 PURCHASE ORDER value shall not be subject to any variation on account of variation in Exchange rate(s).

9.0 Taxes & Duties on raw materials & bought out components:

9.01 Taxes & Duties on raw materials & bought out components are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

9.02 Taxes & Duties on raw materials & bought out components procured indigenously are included in Order Value and are not subject to any escalation or variation for any reason whatsoever.

10.0 Terms of payment and billing

10.01 For Supply of Equipments:

- 100% payment shall be made within 45 days from the date of receipt of material at store/ site against submission of 10 % performance bank guarantee. (Refer 12.01)

10.02 Bidder to submit the following documents against dispatch of each consignment:

i. Consignee copy of LR
ii. Supplier detailed invoice showing commodity description , quantity, unit price, total price and basis of delivery.
iii. Original certificate issued by BSES RAJDHANI POWER LTD confirming receipt of material at site and acceptance of the same.
iv. Dispatch clearance / inspection report in original issued by the inspection authority
v. Packing List.
vi. Test Reports
vii. Guarantee Certificate.

11.0 Price Validity

11.01 All bids submitted shall remain valid, firm and subject to unconditional acceptance by BSES RAJDHANI POWER LTD Delhi for 120 days post bid-date. For awarded suppliers, the prices shall remain valid and firm till contract completion.

12.0 Performance Guarantee

12.01 Supplier shall establish a performance bond in favor of BSES RAJDHANI POWER LTD in an amount not less than Ten percent (10%) of the total price of the Contract (the "Performance Bond"). The Performance Bond shall be valid for a period of Sixty months (60) from the date of the commissioning or Sixty six months (66) from the last date of receipt of material (last consignment) at site/stores which ever is earlier plus 3 months towards claim period. It shall be in accordance with one of the following terms:

(a) Depositing pay order /demand draft of the relevant amount directly with BSES RAJDHANI POWER LTD at the address listed above or as otherwise specified by BSES RAJDHANI POWER LTD, either of which shall constitute the Performance Bond hereunder; or

(b) Bank guarantee from any nationalized bank in favour of BSES RAJDHANI POWER LTD. The performance Bank guarantee shall be in the format as specified by BSES RAJDHANI POWER LTD.

13.0 Forfeiture

13.01 Each Performance Bond established under Clause 10.0 shall contain a statement that it shall be automatically and unconditionally forfeited without recourse and payable against the presentation by BSES RAJDHANI POWER LTD of this Performance Bond to the ICICI Bank at Mumbai, or to the relevant company/ correspondent bank referred to above, as the case may be, together with a

simple statement that supplier has failed to comply with any term or condition set forth in the Contract.

13.02 Each Performance Bond established under will be automatically and unconditionally forfeited without recourse if BSES RAJDHANI POWER LTD in its sole discretion determines that supplier has failed to comply with any term or condition set forth in the contract.

14.0 Release

All Performance Bonds will be released without interest within seven (7) days from the last date up to which the Performance Bond has to be kept valid (as defined in Clause 10.0) except for the case set forth in Clause 21.0.

15.0 Guarantee Period

15.01 The bidder to Guarantee the Meter with Box supplied against any defect of failure, which arise due to faulty materials, workmanship or design for the entire defects liability period. The Defect liability period shall be 60 months from the date of commissioning or 66 months from the last date of delivery whichever is earlier. If during the Guarantee period any materials / items are found to be defective, these shall be replaced with New Meter with Box free of cost by the bidder at his own cost within 30 days from the date of receipt of intimation.The analysis of defective meter within Guarantee period shall be provided by meter OEM's to BRPL. OEM shall ensure to establish a system where he will visit BRPL premises, in every 15 days or on accumulation of 250 defective meter (whichever comes first) and provide the detailed analysis report of faulty meters .

16.0 Return, Replacement or Substitution.

BSES RAJDHANI POWER LTD shall give Supplier notice of any defective Commodity promptly after becoming aware thereof. BSES RAJDHANI POWER LTD may in its discretion elect to return defective Commodities to Supplier for replacement, free of charge to BSES RAJDHANI POWER LTD, or may reject such Commodities and purchase the same or similar Commodities from any third party. In the latter case BSES RAJDHANI POWER LTD shall furnish proof to Supplier of the cost of such substitute purchase. In either case, all costs of any replacement, substitution, shipping, labour and other related expenses incurred in connection with the return and replacement or for the substitute purchase of a Commodity hereunder should be for the account of Supplier. BSES RAJDHANI POWER LTD may set off such costs against any amounts payable by BSES RAJDHANI POWER LTD to Supplier. Supplier shall reimburse BSES RAJDHANI POWER LTD for the amount, if any, by which the price of a substitute Commodity exceeds the price for such Commodity as quoted in the Bid.

17.0 Effective Date of Commencement of Contract:

17.01 The date of the issue of the Letter of Acceptance shall be treated as the effective date of the commencement of Contract.

18.0 Time – The Essence Of Contract

18.01 The time and the date of completion of the "Supply"" as stipulated in the Letter Of Acceptance / Purchase order issued to the Supplier shall be deemed to be the essence of the "Contract". The Supply has to be completed not later than the aforesaid Schedule and date of completion of supply .

19.0 The Laws and Jurisdiction of Contract:

19.01 The laws applicable to this Contract shall be the Laws in force in India.

19.02 All disputes arising in connection with the present Contract shall be settled amicably by mutual consultation failing which shall be finally settled as per the rules of Arbitration and Conciliation Act, 1996 at the discretion of Purchaser. The venue of arbitration shall be at Mumbai in India

20.0 Events of Default

20.01 Events of Default. Each of the following events or occurrences shall constitute an event of default ("Event of Default") under the Contract:

(a) Supplier fails or refuses to pay any amounts due under the Contract;

(b) Supplier fails or refuses to deliver Commodities conforming to this RFQ/ specifications, or fails to deliver Commodities within the period specified in P.O. or any extension thereof

(c) Supplier becomes insolvent or unable to pay its debts when due, or commits any act of bankruptcy, such as filing any petition in any bankruptcy, winding-up or reorganization proceeding, or acknowledges in writing its insolvency or inability to pay its debts; or the Supplier's creditors file any petition relating to bankruptcy of Supplier;

(d) Supplier otherwise fails or refuses to perform or observe any term or condition of the Contract and such failure is not remediable or, if remediable, continues for a period of 30 days after receipt by the Supplier of notice of such failure from BSES RAJDHANI POWER LTD

21.0 Consequences of Default.

(a) If an Event of Default shall occur and be continuing, BSES RAJDHANI POWER LTD may forthwith terminate the Contract by written notice.

(b) In the event of an Event of Default, BSES RAJDHANI POWER LTD may, without prejudice to any other right granted to it by law, or the Contract, take any or all of the following actions;

(i) present for payment to the relevant bank the Performance Bond;

(ii) purchase the same or similar Commodities from any third party; and/or recover any losses and/or additional expenses BSES RAJDHANI POWER LTD may incur as a result of Supplier's default.

22.0 Penalty for Delay

22.01 If supply of items / equipments is delayed beyond the supply schedule as stipulated in purchase order then the Supplier shall be liable to pay to the Purchaser as penalty for delay, a sum of 1% (one percent) of the contract price (Ex-works price) for every week delay or part thereof for individual mile stone deliveries.

22.02 The total amount of penalty for delay under the contract will be subject to a maximum of ten percent (10%) of the contract price(Ex-Works)

22.03 The Purchaser may, without prejudice to any method of recovery, deduct the amount for such damages from any amount due or which may become due to the Supplier or from the Performance Bond or file a claim against the supplier.

23.0 Force Majeure

23.01 General
An "Event of Force Majeure" shall mean any event or circumstance not within the reasonable control directly or indirectly, of the Party affected, but only if and to the extent that:

(i) Such event or circumstance materially and adversely affects the ability of the affected Party to perform its obligations under this Contract, and the affected Party has taken all reasonable precautions,due care and reasonable alternative measures in order to prevent or avoid the effect of such event on the affected party's ability to perform its obligations under this Contract and to mitigate the consequences thereof.

(ii) For the avoidance of doubt, if such event or circumstance would not have materially and adversely affected the performance of the affected party had such affected party followed good industry practice, such event or circumstance shall not constitute force majeure.

(iii) Such event is not the direct or indirect result of the failure of such Party to perform any of its obligations under this Contract.

(iv) Such Party has given the other Party prompt notice describing such events, the effect thereof and the actions being taken in order to comply with above clause.

23.02 Specific Events of Force Majeure subject to the provisions of above clause, Events of Force Majeure shall include only the following to the extent that they or their consequences satisfy the above requirements :

(i) The following events and circumstances :

a) Effect of any natural element or other acts of God, including but not limited to storm, flood, earthquake, lightning, cyclone, landslides or other natural disasters.

b) Explosions or fires

(ii) War declared by the Government of India, provided that the ports at Mumbai are declared as a war zone.

(iii) Dangers of navigation, perils of the sea.

23.03 Notice of Events of Force Majeure If a force majeure event prevents a party from performing any obligations under the Contract in part or in full, that party shall:

i) Immediately notify the other party in writing of the force majeure events within 7(seven) working days of the occurrence of the force majeure event

ii) Be entitled to suspend performance of the obligation under the Contract which is affected by force majeure event for the duration of the force majeure event.

iii) Use all reasonable efforts to resume full performance of the obligation as soon as practicable

iv) Keep the other party informed of all such efforts to resume full performance of the obligation on a regular basis.

v) Provide prompt notice of the resumption of full performance or obligation to the other party.

23.04 Mitigation of Events of Force Majeure Each Party shall:

(i) Make all reasonable efforts to prevent and reduce to a minimum and mitigate the effect of any delay occasioned by an Event of Force Majeure including recourse to alternate methods of satisfying its obligations under the Contract;
(ii) Use its best efforts to ensure resumption of normal performance after the termination of any Event of Force Majeure and shall perform its obligations to the maximum extent practicable as agreed between the Parties; and
(iii) Keep the other Party informed at regular intervals of the circumstances concerning the event of Force Majeure, with best estimates as to its likely continuation and what measures or contingency planning it is taking to mitigate and or terminate the Event of Force Majeure.

23.05 Burden of Proof In the event that the Parties are unable in good faith to agree that a Force Majeure event has occurred to an affected party, the parties shall resolve their dispute in accordance with the provisions of this Agreement. The burden of proof as to whether or not a

force majeure event has occurred shall be upon the party claiming that the force majeure event has occurred and that it is the affected party.

23.06 Termination for Certain Events of Force Majeure. If any obligation of any Party under the Contract is or is reasonably expected to be delayed or prevented by a Force Majeure event for a continuous period of more than 3 months, the Parties shall promptly discuss in good faith how to proceed with a view to reaching a solution on mutually agreed basis. If a solution on mutually agreed basis cannot be arrived at within a period of 30 days after the expiry of the period of three months, the Contract shall be terminated after the said period of 30 days and neither Party shall be liable to the other for any consequences arising on account of such termination.

23.07 Limitation of Force Majeure event. The Supplier shall not be relieved of any obligation under the Contract solely because cost of performance is increased, whether as a consequence of adverse economic consequences or otherwise.

23.08 Extension of Contract Period due to Force Majeure event The Contract period may be extended by mutual agreement of Parties by way of an adjustment on account of any period during which an obligation of either Party is suspended due to a Force Majeure event.

23.09 Effect of Events of Force Majeure. Except as otherwise provided herein or may further be agreed between the Parties, either Party shall be excused from performance and neither Party shall be construed to be in default in respect of any obligations hereunder, for so long as failure to perform such obligations shall be due to and event of Force Majeure."

24.0 Transfer And Sub-Letting

24.01 The Supplier shall not sublet, transfer, assign or otherwise part with the Contract or any part thereof, either directly or indirectly, without prior written permission of the Purchaser.

25.0 Recoveries

25.01 When ever under this contract any money is recoverable from and payable by the bidder, the purchaser shall be entitled to recover such sum by appropriating in part or in whole by detecting any sum due to which any time thereafter may become due from the supplier in this or any other contract. Should the sum be not sufficient to cover the full amount recoverable the bidder shall pay to the purchaser on demand the remaining balance.

26.0 Waiver

26.01 Failure to enforce any condition herein contained shall not operate as a waiver of the condition itself or any subsequent breach thereof.

27.0 Indemnification

27.01 Notwithstanding contrary to anything contained in this RFQ, Supplier shall at his costs and risks make good any loss or damage to the property of the Purchaser and/or the other Supplier engaged by the Purchaser and/or the employees of the Purchaser and/or employees of the other Supplier engaged by the Purchaser whatsoever arising out of the negligence of the Supplier while performing the obligations under this contract.

SECTION – IV:

QUANTITY AND DELIVERY REQUIREMENT

Sl. No.	Item Description	Specification	Requirement Total Qty. (Nos)	Estimated Cost
BRPL,DELHI				
1	MTR,PWR,3PH,20-100A	SECTION V	*18000*	*5.84 Cr*
2	LT CT Meter (3P-4W, 240Volts, CL-0.5s)		1000	
3	HT Meter (3P-4W, 63.5V, 5A, CL-0.5s)		*150*	
4	HT Meter (3P-4W, 63.5V, 1A, CL-0.2s)		*10*	
5	HT Meter 63.5V, 3PH, 4.0 0.5s; HVDS		20	
6	DT METER		1000	
7	Grid Meter /1A,3P 4W		500	
8	Grid Meter /5A,3P 4W		300	
9	MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 1 AMP)		10	
10	MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 5 Amp)		10	

Note : Delivery as per our requirement.

SECTION – V:

TECHNICAL SPECIFICATION(TS)

RATE CONTRACT FOR SUPPLY OF 3 PHASE METER, LTCT METER, HT CONSUMER METER & HT METER (HVDS)

CMC/BR/25-26/FK/PR/MS/1234

Date : 14.01.2025

Volume - II

FORMATS

Tender Notification for

RATE CONTRACT FOR SUPPLY OF 3 PHASE METER, LTCT METER, HT CONSUMER METER & HT METER (HVDS)

CMC/BR/25-26/FK/PR/MS/1234

Date :14.01.2024

BSES

Technical Specification for

Three Phase Whole Current meter

Specification no – BSES-TS-033-TPWM-R0

Rev		0
Date		20 May 2022
Prepared BY	Ashish Joshi	
Reviewed BY	Puneet Duggal	
	Vikas Srivastava	
	Lalit Mukhriya	
Approved BY	Gaurav Sharma	
	Manish Jain	

INDEX

RECORD OF REVISION

Revision No	Item / clause no.	Nature of Change	Approved By

1.0 SCOPE OF SUPPLY

This specification cover the following for Three Phase 4 wire 20-100 Amps Static Watt hour meters of accuracy class 1.0 with and without enclosure.

a. Design, manufacture, testing at manufacturer works before dispatch, packing, delivery and submission of all documentation.
b. Any accessories / hardware required for installation and operation for the meter.
c. Software (BCS and CMRI).

2.0 CODES & STANDARDS

Following codes and standards (with latest amendments) are applicable-

S No.	Code/Standard	Title
2.1	Indian Electricity Act	IE Act 2003
2.2	CEA Metering Regulations	With latest amendments
2.3	CBIP Manual (Pub no.-325)	Standardization of AC Static Electrical Energy Meters
2.4	IS- 11448	Application guide for AC Electricity meters
2.5	IS- 13779: 1999	AC Static Watt-hour Meters, Class 1 and 2 – Specification
2.6	IS- 15707	Testing, evaluation, installation and maintenance of ac electricity meters - Code of practice.
2.7	IEC 62056-21	Electricity metering - Data exchange for meter reading, tariff and load control - Part 21: Direct local data exchange
2.8	IEC 62058-11	Electricity metering equipment (AC) - Acceptance inspection - Part 11: General acceptance inspection methods
2.9	IEC 62058-31	Electricity metering equipment (AC) - Acceptance inspection - Part 31: Particular requirements for static meters for active energy (classes 0,2 S, 0,5 S, 1 and 2)
2.10	IEC 60736	Testing Equipment for electrical Energy meter
2.11	IS 15959 (Part 1): 2011	Data Exchange for Electricity Meter - Reading Tariff and Load Control - Companion Specification
2.12	IS 14772	General requirement for Enclosure for Electrical Requirement.

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

i. Guaranteed Technical Particulars (GTP)
ii. Specification including applicable codes & standards
iii. Approved Vendor Drawings
iv. Other documents

3.0 SERVICE CONDITIONS

3.1	Temperature Range	Operation range: -10 Deg C to 55 Deg C Limit range of operation: -25 to 60 Deg C Limit range of storage / transport : -25 to 70 Deg C

3.2	Relative Humidity	0 to 96 %

4.0 DISTRIBUTION SYSTEM DATA

4.1	Supply	3 phase 4 wire system
4.2	Voltage	11KV
4.3	Frequency	50 Hz ± 5%
4.4	System neutral	Solidly Earthed

5.0 ELECTRICAL AND ACCURACY REQUIREMENTS

5.1	Meter Type	Type 1. 3 phase 4 wire static energy meter with 50 mm extended type terminal cover. Type 2: 3 phase 4 Wire static energy meter along with short type terminal cover fitted in polycarbonate enclosure as per annexure 'E'.
5.2	Accuracy Class	1.0 as per IS13779 (accuracy class for reactive energy should be same as that for active energy)
5.3	Connection	Direct / whole current
5.4	Rated Voltage	240V (P-N), 415V (P-P) with variation of +30% & -40%. However meter should withstand the maximum system voltage across terminals.
5.5	Rated basic current	20A
5.6	Rated maximum Current	100A
5.7	Rated Frequency	50Hz +/- 5%
5.8	Power factor range	Zero Lag – unity – Zero lead
5.9	Power Consumption in Voltage circuit	Less than 1 Watt & 4 VA per phase
5.10	Power consumption in Current circuit	1 VA per phase
5.11	Starting current	0.2% of Ib
5.12	Meter constant	To be specified by bidder
5.13	Process Technology	Surface Mounting Technology or better
5.14	Insulation Level	Meter shall withstand an insulation test of 4 KV and impulse test at 8 KV
5.15	Accuracy	Meter shall comply as per IS 13779.
5.16	Repeatability of error test	As per IS 13779
5.17	Starting and Running with No-Load	Meter shall be fully functional within 5 seconds of applying rated voltage to meter terminals. Meter shall not produce more than one output pulse count when voltage is applied with no current flowing in the current circuit. Meter shall pass test for No-load condition.
5.18	Voltage dips and interruptions	Voltage dips and interruptions shall not produce a change in the register of more than 0.001KWH and test output shall not produce a signal more than 0.001KWH as per IS 13779.
5.19	Short time over current	Meter shall not get damaged due to short time over currents. Meter shall perform correctly when back to its initial working conditions and the variation in error shall not exceed 0.1% @ I_b and unity power factor. Meter shall be able to carry a short time over current of 20 times the maximum current for a period of 0.5 second as per IS 13779.

5.20	Influence of heating and self-heating	As per IS 13779
5.21	Immunity to earth/phase fault	As per IS 13779
5.22	Limits of error due to Current variation	As per IS 13779
5.23	Limits of error due to influence quantities	Meter shall work within guaranteed accuracy as per IS 13779/ CBIP325 (most stringent standard to be followed) under and after influence of following :- a. Voltage variation b. Frequency variation c. 10% third harmonic in current d. Reversed phase sequence e. Voltage unbalance f. Harmonic components in current and voltage circuit g. DC and even harmonics in AC current circuit h. Odd harmonics in AC current circuit i. Sub harmonics in AC current circuit j. Continuous (DC) “stray” magnetic induction of 67mT+/-5%. k. Continuous (DC) “abnormal” magnetic induction of 0.27T+/-5%. l. Alternating (AC) “stray’ magnetic induction of 0.5mT+/-5% m. Alternating (AC) “abnormal’ magnetic induction of 10mT. n. Alternating (AC) “abnormal’ magnetic induction of 0.2T+/-5%. o. External magnetic field 0.5 T p. Electromagnetic HF fields q. Radio frequency interference r. DC immunity test
5.24	Limits of error due to ambient temperature variation	As per IS 13779
5.25	Electromagnetic compatibility	Meter shall remain immune to electrostatic discharge, electromagnetic HF field and fast transient burst as per IS 137 79
5.26	Radio Interference	Meter shall not generate conducted or radiated noise which interferes with other equipment

6.0 CONSTRUCTION REQUIREMENTS

6.1	General	Construction should be in accordance with IS13779.
6.2	Base Body	Opaque, UV stabilized polycarbonate of grade LEXAN 142A/ 943AA or Equivalent with V0 inflammability level
6.3	Top Cover	Transparent, UV stabilized polycarbonate of grade LEXAN 142A/ 943AA or Equivalent with V0 inflammability level It should so be designed so as the internal components should not be visible.

6.4	Assembly of base body and top cover	By ultrasonic welding
6.5	Terminal block	a. Material - Flame retardant glass filled polycarbonate of grade 500 R or equivalent. b. Terminal block shall form Integral part of the meter base c. Terminal block shall be capable of passing the tests as per ISO-75 for a temperature of 135C and pressure of 1.8MPa. The terminals shall be designed so as to ensure adequate and durable contact such that there is no risk of loosening or undue heating.
6.6	Terminal Cover	a. Type 1: 50 mm extended type terminal cover with U cut suitable for 50 mm^2 Cable. b. Type 2: Short type terminal cover suitable for 50 mm^2 Cable. c. Material - UV stabilized transparent polycarbonate cover. LEXAN 143A/943AA or equivalent grade d. Provision of sealing at two points through sealing screw. e. The terminal cover shall be extended type with baffle wall above the cable entry base wall so that access to the terminals is not possible (even with thin metallic wire) without breaking the seal. Terminal cover should have provision for cable entry from bottom. f. Diagram of external connections should be embossed on terminal cover. Sticker is not acceptable.
6.7	Terminals	a. Suitable for 50mm^2 aluminium cable. b. Material of terminals, screws and washers should be brass or tinned copper. Two flat head screws of appropriate size should be provided per terminal. c. Terminals shall be tested for continuous current of 150 % Imax. d. Terminals shall be clearly marked for phase/neutral/incoming/outgoing etc.
6.8	Ingress Protection	IP 51 or better, but without suction in the meter.
6.9	Meter Enclosure	Meter shall be factory fitted using unidirectional screw in a polycarbonate enclosure confirming specifications provided in annexure 'E' for Meter 'Type 1' only.
6.10	Output device	Meter should have flashing LED visible from the front as output device to represent energy recording. LED shall be configurable for KWH, KVAh and KVArh. The resolution shall be such that satisfactory accuracy test can be conducted at the lowest load in less than 5 minutes and starting current test in less than 10 minutes.
6.11	RTC	Meter shall have internal real time clock to set date and time. Time accuracy should be as per relevant IS/IEC. Meter should have facility for time synchronization locally through CMRI. It is preferable to have facility for remote synchronization through AMR. Clock correction events shall be registered in meter's memory.

6.12	Battery	Lithium ion battery with guaranteed shelf life of 10 years and capacity life of 15 years. Battery removal or total discharge should not affect the working of the meter.
6.13	Memory	a. Non volatile memory independent of battery backup to store complete meter data. Data should be retained in the memory up to 10 year without any auxiliary power. b. Memory chip of a meter shall not work in circuit of another meter. Hardware/ firmware level security in microcontroller of meter shall be provided in this regard.
6.14	Self Diagnostic feature	Meter shall have self diagnostic for the following a. Date and RTC b. Battery c. Non volatile memory d. Display
6.15	Clearance and Creepage distance	As per IS 13779
6.16	Mounting	Surface / Flush mounted
6.17	Resistance against heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per IS 13779.
6.18	Electronic components	All active & passive components should be surface mounting type and shall be assembled by state of the art assembly processes.
6.19	Power Supply	The power supply should comply with the relevant standards. Power supply unit of the meter should not be affected in case maximum voltage of the system appears across the terminals due to faults or due to wrong connections.
6.20	Measurement/ computing chips	Measurement/computing ASICs should be surface mounting type.
6.21	Protection against Corrosion	a. Internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b. Mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.
6.22	Meter Sealing Arrangement	Sealing should be in accordance with IS and CEA metering regulations with latest amendments. Approval shall be taken from purchaser for location of seals.
6.22.1	Manufacturer's Seals	One Polycarbonate seal to be provided on meter cover.
6.22.2	BSES Seals	a. One Hologram seal should be provided on each side of meter i.e two hologram seals should be provided. Meter sides should not have sharp edges to avoid damage to hologram seals. b. Polycarbonate seal should be provided on top cover. c. Seals will be issued to manufacturer free of cost.
6.22.3	Seal record	Record of all seals shall be forwarded to purchaser with each lot.
6.23	Guarantee/ Warranty	66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier

7.0 FUNCTIONAL REQUIREMENTS

7.1	Meter category	Meter shall comply C2 category as per IS 15959 part 1 with additional parameters specified in this specification.
7.2	Tariff Basis	Lag only: KVAh is computed based on KVArh and KWH value. If PF=1, or leading, then KVAh = KWH. At no instance KVAh < KWh.
7.3	MD Registration	Meter shall store and display MD upto two decimal in every 30 min. period along with date & time. At the end of every 30 min, new MD shall be computed & compared with previous MD and store whichever is higher and the same shall be displayed. It is preferred that MD is computed using separate counter rather than by difference of initial and final energy counter.
7.4	Auto Reset of MD	Auto resetting shall be 1st of every month at 00:00hrs.
7.5	TOD Metering	a. Meter shall be capable of doing TOD metering in minimum 4 tariff rate registers programmable for minimum 8 time zones and 4 seasonal profiles. b. Meter shall be capable of doing TOD metering for kWh, kVARh, kVAh and MD in kW, kVAR and kVA . Reactive parameter should be recorded separately for Lag and Lead. c. TOD programmable on site through CMRI or AMR remotely. d. At Display as well as BCS end meter TOD values shall be shown as per cumulative values of TOD Zones of respective registers. e. TOD metering shall be implemented by the activity colander method of IS 15959 Part 1 clause 9/ DLMS UA-1000-1 f. Special Day table shall be defined as per IEC/ DLMS UA-1000-1 g. Default TOD programming shall be as per latest DERC guidelines. Prior approval shall also be taken from BSES for the same. h. Tariff rate registers shall be as follow R1: Rate register for Peak R2: Rate register for Normal R3: Rate Register for Off Peak

7.6	Security	a. Reading and writing data into meter memory via optical and remote communication port shall be through DLMS security keys only. b. Bidder shall ensure to safeguard high security keys used for configuring parameters into meter. c. Once the meter memory is locked during manufacturing process, only parameters mentioned in IS 15959 shall be configurable even in factory. It should not be possible to configure any other parameters. d. Please note that there shall be no other mechanism/ method to interface with meter through optical and remote communication port except mentioned in IS 15959, even for manufacturer. e. It should not be possible to change data stored in meter memory even after accessing meter memory physically. In case of any change in memory data, a flag/alert shall be generated. Flag/Alert shall be indicated over display and in remote communication also.
7.7	Parameters profiles	Meter shall support all the parameters profile as per IS 15959 part 1 with additional parameters specified in this specification:
7.7.1	Instantaneous parameters	All the parameters as per table 27 of IS 15959 Part 1 shall be continuously updated by the meter hardware/software as per internal sampling and computation time and last updated value shall be available for downloading as and when required along with following additional parameters: i. Neutral Current ii. % THD in R Phase Voltage iii. % THD in Y Phase Voltage iv. % THD in B Phase Voltage v. % THD in R Phase Current vi. % THD in Y Phase Current vii. % THD in B Phase Current viii. Displacement PF ix. Maximum Demand in kVAR x. Voltage angles all phases xi. High resolution kWh xii. High resolution kVArh xiii. High resolution kVAh All the energies shall be measured and recorded with and without harmonics.
7.7.2	Billing Parameters	All the parameters mentioned in Table 29 of IS 15959 part along-with following additional parameters: i. Cumulative Energy, kVArh (lag) for R1 to r8 ii. Cumulative Energy, kVArh (lead) for R1 to r8 iii. MD in kVAr (lag) iv. MD, kVAr (lag) for R1 to R8 v. MD in kVAr (lead) vi. MD, kVAr (lead) for R1 to R8 vii. Cumulative Power interruption counts in all billing history data viii. Monthly power on/off duration

		All the energies shall be measured and recorded with and without harmonics. 12 no's billing cycle parameters shall be remain in meter memory along with current cycle parameters and shall be available for reading as well as profile
7.7.3	Block load survey parameters	a. All the parameters as per Table 28 of IS 15959 part 1 for 60 power ON days. b. Default profile capture period shall be 1800 sec. c. Following additional parameters shall be provided: i. Current- Neutral I_N ii. Activbe Current- R phase iii. Active Current -Y Phase iv. Active Current -B Phase v. Reactive Current- R Phase vi. Reactive Current- Y Phase vii. Reactive Current- B Phase viii. Three Phase Power Factor ix. R phase Active Power x. Y phase Active Power xi. B phase Active Power xii. R Phase Apparent Power xiii. Y Phase Apparent Power xiv. B Phase Apparent Power xv. Power Off time in integration period All the energies shall be measured and recorded with and without harmonics.
7.7.4	Daily Load Profile	a. All the parameters as per table 57 of IS 15959 Part 1 shall be measured and recorded at each midnight i.e. 00:00 hrs for last 60 power ON days. b. All the energies shall be measured and recorded with and without harmonics.
7.7.5	General Purpose Parameters	Following parameters shall be provided in Non Volatile memory (NVM) of the meter.
7.7.5.1	Name plate details	Provided As per table 30 of IS 15959 Part 1.
7.7.5.2	Programmable parameters	a. Parameters mentioned in table 31 of IS 15959 part 1 shall be provided. b. These parameters can be programmed by BCS or CMRI via proper security. Every transaction shall be logged in non volatile memory of the meter with date and time stamp.
7.7.6	Transaction events	All transaction shall be logged in memory of meter as per table 35 of IS 15959 part 1.

8.0 EVENT AND TAMPER MONITORING

8.1	Top Cover Open	Meter shall have top cover open detection and same shall be logged. Detection and logging mechanism shall work even when the meter is de-energized. Top cover open event should not get reset.
8.2	External Magnetic tamper	1. Meter should either be immune or should log the events of attempt of tampering by external magnetic field as per relevant IS13779/ CBIP 325 with latest amendments. 2. If the working of the meter gets affected under the influence of external magnetic field, meter should record

		energy at Imax and UPF. Meter should not compute MD during this period. Counter for reactive energy should not increase in this case. The meter shall record energy as per actual load once the magnetic field is removed.
8.3	Protection against HV spark/ESD	If the meter is subjected to HV spark/ ESD, meter shall continue to record energy or log the event. Upto 35 KV meter should remain immune. Communication port shall also be immune upto 35KV. Bidder should have valid test report from Sameer/ UL lab or any other NABL accredited Lab for the same.
8.4	Neutral disturbance	Meter should log the event when AC/DC/ Pulsating voltage is injected in neutral circuit.
8.5	Phase sequence reversal	Meter should work accurately irrespective of the phase sequence of the supply. Meter should log the event.
8.6	Detection of missing potential	Absence of potential on any phase should be logged. Restoration of normal supply shall also be recorded. The threshold value of voltage should be programmable at factory end.
8.7	Low Voltage	Meter should log low voltage event if average voltage is below 75% of Vref.
8.8	High Voltage	Meter should log high voltage event if average voltage is above 115% of Vref.
8.9	Voltage Imbalance	Meter should log voltage imbalance event when the difference between minimum and maximum phase voltage is more than 10% of Vref.
8.10	Abnormal/Invalid Voltage	Meter should log invalid voltage if phase angle between voltages deviates from the standard values by more than +/-10 degrees i.e. 120 +/- 10 degrees.
8.11	Reversal of Current Coil Polarity	Meter should log the event of reversal of C.C polarity. Meter should register energy consumed correctly with any one, two or all three current coils reversed.
8.12	Current Circuit Shorting / Bypass	Meter should log the event of current coil shorting/bypass. Threshold value of current should be programmable at factory end.
8.13	Current Circuit Open	Meter should log the event of current coil open. Threshold value of current should be programmable at factory end.
8.14	Over current	If the current in any phase exceeds the rated current, meter should log overcurrent event.
8.15	Current Imbalance	Meter should log current imbalance event when the difference between minimum and maximum phase current is more than 30% of I average.
8.16	Invalid Phase Association	Meter should log invalid phase association event if the voltage sequence does not match with the current sequence.
8.17	High neutral Current	Meter should log high neutral current when neutral current is greater than 50% of I basic.
8.18	Power On/Off	Meter shall detect power OFF (minimum power off period 5 mins) if all phase voltages are absent. This event shall be

		recorded at the time of each power OFF. At the same time power ON event shall be recorded.
8.19	Harmonic events	Meter shall log high harmonic events if meter detect %THD in phase voltage or current more than 5%. Threshold value and occurrence/ restoration time should be factory programmable. Meter shall capture detailed harmonic profile while logging of this event.
8.20	Tamper Logging	Last 200 nos. tamper events shall be recorded in meter memory on FIFO basis excluding top cover open. Last 20 events of top cover open tamper should be recorded in the memory including the first occurrence.
8.20.1	Parameter Snapshot	a. Snapshot of Date, time, voltages, Phase currents, neutral current, power factor, active power, apparent power, signed reactive power, cumulative kWh, cumulative kVAh, cumulative kVArh (lag and lead) etc should be recorded for each tamper event b. Detailed harmonic profile shall be captured at occurrence of High harmonic events.
8.20.2	Tamper Indication	For each tamper event, appropriate Indication/Icon should appear on the meter display either continuously or in auto display mode. Icons appearing continuously are preferable.
8.21	Tamper Logics	Logic sheet for tamper/ event detection and logging should be submitted for purchaser's approval. Following details should be provided for each tamper in tabular form a. Detailed Tamper logic b. Threshold values c. Persistence time d. Restoration time e. Snapshot details

9.0 DISPLAY

9.1	Type	STN Liquid crystal, Pin type with backlight
9.2	Viewing angle	Minimum 160 degrees
9.3	UV Protection	The display modules should be well protected from the external UV radiations
9.4	Size	Minimum 10X5mm
9.5	Digits	Minimum 8 digits
9.6	Language	English
9.7	Display Parameters	Parameters to be displayed are given below
9.7.1	Auto scroll mode	• Display test • Meter SL No. • Real Date • Real Time • Cumulative active energy (Forwarded) • Cumulative Apparent Energy (Forwarded) • Cumulative reactive energy Lag & Lead • Instantaneous load in kW, kVAr & kVA • Active maximum demand with date and time • Apparent maximum demand with date and time • Instantaneous average power factor with sign for lag/

		lead • R phase voltage (P-N) • Y phase Voltage (P-N) • B phase Voltage (P-N) • R Phase Current • Y Phase Current • B Phase Current • Neutral Current • R Phase power Factor • Y Phase power Factor • B Phase power Factor • TOD Total Active Forward Energy Register(Reg 1) • TOD Total Active Forward Energy Register(Reg 2) • TOD Total Active Forward Energy Register(Reg 3) • TOD Total Active Forward Energy Register(Reg 4) • TOD Total Active Forward Energy Register(Reg 5) • TOD Total Active Forward Energy Register(Reg 6) • TOD Total Active Forward Energy Register(Reg 7) • TOD Total Active Forward Energy Register(Reg 8) • TOD Apparent Forward Energy Register(Reg 1) • TOD Apparent Forward Energy Register(Reg 2) • TOD Apparent Forward Energy Register(Reg 3) • TOD Apparent Forward Energy Register(Reg 4) • TOD Apparent Forward Energy Register(Reg 5) • TOD Apparent Forward Energy Register(Reg 6) • TOD Apparent Forward Energy Register(Reg 7) • TOD Apparent Forward Energy Register(Reg 8) • Frequency (Hz) • Cumulative tamper count. • Tamper Status Scroll time should be 6 Sec.
9.7.2	Manual Display mode (push button mode)	Following parameters should be displayed in addition to parameters displayed in Auto display mode – • Signed Active Power – kW • Signed Reactive Power – kVAr (Lag/Lead) • Apparent Power – kVA • Cumulative billing count • Cumulative programming count • Billing date • Last month billing Active energy reading • Last month billing reactive energy reading • % THD in Voltage • % THD in Current Bidder to submit details of display with technical bid. The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated for more than 10 seconds. Scroll lock facility should be provided by pressing scroll push button for long duration (10-15 sec). Lock should be released by repeat action.
9.7.3	Tamper indications	As per clause 8.20.2.

9.7.4	Self Diagnostic Indications	Appropriate indication for each self diagnostic feature should be displayed continuously irrespective of display mode (auto/manual).
9.7.5	Connection check	Appropriate indication to be displayed continuously in case of current/voltage connection error

10.0 SOFTWARE AND COMMUNICATION

10.1	Base computer software	The BCS shall ensure that data downloaded / displayed cannot be tampered. BCS shall be able to display data in tabular (text) as well as graphical format. Software shall have polling feature with optional selection of parameters to be downloaded through AMR in daily / weekly / monthly / annual format. Any software upgrade shall also be provided free in future by the bidder. Licensed Software with the following features should be supplied for free
10.1.1	Operating System	BCS should be compatible for latest Windows OS with backward compatibility.
10.1.2	Security	System shall be password protected where user can login only if login ID is provided by administrator. BCS shall have rights management system so that access rights can be provided as per requirement to maintain security.
10.1.3	Data access	BCS shall be capable of accessing complete data stored in meter memory locally through PC and remotely through modem (RF/GPRS/NBIoT/4G etc.) for connectivity to AMR.
10.1.4	Database	BCS shall maintain master database according to desired area, location, and region etc.
10.1.5	Reporting	a. BCS shall have option of user defined report generation in format of Excel, Word and CSV , XML, PDF etc. b. BCS shall have capability to export data in ASCII, CSV and XML format at desired location so that the same could be integrated with our billing data for processing. c. All the data available in the meter shall be convertible to user defined ASCII, CSV and XML file format.
10.2	CMRI Software	Manufacturer has to provide software capable of downloading data through CMRI. . Software required for CMRI shall be supplied by the supplier for free of cost. Training in the use of software shall be provided by the manufacturer. The software shall be compatible to latest windows systems.
10.2.1	Integration	In the event of order, bidder shall work with BSES IT team to integrate CMRI software with BSES AMR and billing system i.e meter downloading, uploading data on computer etc. Meter reading protocols shall be shared with BSES.
10.2.2	Data access	CMRI software should be capable of downloading complete data stored in the meter memory. Software should have option for selection of parameters to be downloaded from meter i.e billing data, event/tamper logging data etc. Billing data should be downloadable using CMRI within 1 minute.
10.2.3	Suitability	CMRI software shall work both on SANDS & Analogic make CMRI.
10.3	Training	Manufacturer shall impart training to BSES personnel for usage of software

10.4	Communication Ports	Communication ports required in meter are as follows
10.4.1	RJ11 Port	RS232 compatible RJ11 6P4C shall be provided. PIN configuration shall be as per annexure 'A'
10.4.1	Optical Port	Meter shall have optical port in the front for data download. Portable hand held device shall also be provided along with meter for meter reading.
10.4.2	Port protection	All ports shall be galvanically isolated from the power circuit.
10.4.3	Operation	Both ports should work independently. Failure of one port (including display) should not affect the working of other port.
10.5	Communication protocol	a. IS 15959 part 1. b. Integration of meters with BSES system will be supplier's responsibility.
10.6	Data transfer rate	BCS and communication ports should support data transfer rate of 9600 bps (minimum).

11.0 NAME PLATE

11.1	Meter Serial number shall be of 8 digits. Serial number shall be printed in black colour. Embossing is not acceptable. (Should also be stored in meter memory and should be downloadable). Name plate shall be printed preferably by laser.
11.2	Size of the digit shall be minimum 5X3mm
11.3	Bar code shall be printed below serial number
11.4	BIS registration mark (ISI mark)
11.5	'BSES' logo should be printed above LCD display. With property of BSES
11.6	BSES PO No. & date
11.7	Manufacturers name and country of origin
11.8	Model type / number of meter
11.9	Month and Year of manufacturing (Should also be stored in meter memory and should be downloadable)
11.10	Reference voltage and current rating
11.11	The number of phases and the number of wires for which the meter is suitable. Graphical symbol as per IS 12032 can be used.
11.12	Principal units in which meter reads
11.13	Meter constant Impulse/kWh, Impulse/kVAh
11.14	Class index of meter
11.15	Reference frequency
11.16	Warranty period
11.17	Reference temperature if different from 27 Deg C
11.18	Connections, diagrams and terminals shall be marked / provided in accordance with Indian Standard.

12.0 APPROVED MAKES OF COMPONENTS

12.1	Measurement or computing chips	The measurement or computing chips used in the Meter should be with the Surface mount type along with the ASICs	Analog Devices, Cyrus Logic, Atmel, Phillips, Texas Instruments, SAMES, NEC
12.2	Memory chips	The memory chips should not be affected by the external	USA: Atmel, National Semiconductors, Texas

		parameters like sparking, high voltage spikes or electrostatic discharges.	Instruments, Phillips, ST,Microchip Japan: Hitachi or Oki
12.3	Display modules	a) The display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted at height of 0.5 meter as well as at the height of 2 meters (refer 3.2.d for Viewing angle). c) The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). d) It should be trans-reflective HTN or STN type industrial grade with extended temperature range minimum 70	Japan: Hitachi, Sony Holland / Korea: Phillips Truly Semiconductor Tianma/Hijing Electronics
12.4	Communication modules		USA: National Semiconductors, HP, Optonica,ST, Holland / Korea: Phillips Japan: Hitachi Germany: Siemens
12.5	Optical port	a) Optical port should be used to transfer the meter data to meter reading instrument. b) The mechanical construction of the port should be such to facilitate the data transfer easily. 9 pin connector of optical port shall be FCI copper type.	USA: National Semiconductors ,HP Holland / Korea: Phillips Japan: Hitachi, Truly Semiconductor, Agillent, OSRAM, Everlight
12.6	Power supply unit	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections.	SMPS Type, reputed make
12.7	Active & passive components	The active & passive components should be of the	USA: National Semiconductors, Atmel, Phillips, Texas Instruments, ST, Onsemi,

		surface mount type & are to be handled & soldered by the state of art assembly processes. The PTH components should be positioned such a way that the leads of components should not be under stress and not touching the internal wires. LED	Japan: Hitachi, Oki, AVX or Ricoh, Samsung, Everlight, Agillent
12.8	Battery	Lithium with guaranteed life of 15 years.	Varta, Texcell, SAFT
12.9	RTC	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Philips, Dallas Atmel, Motorola, Microchip , NEC or Oki
12.10	Note		a. Manufacturer shall intimate deviation if any from make of components. Any deviation is subject to approval of BSES based on supporting documents and performance feedback of the components. b. Manufacturer should have complete tracking of material used in meter. BSES reserve the right to carry out audit of inventory/ manufacturing process at manufacturer's works and sub vendor's work. c. The components used by manufacturer shall have "Minimum Life" more than the 10 years. d. Even for existing/ par suppliers – fresh approval is needed for all deviations

13.0 QUALITY ASSURANCE, INSPECTION AND TESTING

13.1	Quality Assurance Plan (QAP)	To be submitted for Purchaser's approval.
13.1.1	Inspection Hold-Points	To be mutually identified, agreed and approved in QAP.
13.1.2	Sampling Method	Sampling Method for quality checks shall be as per relevant IS/ IEC/ CBIP guidelines and Purchaser's prior approval shall be taken for the same.
13.2	Type Tests	a. The meter shall be of type tested quality as per relevant IS/IEC/CBIP. Type test conducted at CPRI/

		ERDA labs will be treated as valid. b. The test report should not be more than 5 years old. In case any modification affecting only part of meter is made after type test, only specific type tests on the affected parts shall be repeated. c. Type test certificate should be submitted along with offer for scrutiny. d. For a manufacturer supplying meter for the first time, complete type tests will have to be carried out on sample randomly selected from the lot offered for inspection in event of order. 35kV ESD test will also be carried out on the sample at Sameer/UL lab. e. For regular suppliers, revalidation of meter design should be carried out by repeating the type tests on sample randomly selected from BSES lot at CPRI/ERDA every three years f. Any other component supplied in addition to meter shall also be type tested as per IS /IEC if applicable. g. Conformance test report of IS15959 part 1 shall be submitted.
13.3	Routine tests	All test marked “R” as per IS13779
13.4	Acceptance Tests	a. All tests marked “A” as per IS13779. b. Dimensional and drawing verification. c. Display parameters/ sequence. d. Data Downloading from CMRI and PC. e. Tamper detection/logging features as per approved documents. Tamper conditions will be simulated at varying load up to Imax. Accuracy will also be checked during tamper simulation. f. Burn in chamber test. g. Component verification. h. Testing of Profile parameters and communication protocol. i. Purchaser reserves the right to formulate any other test method to verify guaranteed parameters of Meter.
13.5	Inspection	a. Purchaser reserves the right to inspect /witness all tests on the meters at Seller’s works at any time, prior to dispatch, to verify compliance with the specification/ standards. b. Manufacturer should have all the facilities/ equipments to conduct all the acceptance tests as per IS during inspection. All the testing equipment should be calibrated. c. In-process and / or final inspection call intimation shall be given at least 15 days in advance to the purchaser.
13.6	General Requirements	a. The internal potential links should be in closed position or link less meters will be preferred and there shall not be any external link. b. Terminal cover should be fixed on the meter before dispatch. c. The bidder shall maintain a web site where routine test

		results of all meter supplied against these tender will be maintained and will be accessible to buyer/ buyer representative. d. For any false events recorded in meter, vendor shall depute their representative for field visit within one week and provide the root cause analysis in 4 weeks time.

14.0 SHIPPING, HANDLING AND SITE SUPPORT

14.1	Packing	Every meter shall be properly sealed / packed in environmental friendly boxes/ cartons for protection against damage, vibration and ingress of dust and moisture.
14.2	Packing for accessories and spares	Robust non returnable packing case with all the above protection & identification Label.
14.3	Marking	Following details are required on each packing case: a. Individual serial number b. Purchaser's name c. PO number (along with SAP item code, if any) & date d. Equipment Tag no. (if any) e. Destination f. Manufacturer / Supplier's name g. Address of Manufacturer / Supplier / it's agent h. Type , rating and other description of equipment i. Country of origin j. Month & year of Manufacturing k. Case measurements l. Gross and net weights in kilograms m. All necessary slinging and stacking instructions
14.4	Test reports	Routine test report to be provided with each meter
14.5	Shipping	The seller shall be responsible for all transit damage due to improper packing.
14.6	Handling and Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet /manual to be furnished before commencement of supply.

15.0 DEVIATIONS

15.1	Deviation	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.

16.0 DOCUMENT AND DRAWING SUBMISSION

Drawing submission shall be as per the matrix given below. All documents/ drawing shall be provided on A4 sheet in soft copy with separators for each section. Language of the documents shall be English only. Deficient/ improper document/ drawing submission may liable for rejection

SL	Detail of Document	Bid	Approval	Pre Dispatch
1	Guaranteed Technical particulars (GTP)	Required	Required	

2	Deviation Sheet, if any	Required	Required	
3	Tamper Sheet	Required	Required	
4	Display Parameters	Required	Required	
5	GA / cross sectional drawing of Meter showing all the views / sections (eg: Terminal Block dimensional drawing, Mounting arrangement drawings, Meter box drawing and dimensions)	Required	Required	
6	Samples of each type and rating offered.	2 no's	4 no's	
8	Any software and accessories required for installation/ operation of meter	Required	Required	
9	Manufacturer's quality assurance plan and certification for quality standards	Required	Required	
10	Type Test reports of offered model/ type/ rating	Required		
11	BIS certificate	Required		
12	Complete product catalogue and user manual.	Required		
13	Customer Reference List	Required		
14	Recommended list of spare and accessories	Required		
15	Specification documents containing all parameters, Services, Methods in addition to companion specification of IS 15959 (part 1).		Required	
16	Program for production and testing (A)		Required	Required
18	Detailed installation and commissioning instructions		Required	Required
19	As Built Drawing		Required	Required
20	Operation and maintenance Instruction as well as trouble shooting charts/ manuals		Required	Required
21	Inspection and test reports, carried out in manufacturer's works			Required
22	Routine Test certificates			Required
23	Test certificates of all bought out items			Required
24	Meter Seal data			Required

ANNEXURE – A GUARANTEED TECHNICAL PARTICULARS (DATA BY SUPPLIER)

Bidder shall furnish the GTP as per format provided below. All the clauses of the specification shall be covered in GTP. Any deviation or comments shall be specifically mentioned against each clause. No comments or deviation will be treated as acceptance.

Complete GA drawing, technical literature, operation and maintenance manual of hardware/ software shall be provided with technical bid.

Incomplete technical bids are liable to be rejected without any intimation.

Clause no	Description	Compliance of the clause YES / NO	Deviation / Remarks
1			
2			

3			
4			
5			
6			

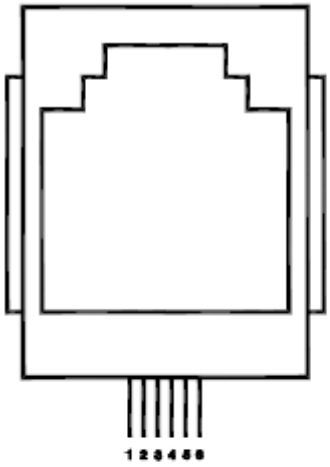
Bidder / Vendor seal / signature ----------

Name of the bidder	
Address of bidder	
Name of contact person	
Telephone no & email id	

ANNEXURE – B RECOMMENDED ACCESSORIES / SPARES (DATA BY SUPPLIER)

S No	Description of spare part	Unit	Quantity
1			
2			
3			
4			
5			
6			

ANNEXURE – C – RJ11 PORT DETAILS

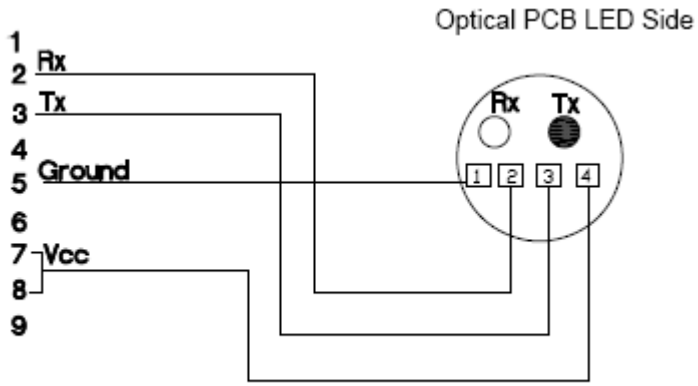


RJ– 11 PORT

PIN OUT DETAIL		
PIN	SIGNAL	DISCRIPTION
1	NC	——
2	GND	GROUND
3	TXD	RS 232 TRANSMIT
4	GND	GROUND
5	RXD	RS 232 RECEIVE
6	NC	——

ANNEXURE- D- CONFIGURATION OF OPTICAL CABLE

9 PIN D Type male Connector



ANNEXURE – E- SPECIFICATION OF METER ENCLOSURE:

Sl	Clause	Clause Description
1	Meter Box Type	Flush type with Completely transparent top cover and base with Incoming and Outgoing cable entry and data downloading arrangement.
2	Codes and Standards	
2.1	IS 14772	General Requirements For Enclosures For Accessories For Household And Similar
2.2	IS 4249	Classification And Methods Of Tests For Non-Ignitable And Self-Extinguishing Properties Of Solid Electrical Insulating Materials
2.3	IS 8623	Specification For Low Voltage Switchgear And Control gear Assemblies
3	Design	Meter box shall comply following requirement.
3.1	General Requirement	The meter box shall be designed in such a way that no access to the meter body, terminals and hardwired port of the meter shall be possible after installation and sealing of the box without breaking the box itself.
3.2	Theft Protection	a. Meter box shall be theft proof i.e. meter box cannot be opened without breaking the seals or meter itself. b. On breaking of the box, clear evident of the physical tempering shall be visual.
3.3	Parts of the box	a. The meter box shall be designed in 02 parts i.e. base and top cover. b. Meter shall be mounted inside the base on fixed moulded pillars by unidirectional screw. c. Meter top cover should be hinge type. d. Cable glands and earthing bolt shall be provided at the base as per construction requirement. e. Proper stiffeners shall be provided in the body of the base and top cover to provide mechanical strength against transportation and installation vibrations.
3.4	Ingress protection	The meter box shall be completely dust and vermin proof.. The meter box shall comply with the requirement of IP-55 & IS: 14772 & its latest version.
3.5	Collar of base and cover	a. 'U' shaped groove shall be provided in the collar of the base body, in which UV stabilized rubber 'O' shall be installed. The design of lining shall be such that it provides proper sealing between the cover & base of box to avoid penetration of dust and ingress of water. b. All around projection provided inside the cover periphery which keeps the 'O' ring pressed. c. The outside collar shall also be provide which cover outer surface of the collar.
3.6	Fixing of 'O' ring	a. Rubber 'O' Ring should be fixed with suitable adhesive so that the same does not get removed. b. Rubber 'O' ring shall be fixed in a single piece with out any gap between open ends. Open end of the 'O' ring shall be provided at the bottom side only.
4	Material	The material shall be as follow:

4.1	Box material	The material of meter box shall be flame retardant with inflammability level V0 having good dielectric and mechanical strength. The top Cover and Base of the box shall be made out of transparent polycarbonate with minimum 90% visibility so as to ease installation and monitoring of box against any tampering. The plastic shall be 'UV' stabilized to ensure that the moulded meter box should not change in colour, shape, size or should not get brittle after exposure to UV rays.
4.2	Hardware	All the metal hardware including hinges, U latches, mounting screws, downloading port ring etc shall be of rust proof stainless steel.
4.3	Cable glands	Polyamide Nylon-66 with flammability level V0.
5	Construction	Meter box shall be constructed by moulding of polycarbonate material as specified in clause no. 3.1. Thickness of meter box shall be minimum 3.0 mm.
5.1	Moulding	The box shall be made through Injection Moulding or better method.
5.2	Base	Meter shall be factory fitted inside base body using unidirectional screws, on fixed mounting pillars, moulded in to the base of sufficient strength, so that removing of meter shall not possible without breaking the meter box or meter itself.
5.3	Top cover	Hinge type
5.3.1	Hinge type	a. Minimum 02 no's concealed / internal hinges, not visible or accessible from outside the box without breaking the box itself. b. Minimum 02 no's U latches shall be provided to closed the box with sealing arrangement at each U latch. c. After closing the U latches no play/ gap shall exist between base and top cover.
6	Padlocking	The box shall also have padlocking facility.
7	Cable entry	At bottom suitable for 4CX50 Sqmm cable through cable glands
7.1	Cable Gland	a. Two nos. of Elbow shaped glands made out of Polyamide Nylon-66 suitable upto 4CX50 sqmm aluminium armoured cable shall be provided on both cable entries in the box. b. Glands shall be designed in such a manner that the same cannot be unscrewed / removed from the box from outside. Manufacturer may either supply two nos. of check nuts or any other alternate design to meet this requirement.
8	Earthing bolt	Earthing bolt of M8 with nut and washer shall be provided on left side of the body of meter box. The arrangement shall be such that one earth point shall be available for customer and external earthing provided by BSES can be terminated. Necessary symbol shall be provided for earth terminal.
9	Gland Plate	MS gland plate of minimum thickness 3.0 mm shall be provided at the bottom of the box.
10	Termination Height	Height of the meter terminals from gland plate shall be 150 mm minimum.
11	Mounting	As follow

11.1	Meter mounting pillars	a. Fixed type, moulded in to the base body as per the requirement of meter mounting holes. b. Stiffeners shall be provided at the base of the mater mounting pillars.
11.2	Meter box mounting	Four (4) nos. fixing holes of 6 to 6.5 mm diameter at the back surface of box shall be provided to fix the same on flat wall. Mounting holes shall not be obstructing by Incoming or Outgoing cables.
11.3	Box Mounting accessories	Long pan head self taping SS screws and washers shall be provided by the supplier with every box. 4 no's plastic fixing plugs suitable for self tapping screws shall also be provided.
12	Data Downloading arrangement	a. DB9 RS232 connector shall be provided at the top cover of box to download meter. b. Meter shall be downloadable without opening of the box/ breaking of seals. c. This arrangement shall not de-rate the IP rating of meter box. A Top hinges and bottom sealable cover shall be provided on the data downloading slot. d. Data downloading shall not be affected by scratches on data downloading port or with ageing of box. Data downloading shall not be affected by visible light conditions.
12.1	Optical to RS232 cable.	Optical reader with 9 pin D-type female connector cable shall be provided in each meter box.The optical meter reader with 9 pin D-type male connector cable of the entire meter boxes (100%) shall be tested for meter downloading before dispatch.
13	Marking	Following marking shall be provided on both top cover and base by indiligible laser printing/ screen printing or embossed from inside of the box. a. BSES insignia shall be embossed on the base & cover of meter box. b. Meter serial no. c. purchaser's PO no. and date. d. Purchaser's Name. e. Name or trade mark of seller f. Any other detail required at the time of approval.
14	Type Tests and Acceptance tests	a. All the below mentioned tests shall be carried out on 01 no randomly selected sample by BYPL representative from the lot offered for inspection at CPRI/ ERDA/ CIPHET. b. Following tests shall be carried out on sampled meter enclosure from the offered lot for inspection as per QAP approved by BYPL as acceptance tests. c. 01 no's box sealed by BYPL representative from the lot offered for inspection shall be tested for mentioned tests at CPRI/ ERDA/ CIPHET.
14.1	Visual examination	As Per GTP/ approved drawing
14.2	Verification of dimensions & Marking	As Per Spec/GTP/approved drawing

13.3	Protection against electric Shock	IS:14772
14.4	Resistance to ingress of solid object & to harmful ingress of water (IP-55)	IS:14772
14.5	Test of Mechanical Strength / Impact Resistance Test	IS:14772
14.6	Resistance to heat	IS:14772
14.7	Resistance to Rusting	IS:14772
14.8	Glow Wire Test at 950 degree Centigrade	IS:14772/ IEC 695-2-1
14.9	Verification of Dielectric Properties at 5 KV	IS:8623
14.10	Heat Deflection Test at 125 degree Centigrade at 0.45 Mpa	
14.11	Test for Self Extinguishing Properties	IS:4249
14.12	Flammability Test	IS:11731 II
14.13	U V Resistance Test	DIN 53387

BSES

Technical Specification For

Three Phase LTCT Operated Consumer Meter

Specification no – BSES-TS-111-LTCTM-R0

Rev		0
Date		20 July 2022
Prepared BY	Shweta Dixit	
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	Vikas Srivastava	
	Lalit Mukheriya	
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	Manish Jain	

Index

Record of Revision

Item/Clause No.	Change in Specification	Reason of Change	Approved By	Rev

1.0 Scope of Supply

This specification covers the following for Three Phase Four Wire 240 V, Ib-/-5A (Imax shall 200% Ib) AC Static transformer operated Watt hour and Var Hour meters (With and Without LTCT box and NBIOT/ 4G modem) of accuracy class 0.5s/ Three Phase Thread through meter (Three Phase Four Wire 240 V, 40A- 200A, cl. 1.0s)

A. Design, manufacture, testing at manufacturer works before dispatch, packing, delivery and submission of all documentation.

B. Any accessories / hardware required for installation and operation for the meter.

2.0 Codes & standards

Materials, equipment and methods used in the manufacturing of above mentioned equipment shall conform to the latest edition/ of following

S No.	Standard Number	Title
2.1	Indian Electricity Act	IE Act 2003
2.2	CEA Metering Regulations	With latest amendments
2.3	CBIP Manual (Pub no.-325)	Standardization of AC Static Electrical Energy Meters
2.4	IS- 14697	ac Static Transformer Operated Watt-hour and Var-hour Meters, Class 0.2 S and 0.5 S
2.5	IS-15959 (Part 1)	Data Exchange for Electricity Meter - Reading Tariff and Load Control - Companion Specification
2.6	IS- 11448	Application guide for AC Electricity meters
2.7	IEC- 62052-11	Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment
2.8	IEC- 62053-21	Electricity metering equipment (A.C) - Particular requirements - Part 21: Static meters for active energy (classes 1 and 2)
2.9	IEC- 62053-52	Electricity metering equipment (AC) - Particular requirements - Part 52: Symbols
2.10	IEC 62053-61	Electricity metering equipment (A.C.) - Particular requirements - Part 61: Power consumption and voltage requirements

2.11	IEC 62058-11	Electricity metering equipment (AC) - Acceptance inspection - Part 11: General acceptance inspection methods
2.12	IEC 62058-31	Electricity metering equipment (AC) - Acceptance inspection - Part 31: Particular requirements for static meters for active energy (classes 0,2 S, 0,5 S, 1 and 2)
2.13	IEC 60736	Testing Equipment for electrical Energy meter
2.14	IS/IEC/TR 62051:Part 1:2004	Electricity Metering — Data Exchange For Meter Reading, Tariff And Load control — Glossary Of Terms Part 1 Terms Related To Data Exchange With metering Equipment Using DLMS/ COSEM
2.15	IEC 62056-1-0:2014	Smart metering standardisation framework
2.16	IEC 62056-3-1:2013	Use of local area networks on twisted pair with carrier signalling
2.17	IEC 62056-4-7:2014	DLMS/COSEM transport layer for IP networks
2.18	IEC 62056-5-3:2017	DLMS/COSEM application layer
2.19	IEC 62056-6-1:2017	Object Identification System (OBIS)
2.20	IEC 62056-6-2:2017	COSEM interface classes
2.21	IEC 62056-6-9:2016	Mapping between the Common Information Model message profiles (IEC 61968-9) and DLMS/COSEM (IEC 62056) data models and protocols
2.22	IEC 62056-7-3:2017	Wired and wireless M-Bus communication profiles for local and neighbourhood networks
2.23	IEC 62056-7-5:2016	Local data transmission profiles for Local Networks (LN)
2.24	IEC 62056-7-6:2013	The 3-layer, connection-oriented HDLC based communication profile
2.25	IEC TS 62056-8-20:2016	Mesh communication profile for neighbourhood networks
2.26	IEC TS 62056-	Communication profile using web-services to access a DLMS/COSEM

	9-1:2016	server via a COSEM Access Service (CAS)
2.27	IEC 62056-9-7:2013	Communication profile for TCP-UDP/IP networks
2.28	IEC 62056-21:2002	Direct local data exchange
2.29	DLMS- White Book	Glossary of DLMS/COSEM terms
2.30	DLMS- Blue Book	COSEM meter object model and the object identification system
2.31	DLMS- Green Book	Architecture and protocols to transport the model
2.32	DLMS- Yellow Book	Conformance testing process
Order of precedence between different standards shall be as follow:		
I	Indian Standards Issued By BIS	
Ii	IEC standard	
Iii	Other standards like CBIP, DLMS etc.	

3.0 Service Conditions

3.1	Temperature Range	Operation range: -10 Deg C to 55 Deg C Limit range of operation: -25 to 60 Deg C Limit range of storage / transport : -25 to 70 Deg C
3.2	Relative Humidity	0 to 96 %

4.0 Distribution System Data

4.1	Supply	3 Phase AC, 4 wire
4.2	Voltage	415 V ± 6%
4.3	Frequency	50 Hz ± 5%
4.4	System Neutral	Solidly Earthed

5.0 Electrical and Accuracy Requirement

5.1	Meter Type -1	a. 3- ø, 4 wire static Transformer Operated Meter without LTCT box. b. 3- ø, 4 wire static Transformer Operated Meter with LTCT box as per annexure 'F
5.1.1	Connection	Current Transformer Operated
5.1.2	Rated Voltage	240V (phase to neutral) with variation of +30% & -40%. However meter should withstand the maximum system voltage.
5.1.3	Rated Current	Ib -5A and Imax- 10 A
5.1.4	Power factor range	Zero lag – Unity – Zero lead
5.1.5	Starting current	0.1 % of base current
5.1.6	Rated Frequency	50Hz +/- 5%
5.1.7	Accuracy Class	0.5s (IS14697 applies for accuracy requirements)
5.2	Meter Type-2	3 ø, 4 wire thread through meter with inbuilt CTs suitable for outdoor application
5.2.1	Connection	Direct Connected (Whole Current)
5.2.2	Rated Voltage	240V (phase to neutral) with variation of +30% & -40%. However meter should withstand the maximum system voltage.
5.2.3	Rated Current	Ib -40A and Imax- 200 A
5.2.4	Power factor range	Zero lag – Unity – Zero lead
5.2.5	Starting current	0.1 % of base current
5.2.6	Rated Frequency	50Hz +/- 5%
5.2.7	Accuracy Class	1.0 s (IS13779 applies for accuracy requirements)
5.3	Meter type selection	Selection between meter type -1 and meter type -2 will be based on requirement and purchaser's requition.
5.4	Power Consumption	As per relevant IS
5.5	Meter constant	Imp/ unit (Bidder to specify meter constant)
5.6	Calibration	Meter shall be software calibrated at factory and modification in calibration shall not be possible at site by any means or external influence.

5.7	Test Output Device	Separate kWh & kVAh/kVArh Flashing LED visible from the front
5.8	Process Technology	Surface Mounting Technology or better
5.9	Insulation Level	Meter shall withstand an insulation test of 4 KV and impulse test at 8 KV
5.10	Influence of supply voltage	As per relevant IS
5.11	Short time over current	As per relevant IS
5.12	Immunity to phase and earth fault	As per relevant IS
5.13	Influence of Self Heating	As per relevant IS
5.14	Influence of Heating	As per relevant IS
5.15	Electromagnetic compatibility	a. Meter shall remain immune to electrostatic discharge (upto and including 35KV), electromagnetic HF field and fast transient burst. b. The meter shall be designed in such a way that conducted or radiated electromagnetic disturbances as well as electrostatic discharge do not influence the meter. c. Meter shall be type tested for electromagnetic compatibility. d. Meter shall comply requirement of relevant IS
5.16	Limits of error due to influence quantities	Meter shall work within guaranteed accuracy as per IS/ CBIP325 (most stringent standard to be followed) under and after influence of following :- a. Current Variation b. Ambient Temperature variation c. Voltage variation d. Frequency variation e. 10% third harmonic in current f. Reversed phase sequence g. Voltage unbalance h. Harmonic components in current and voltage circuit i. DC and even harmonics in AC current circuit

		j. Odd harmonics in AC current circuit. k. Sub harmonics in AC current circuit l. Continuous (DC) "stray" magnetic induction of 67mT+/-5%. m. Continuous (DC) "abnormal" magnetic induction of 0.27T+/-5%. n. Alternating (AC) "stray' magnetic induction of 0.5mT+/-5% o. Alternating (AC) "abnormal' magnetic induction of 10mT. p. External magnetic field 0.5 T q. Electromagnetic HF fields r. Radio frequency interference s. DC immunity test Note: BSES reserves the right to formulate any other test method to check magnetic immunity/ logging of meter. Meter with logging provision will be preferred.

6.0 Construction

6.1	Base Body	Material - Opaque and UV stabilized polycarbonate of grade LEXAN 143/ 943 or Equivalent with V0 inflammability level.
6.2	Top Cover	a. Material: Transparent/Opaque and UV stabilized polycarbonate of grade LEXAN 143/ 943 or Equivalent with V0 inflammability level. b. Top cover and base should be Ultrasonically/Chemically welded. c. Top cover should be designed so as the internal components should not be visible.
6.3	Assembly of Base body and top cover	By ultra-sonic welding
6.4	Terminal and Connection details for Meter type-1 (as per clause 5.1)	

6.4.1	Terminal Block	a. Material - Flame retardant glass filled polycarbonate of grade 500 R or equivalent. b. Terminal block shall form Integral part of the meter base c. Terminal block shall be capable of passing the tests as per ISO-75 for a temperature of 135C and pressure of 1.8MPa. The terminals shall be designed so as to ensure adequate and durable contact such that there is no risk of loosening or undue heating.
6.4.2	Terminal cover	a. Material - UV stabilized transparent/Opaque polycarbonate cover of grade LEXAN 143A/943AA or equivalent. b. Provision of sealing at two points through sealing screw. c. The sealing screws shall be held captive in the terminal cover. d. The terminal cover shall be extended type with baffle wall above the cable entry base wall so that access to the terminals is not possible (even with thin metallic wire) without breaking the seal. Terminal cover should have provision for cable entry from bottom. e. Diagram of external connections should be embossed on terminal cover. Sticker is not acceptable.
6.4.3	Terminals	a. Terminals shall be suitable for 6 Sqmm copper wire. b. Two no's flat head screws per terminal shall be provided c. Material of terminals, screws and washers should be brass or tinned copper. Terminals shall be tested for continuous current of 150 % Imax. d. Terminals shall be clearly marked for phase / neutral / outgoing etc. e. Clearances and creepage shall be as per IS 14697.
6.4.4	Meter Enclosure	a. Polycarbonate meter enclosure suitable for outdoor use (IP55) and LTCT's as per annexure 'F' shall be provided with meter.
6.4.5	Ingress Protection	IP 51 or better, but without suction in the meter.

6.5	Terminal and Connection details for Meter type-2 (as per clause 5.2)	
6.5.1	Connection	a. Provision should be made to pass the connection power cable directly through the meter (Thread through type) for measurement. There should be no need to remove insulation of connecting cable for current measurement. Meter should not have provision for meter terminal connection as well as terminal block similar to conventional meters. b. A set of piercing screws shall be used in the meter for voltage connection c. Meter shall be suitable for to accommodate XLPE insulated aluminum cable up to 150 mm^2
6.5.2	Terminal Cover	a. Material - UV stabilized transparent polycarbonate cover b. Provision of sealing at two points through sealing screw. c. Diagram of external connections should be embossed on terminal cover. Sticker is not acceptable.
6.5.3	Ingress Protection	IP 55 or better, but without suction in the meter
6.6	Output device	Meter should have flashing LED visible from the front to represent energy recording. Resolution shall be such that satisfactory accuracy test can be conducted at the lowest load in less than 5 minutes and starting current test in less than 10 minutes.
6.7	RTC	a. The meter shall have internal real time crystal clock to set date and time. b. Drift in time of this clock shall not be more than ±5minutes/ year at a reference temperature of 27°C. c. Meter should have facility for time synchronization locally through CMRI.

		d. Metering equipment shall have facility for remote synchronization. Any time correction events shall be registered in meter's memory and data acquisition software.
6.8	Battery	Lithium ion battery with guaranteed shelf life of 10 years and capacity life of 15 years. Lithium thioyl Chloride battery will be preferred. In case battery removal or total discharge same should not affect the working & memory of the meter.
6.9	Memory	Non volatile memory independent of battery backup, memory should be retained up to 10 year without any auxiliary power.
6.10	Self Diagnostic feature	Meter shall have self diagnostic for the following a. Date and RTC. b. Battery. c. Non volatile memory. d. Display e. Status of Communication card
6.11	Optical port	Meter shall have an optical port with a metal ring to hold magnet of probe. Optical port shall comply with hardware specifications provided in IEC-62056-21.
6.12	Clearance and Creepage distance	As per relevant IS.
6.13	Mounting	Surface / Flush mounted.
6.14	Electronic components	All active & passive components should be surface mounting type and shall be assembled by state of the art assembly processes
6.15	Power Supply	The power supply should comply with the relevant standards. Power supply unit of the meter should not be affected in case maximum voltage of the system appears across the terminals due to faults or due to wrong connections.
6.16	Protection against Corrosion	a. Internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc.

		b. Mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.
6.17	Meter Sealing Arrangement	Sealing should be in accordance with IS and CEA metering regulations with latest amendments. Approval shall be taken from purchaser for location of seals.
6.17.1	Manufacturer's Seals	c. One Polycarbonate seal to be provided on meter cover. d. Minimum one seal as Hologram type, numbered with hologram transfer on tamper proof paper seal. Seal should not be just Hologram sticker (100% hologram).
6.17.2	BSES Seals	a. Minimum one seal as Hologram type, numbered with hologram transfer on tamper proof paper seal. Seal should not be just Hologram sticker (100% hologram). Meter sides should not have sharp edges to avoid damage to hologram seals. b. Minimum one Polycarbonate seal should be provided on top cover. c. Seals will be issued to manufacturer free of cost.
6.17.3	Seal record	Record of all seals shall be forwarded to purchaser with each lot.
6.18	Insulation	A meter shall withstand an insulation test of 4 KV and impulse test at 6 KV
6.19	Name Plate and marking	a. Meter should have clearly visible, indelible and distinctly marked name plate in accordance with relevant IS clause no. 10.0 of this specification. b. All markings and details shall be printed by laser only. c. Paper stickers are not allowed for name plate.
6.20	Resistance against heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per relevant IS.

6.21	Guarantee	a. 5.5 years from the date of dispatch or 5 year from date of commissioning, whichever is earlier b. Manufacturer shall undertake a guarantee to replace meter up to a period of 5 Year from the date of supply. The meters which are found defective/inoperative within the guarantee period shall be replaced.

7.0 Functional Requirement

7.1	Meter category	Meter should comply with C1 category of IS 15959 (Part 1).
7.2	Mode of metering	Forwarded Only: In this mode any export active energy shall be treated as import energy and shall be recorded in forward only register. Apparent energy calculation in this mode shall be as per Lag Only.
7.3	kVAh Calculation	Lag only: KVAh is computed based on KVArh and KWH value. If PF=1, or leading, then KVAh = KWH. At no instance KVAh < KWh.
7.4	MD calculation	Block window with default demand integration period of 1800 s configurable to 900 s as per requirement. Extended register shall be used for MD recording. It should be possible to reset MD automatically at the defined date (or period) or through CMRI with proper security. Meter shall store and display MD upto two decimal
7.5	TOD Metering	i. Meter shall be capable of doing TOD metering in minimum 4 tariff rate registers programmable for minimum 8 time zones and 4 seasonal profiles. ii. Meter shall be capable of doing TOD metering for kWh, kVARh, kVAh and MD in kW, kVAR and kVA . Reactive parameter should be recorded separately for Lag and Lead. iii. TOD programmable on site through CMRI or

		AMR remotely. iv. At Display as well as BCS end meter TOD values shall be shown as per cumulative values of TOD Zones of respective registers. v. TOD metering shall be implemented by the activity colander method of IS 15959 Part 1 clause 9/ DLMS UA-1000-1 vi. Special Day table shall be defined as per IEC/ DLMS UA-1000-1 vii. Default TOD programming shall be as per latest DERC guidelines. Prior approval shall also be taken from BSES for the same. viii. Tariff rate registers shall be as follow R1: Rate register for Peak R2: Rate register for Normal R3: Rate Register for Off Peak
7.6	Instantaneous Parameters	All the parameters mentioned in table '27' of IS 15959 (Part 1) along with following additional parameters shall be supported by meter. a. Neutral Current (I_N) b. % TDH in R Phase Voltage c. % THD in Y Phase Voltage d. % THD in B Phase Voltage e. % THD in R Phase Current f. % THD in Y Phase Current g. % THD in B Phase Current h. temperature i. GSM signal Strength in milli db. j. Voltage angles for phasor representations. Method of Measurement for harmonic parameters at sl no. 'b' to 'g' shall confirm to the IEEE 519, 2014. All the energies should be measured and recorded with and without harmonics.

7.6.1	Association Rights	As per Clause 7 and annexure E of IS 15959 (Part 1).
7.7	Billing data	a. Billing parameters shall be generated at the end of each billing cycle and stored in memory as per provisions provided in clause no. 10 of IS 15959 (Part 1). b. 12 no's billing cycle parameters shall remain in meter memory along with current cycle parameters and shall be available for reading as well as profile and or 'by entry' for selective access. c. All the energies should be measured and recorded with and without harmonics. d. All the parameters mentioned in table '29' of IS 15959 (Part 1) shall be supported by meter along with following additional parameters: i. Cumulative power interruption counts in all monthly history data ii. Monthly Power off duration in all history data.
7.7.1	Association Rights	As per Clause 7 and annexure E of IS 15959 (Part 1).
7.7.2	Selective access	Support for selective access shall be provided for billing parameters as per clause no 11.3 of IS 15959 (part 1).
7.7.3	Billing period reset/ MD reset	00:00 Hrs of Ist of every month
7.7.4	Billing period reset mechanism	As per clause 10 of IS 15959 (Part 1)
7.7.5	Billing period counter	Cumulative billing period counter since installation and available billing periods shall be provided as per clause 11.2 of IS 15959 (Part 1).

7.8	Load survey Data	a. Load survey parameters shall be measured and recorded at the end of each profile capture period for last 60 Power ON days. b. All the parameters mentioned in table '28' of IS 15959 (Part 1) along with following additional parameters shall be supported by meter: i. % THD in R Phase Voltage ii. % THD in Y Phase Voltage iii. % THD in B Phase Voltage iv. % THD in R phase Current v. % THD in Y Phase Current vi. % THD in B Phase Current vii. Phase wise Voltage and Current (Line, Active, Reactive) with instant and average value. viii. All three phase active, reactive (lag and lead) and apparent power and energy ix. power-off time in integration period x. Neutral Current Note: All the energies should be measured and recorded with and without harmonics.
7.8.1	Profile capture period	Default 1800 s programmable to 900 s.
7.8.2	Selective Access	Support for selective access shall be provided for billing parameters as per clause no 11.3 of IS 15959 (part 1).
7.8.3`	Association Rights	As per of IS 15959 (Part 1)
7.9	Daily load profile	Daily load profile parameters shall be measured and recorded at each midnight i.e. 00:00 hrs for last 60 Power ON days. All the parameters mentioned in table 57 of annexure E IS 15959 (Part 1) alongwith following additional parameters shall be supported by meter as Daily load profile parameters. i. All three phase active, reactive (lag and lead)

		and apparent energy All the energies shall be measured and recorded with and without harmonics.
7.9.1	Association Rights	As per Clause 7 and annexure E of IS 15959 (Part 1).
7.10	General Purpose Parameters	Following parameters shall be provided in Non Volatile memory (NVM) of the meter as per Annexure F of IS 15959 (Part 1).
7.10.1	Name Plate Detail	As per Table '30' of IS 15959 (Part 1) along with following additional parameter a. Manufacturing month of meter.
7.10.2	Association Rights	As per Annexure F clause F-2 of IS 15959 (Part 1)
7.10.3	Programmable parameters	These parameters can be programmed remotely by AMR system and locally by CMRI via proper access writes. Every transaction shall be logged in non volatile memory of the meter with date and time stamp. Programming of any of the parameters shall increment the 'Cumulative programmable count' value. All the parameters mentioned in table '31' of IS 15959 (Part 1) shall be supported by meters with following additional parameters.
7.10.4	Association rights	As per Annexure F clause F-2 of IS 15959 (Part 1)
7.15	Security	a. Advanced security outlined in clause 7.1.2 of IS 15959 (Part 1) shall be provided. b. Reading and writing data into meter memory via optical and remote communication port shall be through DLMS security keys only. c. Bidder shall ensure to safeguard high security keys used for configuring parameters into meter. d. Once the meter memory is locked during manufacturing process, only parameters mentioned in IS 15959 shall be configurable even in factory. It should not be possible to

		configure any other parameters. e. Please note that there shall be no other mechanism/ method to interface with meter through optical and remote communication port except mentioned in IS 15959, even for manufacturer. f. It should not be possible to change data stored in meter memory even after accessing meter memory physically. In case of any change in memory data, a flag/alert shall be generated. Flag/Alert shall be indicated over display and in remote communication also.
7.18	Event and tamper detection	Meter shall detect and log any exceptional/ fraud/ tamper conditions in its memory as an event. In addition to this all transactions and control shall also be recorded as an event in meter memory. Each event type shall be identified by an event ID.
7.18.1	Association Rights	Each event shall be available to download as per following association rights. a. Public Client: No access b. Meter Reader: Read only c. Utility Settings: Read only
7.18.2	Compartments of events	Meter shall be able to log events in following compartments a. Voltage Related Events b. Current Related Events c. Power Related Events d. Others Events e. Non Roll Over Events f. Transaction related events

		a. Occurrence and Restoration of Voltage Related, current related, power related and other events shall be logged in meter memory as per IS 15959 (Part 1). Please refer annexure 'A' for description of events, Event ID, Logics of events and threshold values of events. b. Threshold values shall be factory programmable. c. Selective access shall be provided as per clause 11.3 of IS 15959 (Part 1). d. For each of the events a certain list of parameters shall be captured. e. For each occurrence event captured, the cumulative tamper count shall be incremented.
7.18.3	Parameter Snapshot	Meter shall capture all the parameters mentioned in table '39' of IS 15959 (part 1) including following parameters when event occurrence and restoration is logged a. Meter Date, time, b. voltages, c. Phase currents, d. Neutral current, e. Power factor, f. Active power, g. Apparent power, h. Signed reactive power, i. Cumulative kWh, cumulative kVAh, cumulative kVArh (lag and lead) etc Detailed harmonic profile shall be captured at occurrence of High harmonic events.
7.18.4	Event Logging	The meter shall log minimum 100 tamper events (ensuring at least 20 events for each tamper).

7.18.5	Tamper Indication	Appropriate Indications/Icons for all tampers should appear on the meter display either continuously or in auto display mode.
7.19	Phasor Representation	Meter shall support parameters required to develop phasors of currents and voltages. BCS/HES shall be capable to draw correct phasor diagram.
7.20	Harmonic Energies	All the energies measured and recorded with and without harmonics.

8.0 Meter Display

8.1	LCD Type	STN Liquid crystal with backlit
8.2	Viewing angle	a. Minimum 120 Degree. b. The display visibility should be sufficient to read the Meter mounted at height of 0.5 m as well as at the height of 2 m.
8.3	Size of LCD	Minimum 10X5mm PIN Type
8.4	LCD Digits	Total 7 digits
8.5	LCD language	English
8.6	Display modes	a. Auto Mode b. Manual Mode c. Sub active mode Please refer annexure D for parameters list.
8.7	Display indications	Appropriate indications/flags for all tampers and self diagnostic features should be provided.

9.0 Data and communication protocol/ HES/Integrations/ Software

9.1	Data Exchange protocol	a. Meter should comply Indian companion of data exchange and tariff control specification IS 15959 (Part 1). b. In case of additional requirement from IS 15959 (part 1), they shall be as per DLMS standards/ IEC DLMS protocols suite (62056). c. Bidder shall explain in detail the additional parameters/

		services/ methods used in meters from IS 15959 (part 1) and its reference to DLMS books/ IEC. d. Prior to manufacturing of meters' bidder shall provide a detailed specification explaining all parameters/ services/ methods used in meter in addition to IS 15959 (Part 1).
9.3	Base computer software	Licensed Software with the following features should be supplied for free to download meter through optical port. The software should have capability to transfer data from single CMRI to PC and the multiple CMRI data download to PC with a loader charger.
9.3.1	Operating System	BCS should be compatible for latest Windows operating system.
9.3.2	Security	System shall be password protected where user can login only if login ID is provided by administrator. BCS shall have rights management system so that access rights can be provided as per requirement to maintain security.
9.3.3	Database	BCS shall maintain master database according to desired area, location, and region etc.
9.3.4	Reporting	a. BCS shall have option of user defined report generation in format of Excel, Word and CSV, XML, PDF etc. b. BCS shall have capability to export data in ASCII, CSV and XML format at desired location so that the same could be integrated with our billing data for processing. c. All the data available in the meter shall be convertible to user defined ASCII, CSV and XML file format.
9.3.5	Data transfer rate	BCS and communication ports should support data transfer rate of 9600 bps (minimum).
9.4	Hand Held Unit Software	a. The manufacturer has to provide software capable of downloading all the data stored in meter memory through DOS based, operating system handheld units (HHU/ CMRI) through optical port. b. In the event of order, bidder shall work with BSES IT team to develop HHU software for meter downloading

		and its integration with our SAP billing system. c. HHU software should have option for selection of parameters to be downloaded from meter. d. Meter data consisting of all parameters and complete load survey for all parameters shall be read by HHU in minimum possible time as provided by BSES user template. e. Meter data consisting of all parameters and 60 days load survey for above parameters shall be read by CMRI/AMR and downloaded on desktop PC in minimum possible time and it shall be indicated at the time of finalizing GTP. (The meter reading time should not be more than 5 minutes for complete set of data). f. Necessary provision shall be made in the software for converting all the parameters available for new and old meters if supplied earlier. g. Copy of operation manual shall be supplied. The software should have selection of meters by date, serial number,data file name or groups of files for data conversion to text file process. d. The Supplier shall provide meter reading protocols. Same need to be confirmed and mutually agreed before supply. h. Vendor to jointly work with BSES IT team to develop CMRI software for meter downloading and further uploading on computer i. Training in the use of software shall be provided by the manufacturer.
9.5	Training	Manufacture shall impart training to BSES personnel for usage of software
9.6	Modem	
9.6.1	For Meter type-1 (as per clause 5.1)	Inbuilt or external 4G/ NBIOT with 2G fall back modem compatible for accessing complete meter data through AMR of energy meters installed at the consumer premises. If external type modem is provided, same should be mounted in the

		LTCT box. Refer Annexure – F for details of LTCT box.
9.6.2	For Meter type-2 (as per clause 5.2)	Inbuilt 4G/ NBIOT with 2G fall back modem compatible for accessing complete meter data through AMR of energy meters installed at the consumer premises. The modem shall be accessible only after opening the front cover of the meter. SIM Card Holder shall be accessible only after removal of terminal cover.

10.0 Name Plate

10.1	Meter Serial number shall be of 8 digits. Serial number shall be printed in black colour. Embossing is not acceptable.
10.2	Size of the digit shall be minimum 5X3 mm . Details shall be printed by laser printing preferably.
10.3	Bar code shall be printed below the serial number
10.4	BIS registration mark (ISI mark)
10.5	'BSES' insignia shall be printed above LCD display.
10.6	BSES PO No. & date and Property of BSES
10.7	Manufacturers name and country of origin
10.8	Model type / number of meter
10.9	Month and Year of manufacturing
10.10	Reference voltage / current rating
10.11	The number of phases and the number of wires for which the meter is suitable. Graphical symbol as per IS 12032 can be used.
10.12	Meter constant Impulse/kWh Impulse/kVAh/kVArh
10.13	Class index of meter
10.14	Reference frequency
10.15	Warranty period

11.0 Component Specification

11.1	Current Transformers	The Meters should be with the current transformers as measuring elements.	To meet accuracy requirement
11.2	Measurement or computing chips	The Measurement or computing chips used in the Meter should be	Analog Devices, Cyrus Logic, Atmel, Phillips,

		with the Surface mount type along with the ASICs.	SAMES ,NEC,TEXAS
11.3	Memory chips	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	Atmel, National Semiconductors, Texas Instruments, Phillips, ST, Hitachi, Compiled
11.4	Display modules	a. The display modules should be well protected from the external UV radiations. b. The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). c. It should be STN type industrial grade with extended temperature range min 70 ºC.	Hongkong: Genda Singapore: Bonafied technologies Korea: Advantek China: Success Japan: Hitachi, Sony
11.5	Optical port	The mechanical construction of the port should facilitate the data transfer. Communication shall not disturbed by external light.	USA: National Semiconductors, HP Holland/ Korea: Phillips Japan: Hitachi, Ligitek
11.6	Power Supply	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections.	SMPS Type

11.7	Electronic components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes. The PTH components should be positioned such a way that the leads of components should not be under stress and not touching the internal wires.	USA: National Semiconductors, Atmel, Phillips, Texas Instruments. Japan: Hitachi, Oki, AVX or Ricoh Korea: Samsung
		LED	Everlight, Agillent
11.8	Mechanical parts	a) The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b) The other mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.	
11.9	Battery	Lithium with guaranteed life of 15 years	Texcell, SAFT, Varta, Tedirun, Sanyo
11.10	RTC & Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Philips, Dallas Atmel, Motorola, Microchip, TEXAS, Japan: NEC, Oki
11.11	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	(BBT test is must)
11.12	Note	a. The components used by manufacturer shall have “Minimum Life” more than the 10 years. b. Incase vendor want to use other make components; same shall	

		be approved by BSES before use. c. Even for existing supplier – fresh approval is needed for all deviations. d. Manufacturer should have complete tracking of material used in meter. BSES reserve the right to carry out audit of inventory/ manufacturing process at manufacturer's works and sub vendor's work.	

12.0 Quality Assurance, Inspection and Testing

12.1	Vendor's Quality Plan (QP)	To be submitted for Purchaser's approval.
12.2	Sampling Method	Sampling Method for quality checks shall be as per relevant IS/ IEC/ CBIP guidelines and Purchaser's prior approval shall be taken for the same.
12.3	Inspection Hold-Points	To be mutually identified, agreed and approved in Quality Plan.
12.4	Type Tests	a. The meter shall be of type tested quality including all tests specified in this specification which are beyond IS / IEC or CBIP. b. Type test conducted from CPRI/ ERDA/ or any other lab specified by BIS/ CEA for meter testing will be treated as valid. c. Type test certificate should be submitted along with offer for scrutiny. d. Any other component supplied in addition to meter shall also be type tested as per IS /IEC if applicable. e. Complete type test as per IS relevant shall be carried out on sample selected from BSES lot.

		f. Type test report should not be more than 3 years old.
12.5	Routine tests	All test marked “R” as per relevant IS
12.6	Acceptance Tests	a. All tests marked “A” as per relevant IS b. Meter functional tests as per relevant IS. c. Test for data exchange protocol as per relevant IS.. d. All the routine and acceptance tests shall be carried out as per relevant standards. e. Following tests in addition to IS shall be conducted during lot inspection. I) Dimensional and drawing verification. II) Display parameters/ sequence. III) Data Downloading from CMRI and PC. IV) Tamper/ fraud detection/logging features as per approved documents. Tamper conditions will be simulated at varying load up to Imax. Accuracy will also be checked during tamper simulation. V) Burn in chamber test. VI) Component verifications. f. Purchaser reserves the right to formulate any other test method to verify guaranteed parameters of Meter.
12.7	ESD and Magnetic Interference test	ESD and magnetic interference test will be conducted at Samir lab, Chennai/ CPRI/ ERDA/ ERTL or NABL authorized Lab
12.8	Inspection	a. Purchaser reserves the right to inspect /witness all tests on the meters at Seller’s works at any time, prior to dispatch, to verify compliance with the specification/ standards. b. Manufacturer should have all the facilities/ equipments to conduct all the acceptance tests as per relevant standards and tampers logics as per approved GTP. All the equipments including tamper logs kits/ jigs should be calibrated. c. In-process and / or final inspection call intimation shall be given in advance to purchaser.
12.9	General	a) The internal potential links should be in closed

	Requirements	position or link less meters will be preferred and there shall not be any external link. b) Deliverable with Meters. i. Hard copies for Routine test certificates with each meter till alternate is provided by vendor and approved BSES. ii. Terminal cover should be fixed on the meter before dispatch. iii. Report of seal & initial reading record. (soft copy as per BSES format) c) Box number, meter serial number, type, rating should be mentioned on cases / cartons. d) Meters shall be suitably packed with environmental friendly material in order to avoid damage or disturbance during transit or handling and to prevent in grace of moisture and dust. Also refer CEA Metering Regulation. e) In case battery removal/ total discharge same should not affect the working & memory of the meter. f) The bidder shall maintain a web site where routine test results of all meter supplied against these tender will be maintained and will be accessible to buyer/ buyer representative. g) The supplier shall give 15 day advanced intimation to enable BSES to depute representative for lot inspection. h) Vendor shall ensure that patch required for HHU/CMRI shall be provided within 4 weeks. Vendor shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline. i) Delivery of software for reading through HHU/CMRI before meter delivery is required. j) For any false events recorded in meter, vendor shall

		depute their representative for field visit within one week and provide the root cause analysis in 4 weeks time.

13.0 Packing, Marking, Shipping, Handling and Storage

13.1	Packing	a. Each meter must be packed, together with its terminal cover, in a separate environmental friendly cardboard box, which can be opened and re-closed without needing adhesives. b. Up to 4 to 5 three-phase meters must be packed together with their terminal covers in a group cardboard box, which can be opened and re-closed without needing adhesives. c. The box shall prevent, as much as possible, penetration of dust during long storage periods. The box must be designed for multiple use and be robust, with wall thickness of at least 4 mm. d. Maximum weight of a group meter box shall not be more than 25 Kg. e. The packaging will protect the meters against shock and vibration, preventing damage due to the road conditions during transport and distribution in the field. The electrical and mechanical properties shall not be affected by these disturbances. f. For shipping the boxed meters will be close packed by stockpiles of suitable quantities on pallets. The meters numbers sequence (without partition) shall be kept in each pallet. A pallet will be protected against moisture by a polyethylene hood, covered with a cardboard cover (hood), and fixed onto the pallet by parallel polypropylene bands, using protection angle bars at the corners. The hood shall be marked – on the front (wide side), on the narrow side and on the top as per clause 13.3. g. Each pallet should contain between 70 and 300 meters. The actual number of meters on each pallet will be agreed with the BSES in the event of order. h. Visual indications (stickers) shall be attached to the cardboard hood of several pallets in each container/ transport

		truck, to warn of possible rough handling during shipment, transport and storage.
13.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label.
13.3	Marking	On each group box and pallet, following details are required both on front (wide side) and top: a. BSES logo. b. Meter serial number range along with bar code. c. Unique number of box/ pallet. d. Purchaser's name e. PO number (along with SAP item code, if any) & date with bar code f. Equipment Tag no. (if any) g. Destination h. Manufacturer / Supplier's name i. Address of Manufacturer / Supplier / it's agent j. Type , rating and other description of equipment k. Country of origin l. Month & year of Manufacturing m. Case measurements n. Gross and net weights in kilograms o. All necessary slinging and stacking instructions
13.4	Test reports	Routine test report to be provided with each meter
13.5	Shipping	The seller shall be responsible for all transit damage due to improper packing.
13.6	Handling and Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet /manual to be furnished before commencement of supply.

14.0 Deviations

14.1	Deviations	a. Deviations from this specification can· be acceptable, only where the Seller has listed in his quotation the requirements he cannot, or does not, wish to comply with and which deviations the Buyer has agreed to in writing, before any order is placed.

		b. In the absence of any list of deviations from the Seller, it will be assumed by the Buyer that the Seller complies with the Specification fully.

15.0 Drawing Submission

Drawing submission shall be as per the matrix given below. All documents/ drawing shall be provided on A4 sheet in box file with separators for each section. Language of the documents shall be English only. Deficient/ improper document/ drawing submission may liable for rejection

SL	Detail of Document	Bid	Approval	Pre Dispatch
1	Guaranteed Technical particulars (GTP)	Required	Required	
2	Deviation Sheet, if any	Required	Required	
3	Tamper Sheet	Required	Required	
4	Display Parameters	Required	Required	
5	GA / cross sectional drawing of Meter showing all the views / sections	Required	Required	
6	Detail of network interface i.e. pin out, standard, voltage level etc and its integration requirement.	Required	Required	
7	Samples of each type and rating offered along with box (Highest rating offered) and communication.	2 no's	1 no's	
8	Any software and accessories required for installation/ operation of meter	Required	Required	
9	Manufacturer's quality assurance plan and certification for quality standards	Required		
10	Type Test reports of offered model/ type/ rating	Required		
11	BIS certificate	Required		
12	Complete product catalogue and user manual.	Required		
13	Customer Reference List	Required		
14	Recommended list of spare and accessories	Required		
15	Specification documents containing all parameters,		Required	

	Services, Methods in addition to companion specification of IS 15959 (part 2).			
16	Program for production and testing (A)		Required	Required
17	Makes of components		Required	Required
18	Detailed installation and commissioning instructions		Required	Required
19	As Built Drawing		Required	Required
20	Operation and maintenance Instruction as well as trouble shooting charts/ manuals		Required	Required
21	Inspection and test reports, carried out in manufacturer's works			Required
22	Routine Test certificates			Required
23	Test certificates of all bought out items			Required
24	Meter Seal data			Required
25	Mapping of meter serial no to Communication card.			Required

16.0 Delivery

16.1	Delivery	Despatch of Material: Vendor shall despatch the material, only after the Routine Tests/Final Acceptance Tests (FAT) of the material witnessed/waived by the Purchaser, and after receiving written Material Despatch Clearance (MDC) from the Purchaser.

17.0 METER REPLACEMENT

1. Manufacturer shall undertake to replace meter and box in case of failure within the guarantee period.
2. Faulty meters under Guarantee shall be verified by manufacturer at site at their own cost.
3. Manufacturer will replace the meters with the Serial numbers provided by BSES and manufacturer shall provide an excel sheet with details of returned meters, replaced meter, PO no., PO date,seals etc for mapping purpose by BSES. Format of the same can be taken from Stores if required.
4. Manufacturer shall lift the Faulty Meters from BSES Stores within 30 days of intimation.
5. Manufacturer shall inspect the meter within 5 days of intimation at Stores and inform authorized representative of BSES of any observation in writing. If manufacturer fails to inform BSES then all meters will be considered for replacement.

6. The meters which are found defective/inoperative within the guarantee period, shall be replaced within six weeks of receipt of report for such defective/inoperative meters.
7. If the defective meters are not replaced within the specified period then the same shall be treated as breach of performance and shall be liable for penalty.

Annexure- A- Guaranteed Technical Particulars

Bidder shall furnish the GTP format with all details against each clause of this specification.
Bidder shall not change the format of GTP or clause description.
Bidder to submit duly filled GTP in hard copy format with company seal.

Clause No.	Clause Description	Manufacturer's Reply
1		
2		
3		
4		
5		

Bidder / Vendor seal / signature ----------

Name of the bidder	
Address of the bidder	
Name of contact person	
Telephone number and email id	

Annexure - B- Recommended Accessories / Spares

SL	Description of spare part	Unit	Quantity
1		No	
2		No	
3			

Annexure - C- Tamper and Fraud Detection/ Events

1. Voltage Related Events:			
Description of event	**Logic Of Event**	**Logic Expression/ Threshold values**	**Persistence Time**
R Phase Voltage Missing (Occurrence/ Restoration) Y Phase Voltage Missing (Occurrence/ Restoration) B Phase Voltage Missing (Occurrence/ Restoration)	Absence of potential on any phase should be logged. Restoration of normal supply shall also be recorded. The threshold value of voltage should be programmable at factory end	Occurrence: If Vpn<10% Vref and Ip>10% Ib Restoration: If Vpn>=10% Vref and Ip>10% Ib	Occurrence: 5 Min Restoration: 5 Min
Over Voltage (occurrence/ restoration)	Meter should log high voltage event if voltage in any phase is above a threshold value.	Occurrence: If Vpn>10% Vref Restoration: If Vpn<=10% Vref	Occurrence: 5 Min Restoration: 5 Min
Low Voltage (occurrence/ Restoration)	Meter should log low voltage event if voltage in any phase is below a threshold value. Threshold value if factory programmable.	Occurrence: If Vpn<75% Vref Restoration: If Vpn<=75% Vref	Occurrence: 5 Min Restoration: 5 Min
Voltage Unbalance (Occurrence/ Restoration)	Meter should log voltage imbalance event when the difference between minimum and maximum phase voltage is more than a threshold value. Threshold value should be factory programmable.	Occurrence: If Vmax-Vmin>30% Vref Restoration: If Vmax-Vmin<=30% Vref	Occurrence: 5 Min Restoration: 5 Min
R Phase high Voltage Harmonics Y Phase high Voltage Harmonics B Phase high Voltage Harmonics	Meter should log occurrence of high voltage harmonic event when % THD in voltage of phase will be more than threshold value. Threshold value should be factory programmable.	Occurrence: If % THD in Vpn>5% of fundamental. Restoration: If % THD in Vpn<5% of fundamental.	Occurrence: 5 Min Restoration: 5 Min
Invalid Phase association	Meter should log invalid phase association event if the voltage sequence does not match with the current sequence		Occurrence: 5 Min Restoration: 5 Min
Abnormal/Invalid Voltage	Meter should log invalid voltage if phase angle between voltages deviates from the standard values by more than +/-10 degrees i.e. 120 +/- 10 degrees.		Occurrence: 5 Min Restoration: 5 Min
2. Current Related Events:			
Description of event	**Logic Of Event**	**Logic Expression/ Threshold values**	**Persistence Time**
Current Reverse/ R Phase Current Reverse (occurrence/	Meter should log the event of reversal of C.C polarity. Meter should register energy consumed correctly with any one,	Occurrence: If Ip = -ve direction Restoration: If Ip=+ve direction	Occurrence: 5 Min Restoration: 5 Min

Restoration)	two or all three current coils reversed. This event shall not be valid in bidirectional mode of metering.		
Y Phase Current Reverse (occurrence/ Restoration)			
B Phase Current Reverse (occurrence/ Restoration)			
R Phase Current Open (Occurrence/ Restoration)	Meter should log the event of current coil open. Threshold value of current should be programmable at factory end.	Vector Sum($I_R+I_Y+I_B+I_N$)>20% Ib *and I<10% Ib* *Vector Sum($I_R+I_Y+I_B+I_N$)>20% Ib*	Occurrence: 5 Min Restoration: 5 Min
Y Phase Current Open (Occurrence/ Restoration)			
B Phase Current Open (Occurrence/ Restoration)			
Current Unbalance (Occurrence/ Restoration)			
Current Bypass (Occurrence/ Restoration	Meter should log the event of current coil shorting/bypass. Threshold value of current should be programmable at factory end.	Vector Sum($I_R+I_Y+I_B+I_N$)>20% Ib *and I (any Phase) >5% Ib* *Vector Sum($I_R+I_Y+I_B+I_N$)>10% Ib*	
Over current (occurrence/ restoration)	If the current in any phase exceeds the specified threshold current, meter should log over current event.	Occurrence: If Ip>Imax Restoration: If Ip<=Imax	Occurrence: 5 Min Restoration: 5 Min
R Phase high Current Harmonics	Meter should log occurrence of high voltage harmonic event when % THD in voltage of phase will be more than threshold value. Threshold value should be factory	Occurrence: If % THD in I_P>5% of fundamental. Restoration: If % THD in I_P <5% of fundamental.	Occurrence: 5 Min Restoration: 5 Min
R Phase high Current Harmonics			
R Phase high Current Harmonics			
3. Power Related Events:			
Description of event	**Logic Of Event**	**Logic Expression/ Threshold values**	**Persistence Time**
Power OFF (occurrence/ restoration)	Meter shall detect power OFF if all phase voltages are absent. This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded.		

Abnormal Power Off (Occurrence/ restoration)	If meter micro detect power off whereas phase voltage is present than abnormal power will be recorded. Meter sall continue to record energy as per phase voltage and current.	Occurrence: If voltages at meter power supply<10% Vref and Vp>20% vref. Restoration:	NA
4. Other Events:			
Description of event	**Logic Of Event**	**Logic Expression/ Threshold values**	**Persistence Time**
Abnormal External Magnetic Influence (Occurrence/ Restoration)	a. Meter should either be immune or should log the events of attempt of tampering by external magnetic field as per relevant IS14697/ CBIP 325 with latest amendments. b. If the working of meter gets affected under the influence of external magnetic field, meter should record energy at Imax. Meter should not compute MD during this period. The meter shall record energy as per actual load once the magnetic field is removed.	As per IS 14697/ CBIP 325	As per IS 14697
Neutral Disturbance- HF, DC and Alternating (occurrence/ restoration)	Meter should log the event when AC/DC/ Pulsating voltage is injected in neutral circuit.	As per manufacturing standard.	Bidder shall define threshold values
Low Power Factor	Meter shall able to detect and log the low PF event if power factor of the load found in between 0.2 to 0.5 for a load above than a % threshold value for a threshold time value. Event shall restore if PF factor of load remain out of range 0.2 to 0.5 for a load above than % threshold value for		10% of I basic
Overload (Occurrence/ Restoration)	Meter should able to log the status of overload in KW		
HV Spark (Occurrence/ restoration)/ Jammer	Meter with communication card should be immune or log the event in the case of application of ESD upto and including 35 KV.	Immediately	NA
High neutral Current	Meter should log event of high neutral current if measured neutral current should be more than predefined threshold value.	Occurrence: If I_N > 50% of average phase current Restoration: If I_N < 50% of average phase current	Occurrence: 5 Min Restoration: 5 Min
Distorted PF	Meter shall log the event if difference between displacement		Occurrence: 5 Min

	PF and actual PF is more than a predefined value		Restoration: 5 Min

5. Non Roll over events:
Event Description
Occurrence of cover open
6. Transaction Related Events:
Detail of Transaction
Real Time Clock- Date and Time
Demand Integration Period
Profile Capture Period
Single Action schedule for billing date
Activity calendar for time zones
New firmware activated
LLS secret (MR) change
HLS key (US) change
HLS key (FW) change
Global key change
MD reset

Note:

1. Event ID's shall be defined as per BSES specification/ IS 155959 (part 1). Approval shall be taken from BSES prior to manufacturing for Event ID's
2. Logics of tampers can be changed/ upgraded via firmware up gradation from remote via proper authentication.

Annexure- E- Display Sequence and parameters list

a) Default Display (Auto Mode)

i. LCD test
ii. Meter serial no.
iii. Date
iv. Real time
v. Cumulative kWh
vi. Cumulative kVARh Lag
vii. Cumulative kVARh lead
viii. Cumulative kVAh
ix. Instantaneous load in kW, kVArh & kVA
x. TOD MD for kWh and kVAh
xi. Phase wise voltage and current (R, Y, B phases)
xii. Power factor
xiii. Neutral current
xiv. TOD Total Active Forward Energy Register(Reg 1)
xv. TOD Total Active Forward Energy Register(Reg 2)
xvi. TOD Total Active Forward Energy Register(Reg 3)
xvii. TOD Total Active Forward Energy Register(Reg 4)
xviii. TOD Total Active Forward Energy Register(Reg 5)
xix. TOD Total Active Forward Energy Register(Reg 6)
xx. TOD Total Active Forward Energy Register(Reg 7)
xxi. TOD Total Active Forward Energy Register(Reg 8)
xxii. TOD Apparent Forward Energy Register(Reg 1)
xxiii. TOD Apparent Forward Energy Register(Reg 2)
xxiv. TOD Apparent Forward Energy Register(Reg 3)
xxv. TOD Apparent Forward Energy Register(Reg 4)
xxvi. TOD Apparent Forward Energy Register(Reg 5)
xxvii. TOD Apparent Forward Energy Register(Reg 6)
xxviii. TOD Apparent Forward Energy Register(Reg 7)
xxix. TOD Apparent Forward Energy Register(Reg 8)
xxx. Temperature
xxxi. Total tamper count

b) Default Display (Push button Mode)

After using pushbutton the following parameters should be displayed.

i. LCD test
ii. Meter serial no.
iii. Date
iv. Real Time
v. Cumulative kWh

vi. Cumulative kVARh
vii. Cumulative kVAh
viii. Current MD in kW
ix. Current MD in kVA
x. MD in kVAR
xi. TOD MD for kW and kVA
xii. TOD MD occurrence for kW and kVA
xiii. Instantaneous Power factor
xiv. Instantaneous voltage R phase
xv. Instantaneous voltage Y phase
xvi. Instantaneous voltage B phase
xvii. Instantaneous current R phase
xviii. Instantaneous current Y phase
xix. Instantaneous current B phase
xx. Last month billing Date
xxi. Last month billing kWh reading
xxii. Last month billing kVARh reading
xxiii. Last month billing kVAh reading
xxiv. Last month billing Maximum Demand in kW
xxv. Last month billing Maximum Demand in kW occurrence Date
xxvi. Last month billing Maximum Demand in kW occurrence Time
xxvii. Last month billing Maximum Demand in kVA
xxviii. Last month billing Maximum Demand in kVA occurrence Date
xxix. Last month billing Maximum Demand in kVA occurrence Time
xxx. THD for both Voltage and Current
xxxi. Total Active Energy, Apparent Energy
xxxii. Fundamental Reactive Lag and Fundamental Reactive Lead Energy
xxxiii. Neutral Current
xxxiv. Temperature
xxxv. Battery status
xxxvi. PT/CT status
xxxvii. Self diagnostic flag
xxxviii. Connection check (Phase sequence)
xxxix. Cumulative Tamper count
xl. Cumulative Power off hours
xli. Note: The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated for more than 6 seconds. Provision for scroll lock by pressing for 15 sec and sent to normal after 5 minutes.

Annexure- F- Technical Specification Of LTCT Box

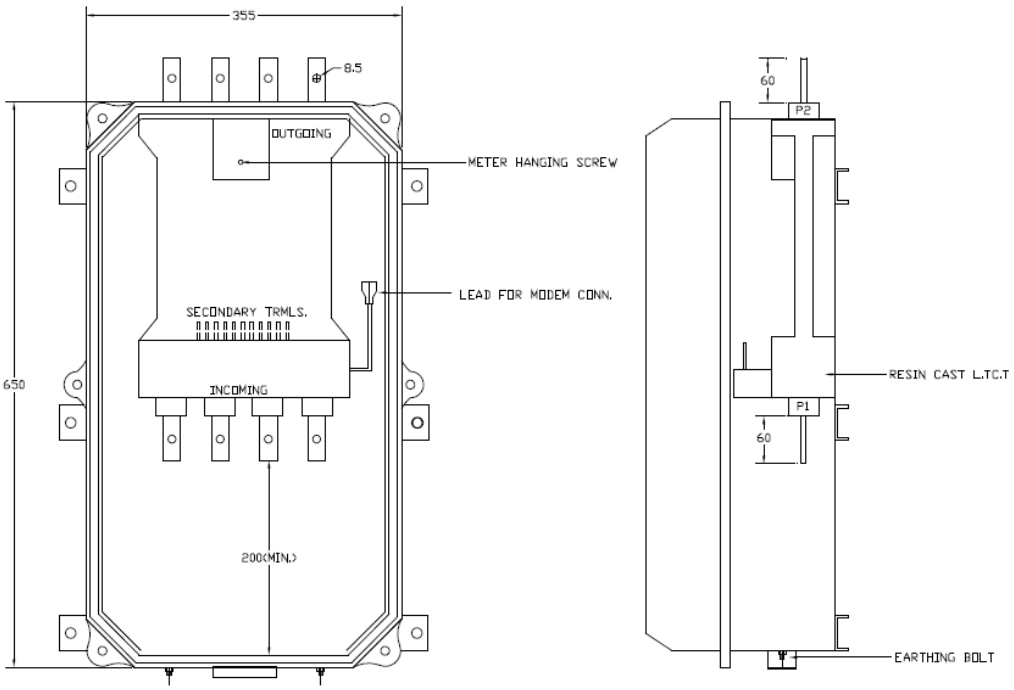
1.0	Constructional Requirement	
1.1	CT Ratio	LTCT of ratio 200/5 A,
1.2	Material	a. Polycarbonate of flammability grade V0 for both top cover and base. b. Top cover shall be transparent and base shall be of grey shade. c. Minimum thickness of sheet shall for both top cover and base shall be 3.0 mm. d. Proper stiffeners shall be provided in both base and top cover.
1.3	Method of closing box	Top cover shall be fixed by sealable bolts on base of box.
1.4	Ingress Protection	IP55 for outdoor use.
1.5	Modem mounting	a. Metallic mounting strip shall be provided to mount modem and its antenna inside the same compartment of box. b. Arrangement shall be provided to power up modem through incoming side of primary busbar using fork type terminals.
1.6	LTCT	a. 3 Phase Cast resin low tension current transformer (LTCT) with bar type primary. b. LTCT shall be mounted inside box with suitable mounting arrangement. c. Secondary terminals of LTCT shall be non removable stud type suitable for 3 Phase energy meter.
1.7	Earth Bus bar	a. Suitable for 8 KA for 1 sec. b. All the metallic hardware/ parts except bus bar and secondary terminals shall be connected to earth bus bar using bolted connection or suitable jumpers.

		c. 2 no's earthing bolt of size M16 shall be provided to connect armour of incoming cable and consumer side earthing.
1.8	Gland plate	Min 3 mm.
1.9	Incoming	Double compression PVC cable gland suitable for cable type A2XFY of size 150 Sqmm
1.10	Outgoing	a. Outgoing of primary bus bar shall be protruded outside the box. b. Suitable sealing shall be provided at exit of bus bars for outdoor use.
1.11	Box mounting arrangement	At least 03 numbers Galvanized Channels. Required hardware shall be provided.
1.12	Drawing	Reference drawings for boxes have been enclosed.
1.13	Bus Bar	Bus bar shall be tinned copper. Size of bus bar shall be suitable according to the CT ratio.
2.0	Technical Parameters of LTCT	
2.1	Type	3 Phase and Neutral CTs in a single mould of cast resin.
2.2	CT Ratio	200/5 A
2.3	Accuracy Class	0.5s
2.4	Instrument Security factor (ISF)	<=10
2.5	Burden	5VA
2.6	Insulation Level	660V/ 3kV
2.7	Power Frequency Withstand voltage	415 V/660 V
2.8	Short Time Rating	20 Times of rated primary current
2.9	Class of insulation	E
2.10	Max Temperature Rise	As per IS
2.11	Marking of terminals	a. Primary winding shall be designated as P1 and P2 to identify incoming and outgoing respectively.

		b. Secondary winding shall be marked as SR1, SR2, SY1, SY2, SB1, SB2 and SN1, SN2 for CT connections and R, Y, B for voltage connections. These marking details shall be engraved on cast resin at suitable place.
2.12	Primary Winding Type	Bar
2.8	Material of Conductor	Aluminium
1.9	Size of Conductor	Bidder need to specify. Calculation need to be provided in support of these this size.
2.10	Secondary winding	Wound
2.11	Material of conductor	Copper.
2.12	Size of conductor	Bidder need to specify. Calculation need to be provided in support of these this size.
2.13	Secondary terminals	Non removable stud type of material brass.
3.0	Name Plate	
3.1	Box	a. Following details shall be provided on name plate of box i. Name of Purchaser's and Place ii. Name of Buyer/ Logo/ Trademark and Place iii. Serial no of equipment iv. PO no and Date v. Serial no of LTCT. vi. Ratio of LTCT b. Type 1: Name plate shall be laser printed on top cover of Box.
3.2	LTCT	a. Following information shall be provided on non-removable name plate of LTCT i. Serial no of LTCT ii. Ratio iii. Accuracy Class iv. Burden

		v. ISF vi. Insulation level vii. Frequency viii. STC
4.0	Testing	
4.1	Vendor's Quality Plan (QP)	To be submitted for Purchaser's approval.
4.2	Sampling Method	Sampling Method for quality checks shall be as per relevant IS/ IEC/ CBIP guidelines and Purchaser's prior approval shall be taken for the same.
4.3	Inspection Hold-Points	To be mutually identified, agreed and approved in Quality Plan.
4.4	Type Tests	g. Box- IS 14772 h. LTCT- IS16227 i. Flammability Test on Box- IS 11731 Part 2
4.5	Routine tests	a. Box- IS 14772 b. LTCT- IS 16227
4.6	Acceptance Tests	a. Box- IS 14772 b. LTCT- IS 16227 c. Purchaser reserves the right to formulate any other test method to verify guaranteed parameters of equipment.
4.7	Inspection	d. Purchaser reserves the right to inspect /witness all test at Seller's works at any time, prior to dispatch, to verify compliance with the specification/ standards. e. Manufacturer should have all the facilities/ equipment's to conduct all the acceptance tests. All the testing equipment should be calibrated. f. In-process and / or final inspection call intimation shall be given at least 15 days in advance to the purchaser.

5.0 LTCT Box layout and CT Detail:



NOTE:-

-ALL DIMENSIONS ARE IN MM.

BSES

Technical Specification For
HT Consumer Meters

Specification No. –
BSES-TS-36-HTCTM-R0

Rev		0
Date		April 11, 2022
Prepared BY	Ashish Joshi	
Reviewed BY	Puneet Duggal	
	Vikas Srivastava	
	Lalit Mukheriya	
Approved BY	Gaurav Sharma	
	Manish Jain	

Index

Record of Revision

Revision No	Revision Date	Item / clause no.	Nature of Change	Approved By

1.0 SCOPE OF SUPPLY

1.1 Design, engineering, manufacture, testing, inspection at manufacturer's works before dispatch, packing and delivery of HT consumer meters in accordance with this specification.
1.2 Any accessories / hardware required for installation and operation for the meter.
1.3 Software required for operation of meter and its interfacing with BSES system.
1.4 All relevant drawings/documents/manuals for the meters and its accessories

2.0 CODES & STANDARDS

Following codes and standards (with latest amendments) are applicable-

S No.	Code/Standard	Title
2.1	Latest Edition	Indian Electricity Rules 1956
2.2	Latest Edition	Indian Electricity Act 1910
2.3	IS 722-1	Specification for AC Electricity Meters General Requirements & Tests
2.4	IS 1401	Protection of Persons and Equipment by Enclosure
2.5	IS 4905	Methods of Random Sampling
2.6	IS 11448	Application Guide for AC Electricity Meters
2.7	IS 14697	AC Static Transformer Operated Watthour & Var-hour Meter
2.8	IEC 60050	International Electro Technical Vocabulary
2.9	IEC 60736	Testing Equipment for Electrical Energy Meters
2.10	IEC 61000	Electromagnetic Compatibility
2.11	IEC 62052	Electricity Metering Equipment General Requirement, Tests & Test Conditions
2.12	IEC 62053	Electricity Metering Equipment Particular Requirements
2.13	IEC 62058	Electricity Metering Equipment - Acceptance Testing
2.14	CBIP304	With latest amendments

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

i. Guaranteed Technical Particulars (GTP)
ii. Specification including applicable codes & standards
iii. Approved Vendor Drawings
iv. Other documents

3.0 SERVICE CONDITIONS

3.1	Temperature Range	Operation range: -10 Deg C to 55 Deg C Limit range of operation: -25 to 60 Deg C Limit range of storage / transport : -25 to 70 Deg C

3.2	Relative Humidity	0 to 96 %

4.0 DISTRIBUTION SYSTEM DATA

4.1	Supply	3 phase 3 wire system
4.2	Voltage	11KV
4.3	Frequency	50 Hz ± 5%
4.4	System neutral	Solidly Earthed.

5.0 ELECTRICAL AND ACCURACY REQUIREMENTS

5.1	Meter Type	3 phase 4 wire static energy meter
5.2	Accuracy Class	0.5s as per IS14697
5.3	Connection	Transformer operated
5.4	Rated Voltage	3 x 63.5V (+30% & -40%)
5.5	Rated basic current	- / 5A
5.6	Rated maximum Current	Shall be two times of basic current.
5.7	Rated Frequency	50Hz +/- 5%
5.8	Power factor range	Zero Lag – unity – Zero lead
5.9	Power Consumption in Voltage circuit	Less than 1 Watt & 5 VA per phase
5.10	Power consumption in Current circuit	1 VA per phase
5.11	Starting and running with No load	As per IS14697
5.12	Starting current	0.1% of Ib
5.13	Meter constant	To be specified by bidder
5.14	Calibration	Meter shall be software calibrated at factory and modification in calibration shall not be possible at site by any means or external influence
5.15	Test Output Device	Separate kWh & kVAh/kVArh Flashing LED visible from the front
5.16	Process Technology	Surface Mounting Technology or better
5.17	Insulation Level	Meter shall withstand an insulation test of 4 KV and impulse test at 8 KV
5.18	Voltage dips and interruptions	As per IS14697
5.19	Short time over current	As per IS14697
5.20	Influence of heating and self-heating	As per IS14697
5.21	Immunity to earth/phase fault	As per IS14697
5.22	Limits of error due to Current variation	As per IS14697
5.23	Limits of error due to influence quantities	Meter shall work within guaranteed accuracy as per IS 14697/ IEC62053/ CBIP304 (most stringent standard to be followed) under and after influence of following :- a. Voltage variation

		b. Frequency variation c. 10% third harmonic in current d. Reversed phase sequence e. Voltage unbalance f. Harmonic components in current and voltage circuit g. DC and even harmonics in AC current circuit h. Odd harmonics in AC current circuit i. Sub harmonics in AC current circuit j. Continuous (DC) "stray" magnetic induction of 67mT+/-5%. k. Continuous (DC) "abnormal" magnetic induction of 0.27T+/-5%. l. Alternating (AC) "stray' magnetic induction of 0.5mT+/-5% m. Alternating (AC) "abnormal' magnetic induction of 10mT. n. Alternating (AC) "abnormal' magnetic induction of 0.2T+/-5%. o. External magnetic field 0.5 T p. Electromagnetic HF fields q. Radio frequency interference r. DC immunity test
5.24	Limits of error due to ambient temperature variation	As per IS14697
5.25	Electromagnetic compatibility	As per IS14697
5.26	Other features	Mid night data: The meter should record midnight Cumulative kWh & kVAh, kVARh lag and kVARh lead reading for last min 60 days load survey data. Total Harmonic Distortion: Meter to record harmonic components in both current and voltage circuits. And should be available in on demand display. Meter to record events in case harmonic component in both V&I if it exceeds predefined limits.

6.0 CONSTRUCTION REQUIREMENTS

6.1	General	Construction should be in accordance with IS14697.
6.2	Base Body	Opaque, UV stabilized polycarbonate of grade LEXAN 142A/ 943AA or Equivalent with V0 inflammability level
6.3	Top Cover	Transparent, UV stabilized polycarbonate of grade LEXAN 142A/ 943AA or Equivalent with V0 inflammability level It should so be designed so as the internal components should not be visible.
6.4	Assembly of base body and top cover	By ultrasonic welding
6.5	Terminal block	a. Material - Flame retardant glass filled polycarbonate of grade 500 R or equivalent. b. Terminal block shall form Integral part of the meter

		base c. Terminal block shall be capable of passing the tests as per ISO-75 for a temperature of 135C and pressure of 1.8MPa. The terminals shall be designed so as to ensure adequate and durable contact such that there is no risk of loosening or undue heating.
6.6	Terminal Cover	a. Material - UV stabilized transparent polycarbonate cover. LEXAN 143A/943AA or equivalent grade b. Provision of sealing at two points through sealing screw. c. Provision for cable entry from bottom. d. Diagram of external connections should be embossed on terminal cover. Sticker is not acceptable.
6.7	Terminals	a. Suitable for 6mm^2 stranded copper wire b. Material of terminals, screws and washers should be brass or tinned copper. Two flat head screws of appropriate size should be provided per terminal. c. Terminals shall be tested for continuous current of 150 % Imax. d. Terminals shall be clearly marked for CT/PT etc.
6.8	Ingress Protection	IP 51 or better, but without suction in the meter.
6.9	Output device	Meter should have flashing LED visible from the front to represent energy recording. LED shall be configurable for KWh, KVAh and KVArh. Resolution shall be such that satisfactory accuracy test can be conducted at the lowest load in less than 5 minutes and starting current test in less than 10 minutes.
6.10	RTC	Meter shall have internal real time clock to set date and time. Time accuracy should be as per relevant IS/IEC. Meter should have facility for time synchronization locally through CMRI. It is preferable to have facility for remote synchronization through AMR. Clock correction events shall be registered in meter's memory.
6.11	Battery	Lithium ion battery with guaranteed shelf life of 10 years and capacity life of 15 years. Battery removal or total discharge should not affect the working of the meter.
6.12	Memory	Non volatile memory independent of battery backup to store complete meter data. Data should be retained in the memory up to 10 year without any auxiliary power.
6.13	Self Diagnostic feature	Meter shall have self diagnostic for the following a. Date and RTC b. Battery c. Non volatile memory d. Display
6.14	Clearance and Creepage distance	As per IS 14697
6.15	Mounting	Surface / Flush mounted
6.16	Resistance against heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by

		thermal overload of live parts in contact with them as per IS 14697.
6.17	Electronic components	All active & passive components should be surface mounting type and shall be assembled by state of the art assembly processes.
6.18	Power Supply	The power supply should comply with the relevant standards. Power supply unit of the meter should not be affected in case maximum voltage of the system appears across the terminals due to faults or due to wrong connections.
6.19	Measurement/ computing chips	Measurement/computing ASICs should be surface mounting type.
6.20	Protection against Corrosion	a. Internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b. Mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.
6.21	Meter Sealing Arrangement	Sealing should be in accordance with IS and CEA metering regulations with latest amendments. Approval shall be taken from purchaser for location of seals.
6.21.1	Manufacturer's Seals	One Polycarbonate seal to be provided on meter cover.
6.21.2	BSES Seals	a. Minimum one seal as Hologram type, numbered with hologram transfer on tamper proof paper seal. Seal should not be just Hologram sticker (100% hologram). Meter sides should not have sharp edges to avoid damage to hologram seals. b. One Hologram seal should be provided on each side of meter i.e two hologram seals should be provided. Meter sides should not have sharp edges to avoid damage to hologram seals. c. Polycarbonate seal should be provided on top cover. Seals will be issued to manufacturer free of cost.
6.21.3	Seal record	Record of all seals shall be forwarded to purchaser with each lot.
6.21.4	Insulation	A meter shall withstand an insulation test of 4 KV and impulse test at 6 KV
6.22	Guarantee/ Warranty	66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier

7.0 FUNCTIONAL REQUIREMENTS

7.1	Billing data	a. Meter serial number b. Date and time c. Cumulative forwarded active energy d. Cumulative forwarded reactive energy (lag) &(Lead) e. Cumulative forwarded apparent energy f. Cumulative TOD energy values g. Cumulative Maximum Demand in kW , kVAr & kVA with date and time h. Last tamper occurrence and restoration details

		i. History for last 12 months i.e kWh, kVArh, kVAh, MD (in kW, kVAr and kVA with date and time), TOD energy readings. j. Monthly power on/off data for last 12 months Above data should be stored in meter memory. Instant profile : As per IS15959 part 1. In addition of following parameters Phase angles, Phasor diagram: Both for amplitude and angle of all 3V & I wrt to R phase voltage
7.2	Tariff basis	Lag only
7.3	MD Registration	Meter should store and display maximum demand in kW/kVA/kVAr with date and time. Demand integration period should be 30 minutes. It is preferred that MD is computed using separate counter rather than by difference of initial and final energy counter. Meter shall store MD in every 15/30 min. period along with date & time with sliding window (5 min interval) programmable. At the end of every 15/30 min, new MD shall be previous MD and store whichever is higher and the same shall be displayed. MD and load survey to be programmable in future. On a later date both MD and load survey can be programmed for 15/30 minutes. However accordingly load survey days shall vary.
7.4	Auto Reset of MD	Default auto reset date should be 00:00Hrs 1st day of month. Date and Time of MD reset should be programmable through CMRI. It should be possible to reset MD automatically at the defined date (or period) or through CMRI or through manual MD resetting push button.
7.4.1	kVAh Calculation	Lag only: KVAh is computed based on KVArh and KWH value. If PF=1, or leading, then KVAh = KWH. At no instance KVAh < KWh.
7.5	TOD metering	a. Meter shall be capable of doing TOD metering in minimum 4 tariff rate registers programmable for minimum 8 time zones and 4 seasonal profiles. b. Meter shall be capable of doing TOD metering for kWh, kVARh, kVAh and MD in kW, kVAR and kVA . Reactive parameter should be recorded separately for Lag and Lead. c. TOD programmable on site through CMRI or AMR remotely. d. At Display as well as BCS end meter TOD values shall be shown as per cumulative values of TOD

		Zones of respective registers. e. TOD metering shall be implemented by the activity colander method of IS 15959 Part 1 clause 9/ DLMS UA-1000-1 f. Special Day table shall be defined as per IEC/ DLMS UA-1000-1 g. Default TOD programming shall be as per latest DERC guidelines. Prior approval shall also be taken from BSES for the same. h. Tariff rate registers shall be as follow R1: Rate register for Peak R2: Rate register for Normal R3: Rate Register for Off Peak
7.6	Load survey	15/30 min integration period, load profile of phase voltage (R, Y, B) with instant and average value and line, active and reactive current (R, Y, B) with instant and average value, and all three phase active, reactive (lag and lead) and apparent power and energy of 60 days (MD integration should be 15/30 min.) Apparent Energy, load, PF, THD in both current and voltage, phase-wise demand, power-off time integration period.
7.7	Time required for data reading from meter and downloading on desktop PC	a) Meter data consisting of all parameters and 60 days load survey for above parameters shall be read by CMRI /AMR and downloaded on desktop PC in minimum possible time. (The meter reading time should not be more than 5 minutes for complete set of data for CMRI and not more than 10 minutes for AMR). b) The software should have capability to transfer data from single CMRI to PC and the multiple CMRI data download to PC with a loader charger.
7.7	Security	a. Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication etc. b. Only RTC and TOD zone timing should be programmable in field. Every transaction for RTC and TOD change shall be logged in non volatile memory of the meter with date and time stamp.
7.8	Note	Please refer draft on CBIP proposal for meter standardization for definitions and requirement of MD, Power OFF, TOD, Load Survey and meter output for field testing. Meter should comply with the requirements.

8.0 EVENT AND TAMPER MONITORING

S No.	Parameters	BSES Requirement
8.1	Top Cover Open	Meter shall have top cover open detection and same shall be logged. Detection and logging mechanism shall work even when the meter is de-energized. Top cover open event should not get reset.
8.2	External Magnetic tamper	a. Meter should either be immune or should log the events of attempt of tampering by external magnetic field as per relevant IS14697/ CBIP 304 with latest amendments. b. If the working of meter gets affected under the influence of external magnetic field, meter should record energy at Imax. Meter should not compute MD during this period. The meter shall record energy as per actual load once the magnetic field is removed.
8.3	Protection against HV spark/ESD	If the meter is subjected to HV spark/ ESD, meter shall continue to record energy or log the event. Upto 35 KV meter should remain immune. Communication port shall also be immune upto 35KV. Bidder should have valid test report from Sameer/ UL lab or any other NABL authorize Lab for the same.
8.4	Neutral disturbance	Meter should log the event when AC/DC/ Pulsating voltage is injected in neutral circuit.
8.5	Phase sequence reversal	Meter should work accurately irrespective of the phase sequence of the supply. Meter should log the event.
8.6	Detection of missing potential	Absence of potential on any phase should be logged. Restoration of normal supply shall also be recorded. The threshold value of voltage should be programmable at factory end
8.7	Low Voltage	Meter should log low voltage event if average voltage is below 75% of Vref.
8.8	High Voltage	Meter should log high voltage event if average voltage is above 115% of Vref.
8.9	Voltage Imbalance	Meter should log voltage imbalance event when the difference between minimum and maximum phase voltage is more than 10% of Vref.
8.10	Abnormal/Invalid Voltage	Meter should log invalid voltage if phase angle between voltages deviates from the standard values by more than +/-10 degrees i.e. 120 +/- 10 degrees.
8.11	Reversal of Current Coil Polarity	Meter should log the event of reversal of C.C polarity. Meter should register energy consumed correctly with any one, two or all three current coils reversed.
8.12	Current Circuit Shorting / Bypass	Meter should log the event of current coil shorting/bypass. Threshold value of current should be programmable at factory end.

8.13	Current Circuit Open	Meter should log the event of current coil open. Threshold value of current should be programmable at factory end.
8.14	Over current	If the current in any phase exceeds the rated current, meter should log over current event.
8.15	Current Imbalance	Meter should log current imbalance event when the difference between minimum and maximum phase current is more than 30% of I average.
8.16	Invalid Phase Association	Meter should log invalid phase association event if the voltage sequence does not match with the current sequence.
8.17	Power On/Off	Meter shall detect power OFF (minimum power off period 5 mins) if all phase voltages are absent. This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded.
8.18	Tamper Logging	Last 200 nos. tamper events shall be recorded in meter memory on FIFO basis excluding top cover open. Last 20 events of top cover open tamper should be recorded in the memory including the first occurrence.
8.18.1	Parameter Snapshot	Snapshot of Date, time, three phase voltage, three phase current, neutral current, three phase power factor, active power, apparent power, cumulative kWH, cumulative KVAH etc should be recorded for each tamper event
8.18.2	Tamper Indication	For each tamper event and wrong wiring connection as sequence error. Phase association error, CT reversal, Phase- CT mismatch, one/two phase no voltage , appropriate Indication/Icon should appear on the meter display either continuously or in auto display mode. Icons appearing continuously are preferable.
8.19	Tamper Logics	Logic sheet for tamper/ event detection and logging should be submitted for purchaser's approval. Following details should be provided for each tamper in tabular form a. Detailed Tamper logic b. Threshold values c. Persistence time d. Restoration time e. Snapshot details

9.0 DISPLAY

9.1	Type	STN Liquid crystal, Pin type with backlight
9.2	Viewing angle	Minimum 160 degrees
9.3	UV Protection	The display modules should be well protected from the external UV radiations
9.4	Size	Minimum 10X5mm
9.5	Digits	8 digits
9.6	Language	English
9.7	Display Parameters	Parameters to be displayed are given below

9.7.1	Auto scroll mode	a. LCD test b. Meter serial no. c. Date d. Time e. Cumulative Active Energy (forwarded) f. Cumulative Apparent Energy (forwarded) g. Cumulative Reactive Energy Lag & Lead h. Instantaneous load in kW, kVAr & kVA i. Phase wise voltage and current (R, Y, B phases) j. Instantaneous average power factor with sign for lag/lead k. Active Maximum demand with date and time l. Apparent Maximum demand with date and time m. TOD Total Active Forward Energy Register(Reg 1) n. TOD Total Active Forward Energy Register(Reg 2) o. TOD Total Active Forward Energy Register(Reg 3) p. TOD Total Active Forward Energy Register(Reg 4) q. TOD Total Active Forward Energy Register(Reg 5) r. TOD Total Active Forward Energy Register(Reg 6) s. TOD Total Active Forward Energy Register(Reg 7) t. TOD Total Active Forward Energy Register(Reg 8) u. TOD Apparent Forward Energy Register(Reg 1) v. TOD Apparent Forward Energy Register(Reg 2) w. TOD Apparent Forward Energy Register(Reg 3) x. TOD Apparent Forward Energy Register(Reg 4) y. TOD Apparent Forward Energy Register(Reg 5) z. TOD Apparent Forward Energy Register(Reg 6) aa. TOD Apparent Forward Energy Register(Reg 7) bb. TOD Apparent Forward Energy Register(Reg 8) cc. Cumulative tamper count dd. Tamper status Scroll time should be 6 Sec
9.7.2	Manual Display mode (push button mode)	Following parameters should be displayed in addition to parameters displayed in Auto display mode - a. Cumulative power on hours b. Cumulative power off hours c. Number of power failures d. Instantaneous phase wise power factor with sign for lag/lead e. Frequency f. Cumulative Billing counts g. Cumulative programming count h. Billing date i. Last month billing Active energy reading j. Last month billing Reactive energy reading-Lag k. Last month billing apparent energy reading l. Last month billing Maximum Demand in Active with date and time m. Last month billing Maximum Demand in Apparent with date and time n. High resolution active forwarded energy o. High resolution reactive lag forwarded energy p. High resolution reactive lead forwarded energy

		q. High resolution apparent forwarded energy r. Present PT Status s. Present CT Status t. THD for both Voltage and Current u. Last occurred and restored tamper with date and time The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated for more than 6 seconds. Scroll lock facility should be provided by pressing scroll push button for long duration (10-15 sec). Lock should be released by repeat action
9.7.3	Tamper indications	As per clause 8.18.2.
9.7.4	Self Diagnostic Indications	Appropriate indication for each self diagnostic feature should be displayed continuously irrespective of display mode (auto/manual).
9.7.5	Connection check	Appropriate indication to be displayed continuously in case of current/voltage connection error

10.0 SOFTWARE AND COMMUNICATION

10.1	Base computer software	Licensed Software with the following features should be supplied for free
10.1.1	Operating System	BCS should be compatible for Windows XP, Vista, 7 and 8.
10.1.2	Security	System shall be password protected where user can login only if login ID is provided by administrator. BCS shall have rights management system so that access rights can be provided as per requirement to maintain security.
10.1.3	Data access	BCS shall be capable of accessing complete data stored in meter memory locally through PC and remotely through modem (RF/NBIOT/4G/GPRS etc.) for connectivity to AMR. BCS shall also be capable of reading CMRI data. BCS should have polling feature with option of selecting parameters to be downloaded i.e billing data, event/tamper logging data etc.
10.1.4	Database	BCS shall maintain master database according to desired area, location, and region etc.
10.1.5	Reporting	a. BCS shall have option of user defined report generation in format of Excel, Word and CSV, XML, PDF etc. b. BCS shall have capability to export data in ASCII, CSV and XML format at desired location so that the same could be integrated with our billing data for processing. c. All the data available in the meter shall be convertible to user defined ASCII, CSV and XML file format.
10.2	CMRI Software	Manufacturer has to provide software capable of downloading data through CMRI. Software required for CMRI shall be supplied by the supplier for free of cost. Training in the use of software shall be provided by the manufacturer. The software shall be compatible to latest windows systems.

10.2.1	Integration	In the event of order, bidder shall work with BSES IT team to integrate CMRI software with BSES billing system i.e meter downloading, uploading data on computer etc. Meter reading protocols shall be shared with BSES.
10.2.2	Data access	CMRI software should be capable of downloading complete data stored in the meter memory. Software should have option for selection of parameters to be downloaded from meter i.e billing data, event/tamper logging data etc. Billing data should be downloadable using CMRI within 1 minute.
10.2.3	Suitability	CMRI software shall work both on SANDS & Analogic make CMRI.
10.3	Training	Manufacturer shall impart training to BSES personnel for usage of software
10.4	Communication Ports	Communication ports required in meter are as follows
10.4.1	Optical Port	Meter shall have one optical port. It should be compatible for data transfer over RS 232 standard
10.4.2	RJ11 Port	One RJ11 (6P4C) port should be provided. Please refer Annexure - B for pin configuration. Port should be compatible for communication on RS232 standard and should have cover with provision of sealing. It is preferable to have RJ11 port outside the terminal cover subject to ESD immunity upto 35 KV.
10.4.3	Port protection	All ports shall be galvanically isolated from the power circuit.
10.4.4	Operation	Both ports should work independently. Failure of one port (including display) should not affect the working of other port.
10.5	Communication protocol	DLMS/ Proprietary protocol. Integration of meters with BSES system will be supplier's responsibility.
10.6	Data transfer rate	BCS and communication ports should support data transfer rate of 9600 bps (minimum).
10.7	Data downloading cable	a. Meter reading cable of 1m length with optical sensor at one end and D type female 9 pin connector on other end should be provided with each meter. b. Optical port on meter and optical sensor should have mechanical arrangement so that the sensor can be securely placed on the optical port of meter at the time of installation for hassle free data downloading. c. D type female connector should be suitable for mounting on meter box. Suitable mounting accessories should be supplied alongwith the cable. d. Refer Annexure – C for detailed cable configuration.
10.8	Software & communication compatibility	a) Optical port with RS 232 compatible to transfer the data locally through CMRI & remote through GSM /GPRS/3G/4G technology to the main computer. b) The supplier shall supply Software required for CMRI & for the connectivity to AMR modules. The supplier shall also provide training for the use of software. The software should be compatible to Microsoft Windows systems

		(latest). Reading can be done through scheduling in BCS or through manual polling for AMR. c) Necessary provision shall be made in the software for converting all the parameters available for all open protocol meters. d) The data transfer (from meter to CMRI / AMR equipment) rate should be 9600 bps or more. e) Offered meter be DLMS protocol compliant. Bidder shall share additional vendor specific protocol if used in meter.
10.9	Memory	Non volatile memory independent of battery backup, memory should be retained up-to 10 year in case of power failure.

11.0 NAME PLATE

11.1	Meter Serial number shall be of 8 digits. Serial number shall be printed in black colour. Embossing is not acceptable. (Should also be stored in meter memory and should be downloadable)
11.2	Size of the digit shall be minimum 5X3mm. Details shall be laser printed.
11.3	Bar code shall be printed below the serial number
11.4	BIS registration mark (ISI mark)
11.5	'BSES' logo should be printed above LCD display. Property of BSES
11.6	BSES PO No. & date
11.7	Manufacturers name and country of origin
11.8	Model type / number of meter
11.9	Month and Year of manufacturing (Should also be stored in meter memory and should be downloadable)
11.10	Reference voltage and current rating
11.11	The number of phases and the number of wires for which the meter is suitable. Graphical symbol as per IS 12032 can be used.
11.12	Meter constant Impulse/kWh, Impulse/ kVAh, Impulse/ kVArh
11.13	Class index of meter
11.14	Reference frequency
11.15	Warranty period
11.16	Connections, diagrams and terminals shall be marked / provided in accordance with Indian Standard.

12.0 APPROVED MAKES OF COMPONENTS

SN	Component Function	Requirement	Makes and Origin
12.1	Measurement or computing chips	The measurement or computing chips used in the Meter should be with the Surface mount type along with the ASICs	Analog Devices, Cyrus Logic, Atmel, Phillips, Texas Instruments, SAMES, NEC
12.2	Memory chips	The memory chips should not be affected by the external parameters like	USA: Atmel, National Semiconductors, Texas Instruments, Phillips, ST,Microchip Japan: Hitachi or Oki

		sparking, high voltage spikes or electrostatic discharges.	
12.3	Display modules	a) The display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted at height of 0.5 meter as well as at the height of 2 meters (refer 3.2.d for Viewing angle). c) The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). d) It should be trans-reflective HTN or STN type industrial grade with extended temperature range minimum 70	Japan: Hitachi, Sony Holland / Korea: Phillips Truly Semiconductor Tianma/Hijing Electronics
12.4	Communication modules		USA: National Semiconductors, HP, Optonica,ST, Holland / Korea: Phillips Japan: Hitachi Germany: Siemens
12.5	Optical port	a) Optical port should be used to transfer the meter data to meter reading instrument. b) The mechanical construction of the port should be such to facilitate the data transfer easily. 9 pin connector of optical port shall be FCI copper type.	USA: National Semiconductors ,HP Holland / Korea: Phillips Japan: Hitachi, Truly Semiconductor, Agillent, OSRAM, Everlight
12.6	Power supply unit	The power supply should be with the capabilities as per the relevant standards. The	SMPS Type, reputed make

		power supply unit of the meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections.	
12.7	Active & passive components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes. The PTH components should be positioned such a way that the leads of components should not be under stress and not touching the internal wires. LED	USA: National Semiconductors, Atmel, Phillips, Texas Instruments, ST, Onsemi, Japan: Hitachi, Oki, AVX or Ricoh, Samsung, Everlight, Agillent Everlight, Agillent
12.8	Battery	Lithium with guaranteed life of 15 years.	Varta, Texcell, SAFT
12.9	RTC	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Philips, Dallas Atmel, Motorola, Microchip , NEC or Oki
12.10	Mechanical parts	a) The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b) The other mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.	
12.11	Current Transformers	The meters should be with the current transformers as measuring elements. The current transformer should withstand as per	The current transformer should withstand as per specifications/standards.

		specifications/standards.	
12.12	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	
12.13	Note		a. Manufacturer shall intimate deviation if any from make of components. Any deviation is subject to approval of BSES based on supporting documents and performance feedback of the components. b. Manufacturer should have complete tracking of material used in meter. BSES reserve the right to carry out audit of inventory/ manufacturing process at manufacturer's works and sub vendor's work. c. The components used by manufacturer shall have "Minimum Life" more than the 10 years. d. Even for existing/ par suppliers – fresh approval is needed for all deviations

13.0 QUALITY ASSURANCE, INSPECTION AND TESTING

13.1	Quality Assurance Plan (QAP)	To be submitted for Purchaser's approval.
13.1.1	Inspection Hold-Points	To be mutually identified, agreed and approved in QAP.
13.1.2	Sampling Method	Sampling Method for quality checks shall be as per relevant IS/ IEC/ CBIP guidelines and Purchaser's prior approval shall be taken for the same.
13.2	Type Tests	a. The meter shall be of type tested quality as per relevant IS/IEC/CBIP. Type test conducted at CPRI/ ERDA/ ERTL labs will be treated as valid. b. The test report should not be more than 5 years old. In case any modification affecting only part of meter is made after type test, only specific type tests on the affected parts shall be repeated. c. Type test certificate should be submitted along with offer for scrutiny. d. For a manufacturer supplying meter for the first time, complete type tests will have to be carried out on sample randomly selected from the lot offered for inspection in event of order. 35kV ESD test will also be carried out on the sample at Sameer/UL lab. e. For regular suppliers, revalidation of meter design

		should be carried out by repeating the type tests on sample randomly selected from BSES lot at CPRI/ERDA every three years f. Any other component supplied in addition to meter shall also be type tested as per IS /IEC if applicable.
13.3	Routine tests	All test marked "R" as per IS14697
13.4	Acceptance Tests	a. All tests marked "A" as per IS14697. b. Dimensional and drawing verification. c. Display parameters/ sequence. d. Data Downloading from CMRI and PC. e. Tamper detection/logging features as per approved documents. Tamper conditions will be simulated at varying load up to Imax. Accuracy will also be checked during tamper simulation. f. Burn in chamber test. g. Component verification. h. Purchaser reserves the right to formulate any other test method to verify guaranteed parameters of Meter.
13.5	Inspection	a. Purchaser reserves the right to inspect /witness all tests on the meters at Seller's works at any time, prior to dispatch, to verify compliance with the specification/ standards. b. Manufacturer should have all the facilities/ equipments to conduct all the acceptance tests as per clause 13.4 during inspection. All the testing equipment should be calibrated. c. In-process and / or final inspection call intimation shall be given at least 15 days in advance to the purchaser.
13.6	General Requirements	**a)** The internal potential links should be in closed position or link less meters will be preferred and there shall not be any external link. **b)** Terminal cover should be fixed on the meter before dispatch. **c)** The bidder shall maintain a web site where routine test results of all meter supplied against these tender will be maintained and will be accessible to buyer/ buyer representative. **d)** Vendor shall ensure that patch required for HHU/CMRI shall be provided within 4 weeks. Vendor shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline. **e)** Delivery of software for reading through HHU/CMRI before meter delivery is required. **f)** For any false events recorded in meter, vendor shall depute their representative for field visit within one week and provide the root cause

		analysis in 4 weeks time.

14.0 SHIPPING, HANDLING AND SITE SUPPORT

14.1	Packing	Every metes shall be properly sealed / packed in environmental friendly boxes/ cartons for protection against damage, vibration and ingress of dust and moisture.
14.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label.
14.3	Marking	Following details are required on each packing case: a. Individual serial number b. Purchaser's name c. PO number (along with SAP item code, if any) & date d. Equipment Tag no. (if any) e. Destination f. Manufacturer / Supplier's name g. Address of Manufacturer / Supplier / it's agent h. Type , rating and other description of equipment i. Country of origin j. Month & year of Manufacturing k. Case measurements l. Gross and net weights in kilograms m. All necessary slinging and stacking instructions
14.4	Test reports	Routine test report to be provided with each meter
14.5	Shipping	The seller shall be responsible for all transit damage due to improper packing.
14.6	Handling and Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet /manual to be furnished before commencement of supply.

15.0 DEVIATIONS

15.1	Deviation	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.

16.0 DOCUMENT AND DRAWING SUBMISSION

16.1	The seller has to submit following along with bid
16.1.1	GTP (duly filled-in) (as per Annexure — A)
16.1.2	Deviation sheet, if any.
16.1.3	GA / cross sectional drawing of Meter showing all the dimensions
16.1.4	4 no's samples along with software and accessories.
16.1.5	Tamper logic sheet.
16.1.6	Detailed reference list of customers using the offered product during the last 5 years with similar design and rating
16.1.7	Manufacturer's quality assurance plan and certification for quality standards
16.1.8	Type test reports for the same type, size & rating of Meter offered

16.1.9	Complete product catalogue and Manual.
16.1.10	Details of recommended accessories / software or any other hardware for five years of operation.
16.2	Seller has to submit following drawings for buyer's Approval/ Reference after award of contract -
16.2.1	Program for production and testing
16.2.3	4 no's samples along with software and accessories for Lab testing
16.2.4	Guaranteed Technical Particulars
16.2.5	GA / cross sectional drawing of Meter showing all the dimensions
16.2.6	Tamper logic sheet.
16.2.7	Makes of components
16.2.8	Terminal arrangement with dimensions
16.2.9	Detailed installation and commissioning instructions
16.2.10	Quality assurance plan
16.3	Submittals required prior to dispatch
16.3.1	Inspection and test reports, carried out in manufacturer's works
16.3.2	Test certificates of all bought out items
16.3.3	Operation and maintenance Instruction as well as trouble shooting charts/ manuals
16.3.4	Drawing and document sizes Standard size paper A4
16.3.5	Duly signed & stamped copies of the drawings / documentation
16.3.6	Consolidated report including routine test, seal record and initial reading record as per BSES format.
16.3.7	Other documents: a. Completely filled-in Technical Parameters b. General arrangement drawing of the meter c. Rating plate d. Terminal Block dimensional drawing e. Mounting arrangement drawings f. Meter box drawing and dimensions g. Display parameter h. PIN configuration of Optical to RJ11 connector i. Manual and SOP/DWI for operation

ANNEXURE – A - GUARANTEED TECHNICAL PARTICULARS (DATA BY SUPPLIER)

Bidder shall furnish the GTP as per format provided below. All the clauses of the specification shall be covered in GTP. Any deviation or comments shall be specifically mentioned against each clause. No comments or deviation will be treated as acceptance.

Complete GA drawing, technical literature, operation and maintenance manual of hardware/ software shall be provided with technical bid.

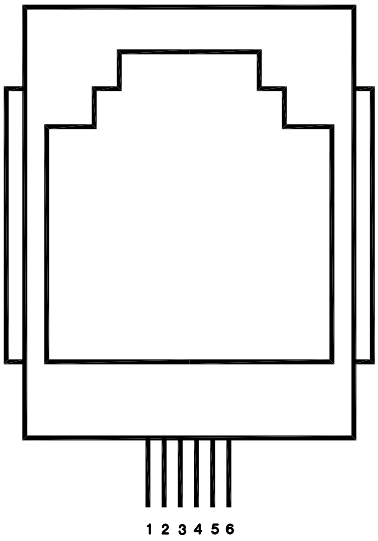
Incomplete technical bids are liable to be rejected without any intimation.

Clause no	Description	Compliance of the clause YES / NO	Deviation / Remarks
1			
2			
3			
4			
5			
6			

Bidder / Vendor seal / signature ----------

Name of the bidder	
Address of bidder	
Name of contact person	
Telephone no & email id	

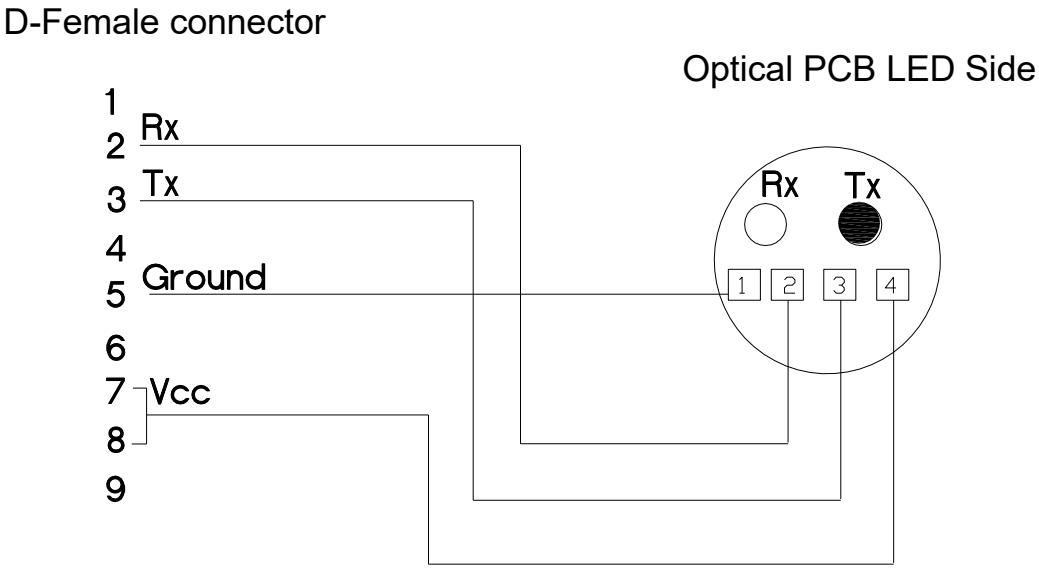
ANNEXURE – B – RJ11 PORT DETAILS



RJ- 11 PORT

PIN OUT DETAIL		
PIN	SIGNAL	DISCRIPTION
1	NC	———
2	GND	GROUND
3	TXD	RS 232 TRANSMIT
4	GND	GROUND
5	RXD	RS 232 RECEIVE
6	NC	———

ANNEXURE – C – CONFIGURATION OF OPTICAL CABLE



Technical Specification for

Three Phase HT 3 Phase 4 Wire

Energy Audit Meter (For HVDS Applications)

Specification no – BSES-TS-144-HTEAM-R0

Rev		**0**
Date		**April 13, 2023**
Prepared BY	Ashish Joshi	
Reviewed BY	Puneet Duggal	
	Vikas Srivastava	
	Lalit Mukhriya	
Approved BY	Gaurav Sharma	
	Manish Jain	

VERSION CONTROL

SN	Date	Previous Version No.	Current Version No.	Author
1	01.08.19	NA	GN101-03-SP-182-00	Md. Akhtar Ansari, Rishi Goyal

Contents

1.0 SCOPE

This specification covers design, engineering, manufacture, assembly, inspection, testing at manufacturers' works before dispatch, supply of 3 phase 4 wire, Class 0.5 accuracy, lag only, HT CT-PT operated energy meter for HVDS application. The meter shall be suitable for measurement of energy and power, demand requirement in an A.C. balanced/unbalanced system over a power factor range of zero lag to zero lead. These meters should have communication ports to interface standard modems for remote meter reading on Cellular technology.

The Purchaser wishes to have these energy meters installed to measure & log energy with other associated electrical parameters, at HVDS s/s installation for energy accounting purpose & operational data collection. The purchaser desires that the metering system should be flexible enough to the changing requirements of future tariffs and designed for minimum maintenance. Meters shall be having standard remote communication links for remote data collection. A related base computer & analysis software (BCS), as per the details given in this specification, shall also be supplied along with the meters.

2.0 APPLICABLE STANDARDS

SN	Standards
1	IS 14697: 1999 for Class 0.5
2	IS :13779:1999 for class 1.0
3	IEC 687 for Class 0.5
4	IEC 61036 for Class 1.0 with latest amendments
5	CBIP Technical Report No. 88 with latest amendments
6	CBIP Manual – No. 325
7	IS 9001:2008

3.0 TECHNICAL SPECIFICATION

SN	Parameters	Technical Requirements
3.1	Voltage	63.5 V (P-N) with +20% to -30% Vref.
3.2	Rated secondary current	-/5 Amps. Balanced & unbalanced load
3.3	Display	LCD, scrolling, 5 sec for each parameter
3.4	Display parameters	a) LCD (Seven digits) b) Height: 10 mm X 5 mm min. c) Pin Type d) Viewing angle min. 60 degrees Phasor diagram/ wiring error: Offered meter shall have connection check display parameter for this requirement, also meter shall have phase enunciators to indicate the availability of phases on display. However meter should have phase association event to capture phase association error.
3.5	Power Consumption	As per relevant IS.
3.6	Starting current	0.1 % of I_b for Class0. 5 and 0.2 % Ib for Class 1.0
3.7	Frequency	50 Hz with + / - 5% variation
3.8	Process technology	SMT or better

SN	Parameters	Technical Requirements
3.9	Test Output Device	Flashing LED visible from the front for kWh, kVAh, kVARh
3.10	Billing data	a) Display parameters: LCD test, date & time, cumulative KWH, cumulative kVAh & kVARh, MD in kW & kVA, PF, V, I (cumulative kWH, kVAh and other parameter with pushbutton.) b) Display order shall be as per Annexure-1
3.11	MD Registration	a) Meter shall store MD in every 15/30 min. period along with date & time with sliding window (5/15/30 min interval) programmable. At the end of every 15/30 min, new MD shall be previous MD and store whichever is higher and the same shall be displayed. MD and load survey to be programmable in future. On a later date both MD and load survey can be programmed for 15/30 minutes. However accordingly load survey days shall vary. b) It shall be possible to reset MD automatically at the defined date (or period) or through MRI or through manual MD resetting push button. c) MD reset button shall be sealable.
3.12	Auto Reset of MD	Auto reset date for MD shall be indicated at the time of finalizing GTP and provision shall be made to change MD reset date through MRI even after installation of meter on site.
3.13	TOD metering	Meter shall be capable of doing TOD metering for kWh, kVARh, kVAh and MD in kW and kVA with 7 time zones (programmable on site through CMRI). TOD shall be as per latest DERC tariff order. TOD parameters as per DERC should be programmable on site through CMRI. At Display as well as BCS end meter TOD values shall be shown as per cumulative values of TOD Zones of respective registers. As per required TOD registers, 3 Registers shall be available at BCS end as well as at display.
3.14	Load survey	15/30 min integration period, load profile of phase wise voltage and current, phase wise kW, kVAR and KVA, phase wise THD voltage and THD current, no power duration in each 15/30 mins, voltage angles, kWH for minimum 60 days
3.15	Time required for data reading from meter and downloading on desktop PC	a) Meter data consisting of all parameters and 60 days load survey for above parameters shall be read by CMRI and downloaded on desktop PC in minimum possible time and it shall be indicated at the time of finalizing GTP. (The meter reading time should not be more than 3 minutes for complete set of data). b) The software should have capability to transfer data from single CMRI to PC and the multiple CMRI data download to PC with a loader charger.

SN	Parameters	Technical Requirements
3.16	Diagnostic feature	Self-diagnostic for time, calendar, RTC battery all display segments and NVM.
3.17	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, communication write etc.
3.18	Additional communication port	An additional RS 232 hardwired port to be provided in terminal block for AMR GSM/GPRS to the main computer.
3.19	Software & communication compatibility	a) Optical port with RS 232 compatible to transfer the data locally through CMRI & remote through GSM /GPRS technology to the main computer. b) The supplier shall supply Software required for CMRI & for the connectivity to AMR modules. The supplier shall also provide training for the use of software. The software should be compatible to Microsoft Windows systems Reading can be done through scheduling in BCS or through manual polling for AMR. c) Necessary provision shall be made in the software for converting all the parameters available for all open protocol meters. d) The data transfer (from meter to CMRI / AMR equipment) rate should be 9600 bps (minimum). e) Offered meter shall have open protocol. However if required the supplier shall provide API/protocol of meter.
3.20	Memory	Non volatile memory independent of battery backup, memory should be retained up-to 10 year in case of power failure.
3.21	Climatic Conditions	a) The meter should function satisfactorily in India with temperature ranging from 0 - 60ºC and humidity upto 96% as per IS: 14697. b) Also refer IS: 14697 for climatic conditions.
3.22	Calibration	Meters shall be software calibrated at factory and modification in calibration shall not be possible at site by any means.
3.23	Computation of KVAh	KVAh shall be computed as Modulus of Active and reactive energy. However incase of capacitive Reactive energy, the KVA shall be same as KW. The polarity of KVA is same as KW. At no given instant, the KVAH should be less than KWH. Meter should have calibration LED to check meter accuracy in field condition both for Active and Apparent Energy.

4.0 CONSTRUCTIONAL FEATURES

SN	Parameters	Technical Requirements
4.1	Body of Meter	a) Top transparent and base opaque material polycarbonate of LEXAN 143 or equivalent grade. b) Front cover & base should be ultrasonically welded. c) Top cover shall be transparent with white name plate. It should so be designed so as the internal components should not be visible.
4.2	Terminal Block	Made of polycarbonate of grade 500 R or equivalent grade and shall form Integral part of the meter base, brass terminal inserts & MS screws.
4.3	Terminal cover	Transparent terminal cover with provision of sealing through sealing screw.
4.4	Diagram of connections	Diagram of external connections to be shown on terminal cover from inside.
4.5	Marking on name plates	Meter should have clearly visible, indelible and distinctly name plate marked in accordance with IS & offer.
4.6	Meter Sealing	The supplier shall affix one seal on side of Meter body and record should be forwarded to Buyer.
4.7	Warrantee	66 months.
4.8	Insulation	A meter shall withstand an insulation test of 4 kV and impulse test at 6 kV
4.9	Resistance to heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per the relevant IS 14697.

TAMPER AND ANTI-FRAUD DETECTION / EVIDENCE FEATURES

Total no of tamper events logged by meter shall be at least 200 nos., compartment wise division of each event and their persistence time shall be indicated at the time of finalizing GTP.

The meter shall not get affected by any remote control devices and shall continue recording energy under any one or combinations of the following conditions:

Phase sequence reversal: The meters shall work accurately irrespective of the phase sequence of the supply.

Detection of missing potential: In case someone intentionally takes out a potential lead, the date and time of such occurrence shall be recorded by the meter. The last restoration of normal supply shall also be similarly recorded. The threshold of the voltages should be factory programmable.

Reversal of C.C. Polarity: Meter shall record the reversal of C.C. polarity with time and date, and also the time of restoration. Meter shall however register the energy in forwarded energy register with any one, or all two, three phase c.c. reversal.

Power On / Off: - Meter shall detect power OFF (minimum power off period 5 minutes) if any of phase voltages are not present. This event shall be recorded at the time of eachpower OFF. At the same time power 'ON 'event shall be recorded. This logging shall be available in Tamper details along with date & time.

Snapshots: Meter shall log all three phase voltage, current, power factor at the time of confirmation of tamper for all such occurrences (after P-time of occurrence) except power on/off.

External Magnetic tamper: Meter should log on the events of attempt of tampering by external magnetic field & should function as mentioned in the CBIP Technical report no. 88 with latest amendments.

Over Load/Low Load: Meter shall record Over Load/Low load as an event, in terms of defined % threshold value of load (Programmable at field)

Voltage High/Voltage Low: Meter shall record case of High Voltage/Low Voltage in terms of defined value Voltage Threshold (Vref.)

** Vendor has to define Tamper Logic, Occurrence and restoration time before supply and take approval before supply. Further when ever meter switch to Imax mode due to tamper the event should be logged and no MD should be computed for that period.*

Influence Quantities: The meter shall work satisfactorily with guaranteed accuracy limit under the presence of the following influence quantities as per IS: 14697, and CBIP Technical Report No.88 with latest amendment.

The influence quantities are:

- **a)** External Magnetic field – 0.2 Tesla (with log on feature)
- **b)** Electromagnetic field induction,
- **c)** Radio frequency interference,
- **d)** Unbalanced load,
- **e)** Vibration etc,
- **f)** Wave form 10% of 3rd harmonics,
- **g)** Phase sequence,
- **h)** Voltage unbalance,
- **i)** Electro Magnetic H.F. Field

RTC Drift: In case of TOD tariff the proper RTC functioning shall be of prime importance. In view of this software to adjust the RTC drift to be provided along with.

Protection against HV spark: Meter shall continue to record energy incase it is disturbed externally using a spark gun/ ignition coil. Upto 35 KV meter should be immune.

Recording of Neutral disturbance: In case of spurious signal injected in neutral of the meter, offered meter shall be either immune or if gets affected register energy on reference voltage, actual current and UPF.

Abnormal power off: Offered meter shall have Power Off event logging in case all the three phase are not available.

Abnormal voltage (invalid voltage): Offered meter shall record invalid voltage and if either the angle between two phases is beyond 120 +/- 10deg.

Top cover open: The meter shall have specific legend on LCD display in case top cover is opened. Cover open event shall be configured in non rollover compartment hence it should not be reset in BCS in any case. However legend on LCD display shall be removed after CMRI reading.

Wiring connection Display: Incase of abnormal wiring like Sequence Error, Phase Association Error, CT reversal, Phase - CT mismatch, one/two phase no voltage, no

load – An indication, clearly indicating type of fault should appear and get logged in meter.

Note - Tamper and fraud protection test shall be part of acceptance test.

6.0 COMPONENT SPECIFICATIONS

SN	Component Function	Requirement	Makes and Origin
6.1	Current Transformers	The Meters should be with the current transformers as measuring elements. The current transformer should withstand for the relevant clauses.	The current transformer should withstand relevant clauses.
6.2	Measurement or computing chips	The Measurement or computing chips used in the Meter should be with the Surface mount type along with the ASICs.	USA: Anolog Devices, Cyrus Logic, Atmel, Phillips,Texas Instruments. Free scale semiconductor South Africa: SAMES Japan: NEC
6.3	Memory chips	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	USA: Atmel, National Semiconductors, Texas Instruments, Phillips, ST,Microchip Japan: Hitachi or Oki
6.4	Display modules	a) The display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted at height of 0.5 meter as well as at the height of 2 meters (refer 3.2.d for Viewing angle). c) The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). d) It should be trans-reflective HTN or STN type industrial grade with extended temperature range.	Hongkong: Genda Singapore: Bonafied Technologies Everlight, Truly semiconductor Korea: Advantek China: Sucess Japan: Hitachi, Sony Holland / Korea: Phillips
6.5	Communication modules	Communication modules should be compatible for the two RS 232 ports (one for optical port for communication with Meter reading instruments & the other - for the hardwired RS 232 port to communicate with various modems for AMR)	USA: National Semiconductors, HP, Optonica,ST, Holland / Korea: Phillips Japan: Hitachi Taiwan: Ligitek, Everlight Germany: Siemens
6.6	Optical port	Optical port should be used to transfer the meter data to meter reading instrument. The mechanical construction of the port should be such to facilitate the data transfer easily.	USA: National Semiconductors ,HP Holland / Korea: Phillips Japan: Hitachi, Taiwan: Ligitek, Everlight
6.7	Power Supply	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the meter should not be affected in case the maximum	SMPS Type

SN	Component Function	Requirement	Makes and Origin
		voltage of the system appears to the terminals due to faults or due to wrong connections.	
6.8	Electronic components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes.	USA: National Semiconductors, Atmel, Phillips, Texas Instruments,ST,Onsemi, Vishay Japan: Hitachi, Oki, AVX or Ricoh Korea: Samsung
6.9	Mechanical parts	a) The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b) The other mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.	
6.10	Battery	Lithium with guaranteed life of 15 years	Varta, Tedirun, Sanyo or National , Vitzrocell, Tekcell, Xeno energy
6.11	RTC & Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	Built into microcontroller
6.12	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	

GENERAL REQUIREMENTS

On the meter nameplate:

a) Meter serial number should be of 8 digits
b) Size of the digit of the meter serial number should be minimum 5mm X 3mm.
c) Bar code should be printed next to / below / above the meter serial number.
d) BIS registration mark (ISI mark)

The supplier shall supply software suitable for energy measurement through CMRI.
Only one Meter Sr. No. should be of 8 alpha numeric digits should be printed in black on the name plate.
Supplier should seal meters on both sides.
Offered meter should have linkless design.
Terminal cover should be fixed on Meter before dispatch.
Meter Sr. Nos. shall be printed in black on the name plate.
Box number, Meter serial number, type, rating should be mentioned on cases / cartons.
Meters shall be suitably packed with environmental friendly material in order to avoid damage or disturbance during transit or handling and to prevent in grace of moisture and dust.

ADDITIONAL FEATURES

a) Meter downloading time with Load survey shall be indicated on the display.
b) In built 3G/4G modem (preferred)

c) Mid night data: The meter should record midnight Cumulative kWh & kVAh reading for last 45 days load survey data.
d) Total Harmonic Distortion: Meter to record harmonic components in both current and voltage circuits and should be available in on demand display.
e) Mobile App (Optional): App for mobile reading to be supplied by the bidder.
f) Bluetooth (Optional): Meter to have Bluetooth communication facility to download meter data through mobile app.

Any additional feature shall be preferred. The Supplier to detail out additional features while submitting the technical bid.

9.0 ANNEXURE 1: DISPLAY SEQUENCE FOR THE PARAMETERS

Default Display

(Auto scroll mode, Scroll time 6 Sec.)

1. All Segment on display (LCD Test)
2. Meter serial no.
3. Date
4. Real Time
5. Total Active Forward Energy Register (Absolute)
6. Reactive Lag Forward Energy Register
7. Instantaneous Average Power Factor
8. Cumulative Absolute kWH
9. Cumulative Absolute kVARH
10. Cumulative Absolute kVAH
11. TOD Total Active Forward MD Register(Reg 0-24hrs)
12. TOD Apparent Forward MD Register(Reg 0-24hrs)
13. TOD Total Active Forward Energy Register(Reg 1)
14. TOD Total Active Forward Energy Register(Reg 2)
15. TOD Total Active Forward Energy Register(Reg 3)
16. TOD Total Active Forward Energy Register(Reg 4)
17. TOD Total Active Forward Energy Register(Reg 5)
18. TOD Total Active Forward Energy Register(Reg 6)
19. TOD Total Active Forward Energy Register(Reg 7)
20. TOD Total Active Forward Energy Register(Reg 8)
21. TOD Apparent Forward Energy Register(Reg 1)
22. TOD Apparent Forward Energy Register(Reg 2)
23. TOD Apparent Forward Energy Register(Reg 3)
24. TOD Apparent Forward Energy Register(Reg 4)
25. TOD Apparent Forward Energy Register(Reg 5)
26. TOD Apparent Forward Energy Register(Reg 6)
27. TOD Apparent Forward Energy Register(Reg 7)
28. TOD Apparent Forward Energy Register(Reg 8)
29. TOD Reactive Lag Forward Energy Register(Reg 1)
30. TOD Reactive Lag Forward Energy Register(Reg 2)
31. TOD Reactive Lag Forward Energy Register(Reg 3)
32. TOD Reactive Lag Forward Energy Register(Reg 4)
33. TOD Reactive Lag Forward Energy Register(Reg 5)
34. TOD Reactive Lag Forward Energy Register(Reg 6)
35. TOD Reactive Lag Forward Energy Register(Reg 7)
36. TOD Reactive Lag Forward Energy Register(Reg 8)
37. Phase To Neutral Voltage R
38. Phase To Neutral Voltage Y
39. Phase To Neutral Voltage B
40. R Phase Line Current
41. Y Phase Line Current
42. B Phase Line Current

On-demand Display

After using pushbutton the following parameters should be displayed.

a. Phase To Neutral Voltage R
b. Phase To Neutral Voltage Y
c. Phase To Neutral Voltage B
d. R Phase Line Current
e. Y Phase Line Current
f. B Phase Line Current

g. Power Factor of R Phase
h. Power Factor of Y Phase
i. Power Factor of B Phase
j. Current month 1st Date Cumulative Absolute kWH
k. Current month 1st Date Cumulative Absolute kVARH
l. Current month 1st Date Cumulative Absolute kVAH
m. History 1 Total Active Forward Energy Register
n. History 1 Reactive Lag Forward Energy Register
o. History 1 Apparent Forward Energy Register
p. History 1 TOD Total Active Forward MD Register(Reg 0-24hrs)
q. History 1 TOD Total Active Forward MD Occurrence Time and Date(Reg 0-24hrs)
r. History 1 TOD Apparent Forward MD Register(Reg 0-24hrs)
s. History 1 TOD Apparent Forward MD Occurrence Time and Date(Reg 0-24hrs)
t. Cumulative Tamper Count
u. Present PT Status
v. Present CT Status
w. Present Others Status
x. Meter Serial Number BIS
y. Manufacturer name/identity
z. Date of manufacturing
aa. Software version nos

Note: The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated for more than 6 seconds.

10.0 ANNEXURE 2: PARAMETERS LIST

SN	Parameters		Details
1	General	Date-Time	30 mins integration
2		Meter No	Meter serial no.
3		Voltage	Phase Voltage_R
			Phase Voltage_Y
			Phase Voltage_B
4		Secondary Current	Phase Current_R
			Phase Current_Y
			Phase Current_B
5		Power Factor	PF_R
			PF_Y
			PF_B
6		Active Power	kW_R
			kW_Y
			kW_B
7		Reactive Power	kVAR_R
			kVAR_Y
			kVAR_B
8		Apparent Power	kVA_R
			kVA_Y
			kVA_B
9		WH_ABS	Cumulative
10		Energy Recording	Forward
10	Log	Events	Power Off (200 Nos.)
			RTC Fail
			Phase Sequence Reversal
			Phase Association
			CT Reversal
			Phase CT Mismatch
			Phase CT Missing
			Abnormal Voltage
			Neutral Missing
11	Midnight Billing with 12 History	Energy	kWH_ABS_Cumulative
			kVARH_ABS_Cumulative
			kVAH_ABS_Cumulative
		PF	Average
		MD	kW
			kVAR
			kVA
		Power Interruptions	Cumulative & For the Month
		Power ON	Cumulative & For the Month ddd:hh:mm:ss
		Power OFF	Cumulative & For the Month ddd:hh:mm:ss
12	Instantaneous	Voltage	VOLT_R
			VOLT_Y
			VOLT_B
		Current	LCURRENT_R
			ACURRENT_R
			RCURRENT_R
			LCURRENT_Y
			ACURRENT_Y

			RCURRENT_Y
			LCURRENT_B
			ACURRENT_B
			RCURRENT_B
		Power Factor (+)Lagging (-)Leading	POWERFACTOR_R
			POWERFACTOR_Y
			POWERFACTOR_B
			POWERFACTOR_AVG
		Power	ACT_POWER
			REACT_POWER
			APPARENT_POWER
		Voltage Angle	ANGLE_R_Y
			ANGLE_R_B
13	Load Survey	Meter No	Meter serial no.
		Date-Time	Every 30 mins
		Voltage	VOLT_R
			VOLT_Y
			VOLT_B
		Power	Active_Power_B
			Active_Power_R
			Active_Power_Y
			Reactive_Power_B
			Reactive_Power_R
			Reactive_Power_Y
		THD	THD_Voltage_B
			THD_Voltage_R
			THD_Voltage_Y
			THD_Current_B
			THD_Current_Y
			THD_Current_R
		Voltage Angle	ANGLE_R_Y
			ANGLE_R_B
		Power OFF Duration	Total Power Off for each 30 mins slot (in minutes)
		Energy	WH_ABS Total Energy for each 30 mins slot
		Data Status	1 for values available and 2 for complete power off duration
		For complete power off duration all values should be (-1) except Meter no, Date-time & Power off duration	

--End of document--

BSES

Technical Specification For

DT Meters

Specification No. –

BSES-TS-35-DTM-R0

Rev		0
Date		April 11, 2022
Prepared BY	Ashish Joshi	
Reviewed BY	Puneet Duggal	
	Vikas Srivastava	
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Record of Revision

Revision No	Revision Date	Item / clause no.	Nature of Change	Approved By

1.0 SCOPE OF SUPPLY

1.1 Design, engineering, manufacture, testing, inspection at manufacturer's works before dispatch, packing and delivery of DT meters in accordance with this specification.
1.2 All accessories / hardware required for installation and operation for the meter.
1.3 Software required for operation of meter and its interfacing with BSES system.
1.4 All relevant drawings/documents/manuals for the meters and its accessories.

2.0 CODES & STANDARDS

Following codes and standards (with latest amendments) are applicable-

S No	Code/Standard	Title
2.1	Latest Edition	Indian Electricity Rules 1956
2.2	Latest Edition	Indian Electricity Act 1910
2.3	IS 722-1	Specification for AC Electricity Meters General Requirements & Tests
2.4	IS 1401	Protection of Persons and Equipment by Enclosure
2.5	IS 4905	Methods of Random Sampling
2.6	IS 11448	Application Guide for AC Electricity Meters
2.7	IS 14697	AC Static Transformer Operated Watthour & Var-hour Meter
2.8	IEC 60050	International Electro Technical Vocabulary
2.9	IEC 60736	Testing Equipment for Electrical Energy Meters
2.10	IEC 61000	Electromagnetic Compatibility
2.11	IEC 62052	Electricity Metering Equipment General Requirement, Tests & Test Conditions
2.12	IEC 62053	Electricity Metering Equipment Particular Requirements
2.13	IEC 62058	Electricity Metering Equipment - Acceptance Testing
2.14	CBIP304	With latest amendments

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

i. Guaranteed Technical Particulars (GTP)
ii. Specification including applicable codes & standards
iii. Approved Vendor Drawings
iv. Other documents

3.0 SERVICE CONDITIONS

3.1	Temperature Range	Operation range: -10 Deg C to 55 Deg C Limit range of operation: -25 to 60 Deg C Limit range of storage / transport : -25 to 70 Deg C
3.2	Relative Humidity	0 to 96 %

4.0 DISTRIBUTION SYSTEM DATA

4.1	Supply	3 phase 4 wire system
4.2	Voltage	415 V+/-
4.3	Frequency	50 Hz ± 5%
4.4	System neutral	Solidly Earthed.

5.0 ELECTRICAL AND ACCURACY REQUIREMENTS

5.1	Meter Type	3 ø 4 wire static energy meter
5.2	Accuracy Class	0.5s as per IS14697 (for both active and Reactive)
5.3	Connection	Transformer operated
5.4	Rated Voltage	240 V (P-N), 415 V (P-P) +20% to -40% Vref However Meter should withstand the maximum system voltage
5.5	Rated basic current	5A
5.6	Rated maximum Current	10A
5.7	Rated Frequency	50HZ +/- 5%
5.8	Power factor range	Zero Lag – unity – Zero lead
5.9	Power Consumption in Voltage circuit	As per IS14697
5.10	Power consumption in Current circuit	As per IS14697
5.11	Starting and running with No load	As per IS14697
5.12	Starting current	0.1% of Ib
5.13	Meter constant	To be specified by bidder
5.14	Calibration	Meter shall be software calibrated at factory and modification in calibration shall not be possible at site by any means or external influence
5.15	Insulation Level	Meter shall withstand an insulation test of 4 KV and impulse test at 8 KV
5.16	Voltage dips and interruptions	As per IS14697
5.17	Short time over current	As per IS14697
5.18	Influence of heating and self-heating	As per IS14697
5.19	Immunity to earth/phase fault	As per IS14697
5.20	Limits of error due to Current variation	As per IS14697
5.21	Limits of error due to influence quantities	Meter shall work within guaranteed accuracy as per IS 14697/ IEC62053/ CBIP304 (most stringent standard to be followed) under and after influence of following :- a. Voltage variation b. Frequency variation c. 10% third harmonic in current d. Reversed phase sequence e. Voltage unbalance f. Harmonic components in current and voltage circuit

		g. DC and even harmonics in AC current circuit h. Odd harmonics in AC current circuit i. Sub harmonics in AC current circuit j. Continuous (DC) "stray" magnetic induction of 67mT+/-5%. k. Continuous (DC) "abnormal" magnetic induction of 0.27T+/-5%. l. Alternating (AC) "stray' magnetic induction of 0.5mT+/-5% m. Alternating (AC) "abnormal' magnetic induction of 10mT. n. Alternating (AC) "abnormal' magnetic induction of 0.2T+/-5%. o. External magnetic field 0.5 T p. Electromagnetic HF fields q. Radio frequency interference r. DC immunity test
5.22	Limits of error due to ambient temperature variation	As per IS14697
5.23	Electromagnetic compatibility	As per IS14697
5.24	Additional feature (Mandatory	a) Meter should measure Voltage between Earth and Neutral and for the same have an additional terminal which can be connected to earth potential. The VNE can be part of inst parameter group. b) When ever meter experiences a sudden change in load i.e. sudden reduction by 30%, it should log last 10 such events.
5.25	Digital Output (DO), Digital Input (DI) , Analog Input (AI)	a) Meter should have 2 no. of Digital Output (DO) ports to remotely connect/ disconnect the load via suitable mechanism. b) Meter should have 2 no. of Digital Input (DI) and 2 no. of AI ports for measurement of various sensor parameters like ambient temperature, oil temperature, oil level etc.

6.0 CONSTRUCTION REQUIREMENTS

6.1	General	Construction should be in accordance with IS14697.
6.2	Base Body	Opaque, UV stabilized polycarbonate of grade LEXAN 142A/ 943AA or Equivalent with V0 inflammability level
6.3	Top Cover	Transparent, UV stabilized polycarbonate of grade LEXAN 142A/ 943AA or Equivalent with V0 inflammability level
6.4	Assembly of base body and top cover	By ultrasonic welding
6.5	Terminal block	a. Material - Flame retardant glass filled polycarbonate of grade 500 R or equivalent. b. Terminal block shall be capable of passing the tests as per ISO-75 for a temperature of 135C and pressure of 1.8MPa. The terminals shall be

		designed so as to ensure adequate and durable contact such that there is no risk of loosening or undue heating.
6.6	Terminal Cover	a. Material - UV stabilized transparent polycarbonate cover b. Provision of sealing at two points through sealing screw. c. Provision for cable entry from bottom. d. Diagram of external connections should be embossed on terminal cover. Sticker is not acceptable.
6.7	Terminals	a. Suitable for 6mm^2 stranded copper wire b. Material of terminals, screws and washers should be brass or tinned copper. Two flat head screws of appropriate size should be provided per terminal. c. Terminals shall be tested for continuous current of 150 % Imax. d. Terminals shall be clearly marked for CT/PT.
6.8	Ingress Protection	IP 51 or better, but without suction in the meter.
6.9	Output device	Meter should have flashing LED visible from the front to represent energy recording. LED shall be configurable for KWh, KVAh and KVArh. Resolution shall be such that satisfactory accuracy test can be conducted at the lowest load in less than 5 minutes and starting current test in less than 10 minutes.
6.10	RTC	Meter shall have internal real time clock to set date and time. Time accuracy should be as per relevant IS/IEC. Meter should have facility for time synchronization locally through CMRI. It is preferable to have facility for remote synchronization through AMR. Clock correction events shall be registered in meter's memory.
6.11	Battery	Lithium ion battery with guaranteed shelf life of 10 years and capacity life of 15 years. In case battery removal or total discharge same should not affect the working & memory of the meter even in case of single wire power condition.
6.12	Memory	Non volatile memory independent of battery backup to store complete meter data. Data should be retained in the memory up to 10 year without any auxiliary power.
6.13	Self Diagnostic feature	Meter shall have self diagnostic for the following a. Date and RTC b. Battery c. Non volatile memory d. Display
6.14	Clearance and Creepage distance	As per IS 14697
6.15	Mounting	Surface / Flush mounted
6.16	Resistance against heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per IS 14697.

6.17	Electronic components	All active & passive components should be surface mounting type and shall be assembled by state of the art assembly processes.
6.18	Power Supply	The power supply should comply with the relevant standards. Power supply unit of the meter should not be affected in case maximum voltage of the system appears across the terminals due to faults or due to wrong connections.
6.19	Measurement/ computing chips	Measurement/computing ASICs should be surface mounting type.
6.20	Protection against Corrosion	a. Internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b. Mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.
6.21	Meter Sealing Arrangement	Sealing should be in accordance with IS and CEA metering regulations with latest amendments. Approval shall be taken from purchaser for location of seals.
6.21.1	Manufacturer's Seals	One Polycarbonate seal to be provided on meter cover.
6.21.2	BSES Seals	a. One Hologram seal should be provided on each side of meter i.e two hologram seals should be provided. Meter sides should not have sharp edges to avoid damage to hologram seals. b. Polycarbonate seal should be provided on top cover. Seals will be issued to manufacturer free of cost.
6.21.3	Seal record	Record of all seals shall be forwarded to purchaser with each lot.
6.22	Guarantee/ Warranty	66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier

7.0 FUNCTIONAL REQUIREMENTS

7.1	Billing/Energy Audit data	a. Meter serial number b. Date and time c. Cumulative active energy Import d. Cumulative active energy Export e. Cumulative apparent energy Import f. Cumulative apparent energy Export a. Cumulative Energy kVARh- Q1 b. Cumulative Energy kVARh- Q2 c. Cumulative Energy kVARh- Q3 g. Cumulative Energy kVARh- Q4 h. Cumulative TOD energy values i. Cumulative Maximum Demand in kW, kVA, KVAr (lag) and kVAr (Lead) ith date and time j. History for last 12 months i.e kWh, kVArh (lag and lead), kVAh, MD (in kW, kVA and kVAR (lag and Lead) with date and time), TOD energy readings. k. Monthly power on/off data for last 12 months l. Last tamper occurrence and restoration details Above data (except instantaneous values) should be stored

		in meter memory. m. Instantaneous parameters: Phase wise V, I, pf., Neutral current n. Phasor diagram: Both for amplitude and angle of all 3V & I wrt to R phase voltage Last 12 months data regarding energy, TOD, power factor, power On/OFF and MD shall be stored in meter.
7.2	Metering philosophy	Metering in first and fourth quadrant (Lag + Lead)
7.3	MD Registration	Meter should store and display maximum demand for all three type of powers with date and time. Demand integration period should be 30 minutes. It is preferred that MD is computed using separate counter rather than by difference of initial and final energy counter.
7.4	Auto Reset of MD	Default auto reset date should be 00:00Hrs 1st day of month. Date and Time of MD reset should be programmable through CMRI.
7.5	TOD metering	a. Meter shall be capable of doing TOD metering in minimum 4 tariff rate registers programmable for minimum 8 time zones and 4 seasonal profiles. b. Meter shall be capable of doing TOD metering for kWh, kVARh, kVAh and MD in kW, kVAR and kVA . Reactive parameter should be recorded separately for Lag and Lead. c. TOD programmable on site through CMRI or AMR remotely. d. At Display as well as BCS end meter TOD values shall be shown as per cumulative values of TOD Zones of respective registers. e. TOD metering shall be implemented by the activity colander method of IS 15959 Part 1 clause 9/ DLMS UA-1000-1 f. Special Day table shall be defined as per IEC/ DLMS UA-1000-1 g. Default TOD programming shall be as per latest DERC guidelines. Prior approval shall also be taken from BSES for the same. h. Tariff rate registers shall be as follow R1: Rate register for Peak R2: Rate register for Normal

		R3: Rate Register for Off Peak
7.6	Load survey	Load profile of phase wise voltage, phase wise current, Neutral Current phase wise active power, phase wise reactive power (lag), phase wise reactive power (lead), phase wise apparent power and power downtime during IP, THD for Voltage and Current, Phase angle shall be stored in memory for a period of 60 days. Integration period shall be 30 minutes.
7.7	Security	a. Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication etc. b. Only RTC and TOD zone timing should be programmable in field. Every transaction including RTC and TOD change shall be logged in memory of the meter with date and time stamp.
7.8	Note	Please refer draft for CBIP proposal for meter standardization for definitions and requirement of MD, Power OFF, TOD, Load Survey and meter output for field testing. Meter should comply with the requirements.
7.9	Harmonic Energies	All the energies should be measured and recorded with and without harmonics.

8.0 EVENT AND TAMPER MONITORING

S No.	Parameters	BSES Requirement
8.1	Top Cover Open	Meter shall have top cover open detection and same shall be logged. Detection and logging mechanism shall work even when the meter is de-energized. Top cover open event should not get reset.
8.2	External Magnetic tamper	a. Meter should either be immune or should log the events of attempt of tampering by external magnetic field as per relevant IS14697/ CBIP 304 with latest amendments. b. If the working of meter gets affected under the influence of external magnetic field, meter should record energy at Imax. Meter should not compute MD during this period. The meter shall record energy as per actual load once the magnetic field is removed.
8.3	Protection against HV spark/ESD	If the meter is subjected to HV spark/ ESD, meter shall continue to record energy or log the event. Upto 35 KV meter should remain immune. Communication port shall also be immune upto 35KV. Bidder should have valid test report from Sameer/ UL lab for the same.
8.4	Neutral disturbance	Meter should log the event when AC/DC/ Pulsating voltage is injected in neutral circuit.
8.5	Phase sequence reversal	Meter should work accurately irrespective of the phase sequence of the supply. Meter should log the event.

8.6	Detection of missing potential	Absence of potential on any phase should be logged. Restoration of normal supply shall also be recorded. The threshold value of voltage should be programmable at factory end.
8.7	Low Voltage	Meter should log low voltage event if average voltage is below 75% of Vref.
8.8	High Voltage	Meter should log high voltage event if average voltage is above 115% of Vref.
8.9	Voltage Imbalance	Meter should log voltage imbalance event when the difference between minimum and maximum phase voltage is more than 10% of Vref.
8.10	Abnormal/Invalid Voltage	Meter should log invalid voltage if phase angle between voltages deviates from the standard values by more than +/-10 degrees i.e. 120 +/- 10 degrees.
8.11	Reversal of Current Coil Polarity	Meter should log the event of reversal of C.C polarity. Meter should register energy consumed correctly with any one or two coils reversed.
8.12	Current Circuit Shorting / Bypass	Meter should log the event of current coil shorting/bypass. Threshold value of current should be programmable at factory end.
8.13	Current Circuit Open	Meter should log the event of current coil open. Threshold value of current should be programmable at factory end.
8.14	Overcurrent	If the current in any phase exceeds the rated current, meter should log overcurrent event.
8.15	Current Imbalance	Meter should log current imbalance event when the difference between minimum and maximum phase current is more than 30% of I average.
8.16	Invalid Phase Association	Meter should log invalid phase association event if the voltage sequence does not match with the current sequence.
8.17	Power On/Off	Meter shall detect power OFF (minimum power off period 5 mins) if all phase voltages are absent. This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded. Total Events 100 nos.
8.18	Tamper Logging	Last 200 nos. tamper events (occurrence and restoration) shall be recorded in meter memory on FIFO basis excluding top cover open. Last 20 events of top cover open tamper should be recorded in the memory including the first occurrence.
8.18.1	Parameter Snapshot	Snapshot of Date, time, voltage, Phase current, neutral current, power factor, active power, apparent power, cumulative kWH, cumulative KVAH etc should be recorded for each tamper event
8.18.2	Tamper Indication	For each tamper event, appropriate Indication/Icon should appear on the meter display either continuously or in auto display mode. Icons appearing continuously are preferable.

8.19	Tamper Logics	Logic sheet for tamper/ event detection and logging should be submitted for purchaser's approval. Following details should be provided for each tamper in tabular form a. Detailed Tamper logic b. Threshold values c. Persistence time d. Restoration time
8.20	Wiring connection Display	Incase of abnormal wiring like sequence error. Phase association error, CT reversal, Phase- CT mismatch, one/two phase no voltage- An indication, clearly indicating type of fault should be appear on meter.

9.0 DISPLAY

9.1	Type	STN Liquid crystal, Pin type with backlight
9.2	Viewing angle	Minimum 160 degrees
9.3	UV Protection	The display modules should be well protected from the external UV radiations
9.4	Size	Minimum 10X5mm
9.5	Digits	8 digits
9.6	Language	English
9.7	Display Parameters	Parameters to be displayed are given below
9.7.1	Auto scroll mode	a. LCD test b. Meter Serial no. c. Date d. Time e. Cumulative Active Energy f. Cumulative Apparent Energy g. Cumulative Reactive Energy – Lag h. Cumulative Reactive Energy – Lead i. Active Maximum demand with date and time j. Apparent Maximum demand with date and time k. Active load l. Reactive load m. Apparent load n. Phase wise power factor o. Average power factor p. R phase voltage q. Y phase voltage r. B phase voltage s. R phase current (line) t. Y phase current (line) u. B phase current (line) v. Neutral Current w. Instantaneous average power factor with sign for lag/lead x. Temperature y. Cumulative tamper count z. Tamper status Scroll time should be 6 Sec

9.7.2	Manual Display mode (push button mode)	Following parameters should be displayed in addition to parameters displayed in Auto display mode - a. Cumulative power on hours b. Cumulative power off hours c. Power on hours since last billing d. Power off hours since last billing e. Number of power failures f. Frequency g. Cumulative programming count h. Billing count i. Billing date j. Last month Active energy reading k. Last month Reactive energy reading-Lag l. Last month Reactive energy reading-Lead m. Last month Apparent energy reading n. Last month Maximum Demand in Active with date and time o. Last month Maximum Demand in Apparent with date and time p. High resolution active energy q. High resolution reactive energy -Lag r. High resolution reactive energy -Lead s. High resolution apparent energy t. Last occurred and restored tamper with date and time u. THD for both Voltage and Current v. Battery status w. PT/CT status x. Self diagnostic flag y. Cumulative Tamper count The meter display should return to Auto Scroll mode if the 'push button' is not operated for more than 10 seconds. Scroll lock facility should be provided by pressing scroll push button for long duration (10 sec). Lock should be released by repeat action.
9.7.3	Tamper indications	As per clause 8.18.2.
9.7.4	Self Diagnostic Indications	Appropriate indication for each self diagnostic feature should be displayed continuously irrespective of display mode (auto/manual).
9.7.5	Connection check	Appropriate indication to be displayed continuously for a. Current/voltage connection error b. Reverse active power c. Phasor Diagram/ Wiring Error a) Meter should indicate/ display wiring error with fault type. Fault related to phase association error should be clearly tagged.
9.8	Additional Features.	**a)** Mid night data: The meter should record midnight Cumulative kWh, kVArh & kVAh reading for last 45 **b)** Total Harmonic Distortion: Meter to record harmonic

		components in both current and voltage circuits. And should be available in on demand display. **c)** Mobile App (Optional): App for mobile reading to be supplied by the bidder. **d)** Bluetooth (Optional): Meter to have Bluetooth communication facility to download meter data through mobile app. **e)** Any additional feature shall be preferred. The Supplier to detail out additional features while submitting the technical bid.

10.0 SOFTWARE AND COMMUNICATION

10.1	Base computer software	Licensed Software with the following features should be supplied for free
10.1.1	Operating System	BCS should be compatible for Windows XP, Vista, 7 and 8.
10.1.2	Security	System shall be password protected where user can login only if login ID is provided by administrator. BCS shall have rights management system so that access rights can be provided as per requirement to maintain security.
10.1.3	Data access	BCS shall be capable of accessing complete data stored in meter memory locally through PC and remotely through modem (RF/NBIOT/4G/GPRS etc.) for connectivity to AMR. BCS shall also be capable of reading CMRI data. BCS should have polling feature with option of selecting parameters to be downloaded i.e billing data, event/tamper logging data etc.
10.1.4	Database	BCS shall maintain master database according to desired area, location, and region etc.
10.1.5	Reporting	a. BCS shall have option of user defined report generation in format of Excel, Word and CSV , XML, PDF etc. b. BCS shall have capability to export data in ASCII, CSV and XML format at desired location so that the same could be integrated with our billing data for processing. c. All the data available in the meter shall be convertible to user defined ASCII, CSV and XML file format.
10.2	CMRI Software	Manufacturer has to provide software capable of downloading data through CMRI. Software required for CMRI shall be supplied by the supplier for free of cost. Training in the use of software shall be provided by the manufacturer. The software shall be compatible to latest windows systems.
10.2.1	Integration	In the event of order, bidder shall work with BSES IT team to integrate CMRI software with BSES billing system i.e meter downloading, uploading data on computer etc. Meter reading protocols shall be shared with BSES.

10.2.2	Data access	CMRI software should be capable of downloading complete data stored in the meter memory. Software should have option for selection of parameters to be downloaded from meter i.e billing data, event/tamper logging data etc. Monthly billing data should be downloadable using CMRI within 1 minute.
10.2.3	Suitability	CMRI software shall work both on SANDS & Analogic make CMRI.
10.3	Training	Manufacturer shall impart training to BSES personnel for usage of software
10.4	Communication Ports	Communication ports required in meter are as follows
10.4.1	Optical Port	Meter shall have one optical port. It should be compatible for data transfer over RS 232 standard
10.4.2	RJ11 Port	One RJ11 (6P4C) port should be provided. Please refer Annexure - B for pin configuration. Port should be compatible for communication on RS232 standard and should have cover with provision of sealing. It is preferable to have RJ11 port outside the terminal cover subject to ESD immunity upto 35 KV.
10.4.3	Port protection	All ports shall be galvanically isolated from the power circuit.
10.4.4	Operation	Both ports should work independently. Failure of one port (including display) should not affect the working of other port.
10.5	Communication protocol	DLMS/ Proprietary protocol. Integration of meters with BSES system will be supplier's responsibility.
10.6	Data transfer rate	BCS and communication ports should support data transfer rate of 9600 bps (minimum).
10.7	Data downloading cable	a. Meter reading cable of 1m length with optical sensor at one end and D type female 9 pin connector on other end should be provided with each meter. b. Optical port on meter and optical sensor should have mechanical arrangement so that the sensor can be securely placed on the optical port of meter at the time of installation for hassle free data downloading. c. D type female connector should be suitable for mounting on meter box. Suitable mounting accessories should be supplied alongwith the cable. d. Refer Annexure – C for detailed cable configuration.

11.0 NAME PLATE

11.1	Meter Serial number shall be of 8 digits. Serial number shall be printed in black colour. Embossing is not acceptable.
11.2	Size of the digit shall be minimum 5X3mm Details shall be printed prepferabely by laser printing.
11.3	Bar code shall be printed Below the serial number
11.4	BIS registration mark (ISI mark)
11.5	'BSES' logo should be printed above LCD display.
11.6	BSES PO No. & date and Property of BSES

11.7	Manufacturers name and country of origin
11.8	Model type / number of meter
11.9	Month and Year of manufacturing
11.10	Reference voltage and current rating
11.11	The number of phases and the number of wires for which the meter is suitable. Graphical symbol as per IS 12032 can be used.
11.12	Meter constant Impulse/kWh, Impulse/ kVAh, Impulse/ kVArh
11.13	Class index of meter
11.14	Reference frequency
11.15	Warranty period
11.16	Connections, diagrams and terminals shall be marked / provided in accordance with Indian Standard.

12.0 APPROVED MAKES OF COMPONENTS

SN	Component Function	Requirement	Makes and Origin
12.1	Measurement or computing chips	The measurement or computing chips used in the Meter should be with the Surface mount type along with the ASICs	Analog Devices, Cyrus Logic, Atmel, Phillips, Texas Instruments, SAMES, NEC
12.2	Memory chips	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	USA: Atmel, National Semiconductors, Texas Instruments, Phillips, ST,Microchip Japan: Hitachi or Oki
12.3	Display modules	a) The display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted at height of 0.5 meter as well as at the height of 2 meters (refer 3.2.d for Viewing angle). c) The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). d) It should be trans-reflective HTN or STN type industrial grade with extended	Japan: Hitachi, Sony Holland / Korea: Phillips Truly Semiconductor Tianma/Hijing Electronics

		temperature range minimum 70	
12.4	Communication modules		USA: National Semiconductors, HP, Optonica,ST, Holland / Korea: Phillips Japan: Hitachi Germany: Siemens
12.5	Optical port	a) Optical port should be used to transfer the meter data to meter reading instrument. b) The mechanical construction of the port should be such to facilitate the data transfer easily. 9 pin connector of optical port shall be FCI copper type.	USA: National Semiconductors ,HP Holland / Korea: Phillips Japan: Hitachi, Truly Semiconductor, Agillent, OSRAM, Everlight
12.6	Power supply unit	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections.	SMPS Type, reputed make
12.7	Active & passive components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes. The PTH components should be positioned such a way that the leads of components should not be under stress and not touching the internal	USA: National Semiconductors, Atmel, Phillips, Texas Instruments, ST, Onsemi, Japan: Hitachi, Oki, AVX or Ricoh, Samsung, Everlight, Agillent

		wires. LED	Everlight, Agillent
12.8	Battery	Lithium with guaranteed life of 15 years.	Varta, Texcell, SAFT
12.9	RTC	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Philips, Dallas Atmel, Motorola, Microchip , NEC or Oki
12.10	Mechanical parts	a) The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b) The other mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.	
12.11	Current Transformers	The meters should be with the current transformers as measuring elements. The current transformer should withstand as per specifications/standards.	The current transformer should withstand as per specifications/standards.
12.12	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	
12.13	Note		a. Manufacturer shall intimate deviation if any from make of components. Any deviation is subject to approval of BSES based on supporting documents and performance feedback of the components. b. Manufacturer should have complete tracking of material used in meter. BSES reserve the right to carry out audit of inventory/ manufacturing process at manufacturer's works and sub vendor's work. c. The components used by manufacturer shall have "Minimum Life" more than the 10 years.

			d. Even for existing/ par suppliers – fresh approval is needed for all deviations

13.0 QUALITY ASSURANCE, INSPECTION AND TESTING

13.1	Quality Assurance Plan (QAP)	To be submitted for Purchaser's approval.
13.1.1	Inspection Hold-Points	To be mutually identified, agreed and approved in QAP.
13.1.2	Sampling Method	Sampling Method for quality checks shall be as per relevant IS/ IEC/ CBIP guidelines and Purchaser's prior approval shall be taken for the same.
13.2	Type Tests	a. The meter shall be of type tested quality as per relevant IS/IEC/CBIP. Type test conducted at CPRI/ ERDA/ ERTL labs will be treated as valid. b. The test report should not be more than 5 years old. In case any modification affecting only part of meter is made after type test, only specific type tests on the affected parts shall be repeated. c. Type test certificate should be submitted along with offer for scrutiny. d. For a manufacturer supplying meter for the first time, complete type tests will have to be carried out on sample randomly selected from the lot offered for inspection in event of order. 35kV ESD test will also be carried out on the sample at Sameer/UL lab. e. For regular suppliers, revalidation of meter design should be carried out by repeating the type tests on sample randomly selected from BSES lot at CPRI/ERDA every three years f. Any other component supplied in addition to meter shall also be type tested as per IS /IEC if applicable.
13.3	Routine tests	All test marked “R” as per IS14697
13.4	Acceptance Tests	a. All tests marked “A” as per IS14697. b. Dimensional and drawing verification. c. Display parameters/ sequence. d. Data Downloading from CMRI and PC. e. Tamper detection/logging features as per approved documents. Tamper conditions will be simulated at varying load up to Imax. Accuracy will also be checked during tamper simulation. f. Burn in chamber test. g. Component verification. h. Purchaser reserves the right to formulate any other test method to verify guaranteed parameters of Meter.

13.5	Inspection	a. Purchaser reserves the right to inspect /witness all tests on the meters at Seller's works at any time, prior to dispatch, to verify compliance with the specification/ standards. b. Manufacturer should have facilities/ equipments to conduct all the acceptance tests as per clause 13.4 during inspection. All the testing equipment should be calibrated. c. In-process and / or final inspection call intimation shall be given at least 15 days in advance to the purchaser.
14.5	General Requirements	**a)** The internal potential links should be in closed position or link less meters will be preferred and there shall not be any external link. **b)** Deliverable with Meters. i. Hard copies for Routine test certificates with each meter till alternate is provided by vendor and approved BRPL. ii. Terminal cover should be fixed on the meter before dispatch. iii. Report of seal & initial reading record. (soft copy as per BRPL format) **c)** Box number, meter serial number, type, rating should be mentioned on cases / cartons. **d)** Meters shall be suitably packed with environmental friendly material in order to avoid damage or disturbance during transit or handling and to prevent in grace of moisture and dust. Also refer CEA Metering Regulation 2006. **e)** In case battery removal/ total discharge same should not affect the working & memory of the meter. **f)** The bidder shall maintain a web site where routine test results of all meter supplied against these tender will be maintained and will be accessible to buyer/ buyer representative. **g)** The supplier shall give 15 day advanced intimation to enable BRPL to depute representative for lot inspection. **h)** Vendor shall ensure that patch required for HHU/CMRI shall be provided within 4 weeks. Vendor shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline. **i)** Delivery of software for reading through HHU/CMRI before meter delivery is required. **j)** For any false events recorded in meter, vendor

		shall depute their representative for field visit within one week and provide the root cause analysis in 4 weeks time.

14.0 SHIPPING, HANDLING AND SITE SUPPORT

14.1	Packing	Every metes shall be properly sealed / packed in environmental friendly boxes/ cartons for protection against damage, vibration and ingress of dust and moisture.
14.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label.
14.3	Marking	Following details are required on each packing case: a. Individual serial number b. Purchaser's name c. PO number (along with SAP item code, if any) & date d. Equipment Tag no. (if any) e. Destination f. Manufacturer / Supplier's name g. Address of Manufacturer / Supplier / it's agent h. Type , rating and other description of equipment i. Country of origin j. Month & year of Manufacturing k. Case measurements l. Gross and net weights in kilograms m. All necessary slinging and stacking instructions
14.4	Test reports	Routine test report to be provided with each meter
14.5	Shipping	The seller shall be responsible for all transit damage due to improper packing.
14.6	Handling and Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet /manual to be furnished before commencement of supply.

15.0 DEVIATIONS

15.1	Deviation	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.

16.0 DOCUMENT AND DRAWING SUBMISSION

16.1	The seller has to submit following along with bid
16.1.1	GTP (duly filled-in as per Annexure — A)
16.1.2	Deviation sheet, if any.
16.1.3	GA / cross sectional drawing of Meter showing all the dimensions
16.1.4	4 no's samples along with software and accessories.
16.1.5	Tamper logic sheet.
16.1.6	Detailed reference list of customers using the offered product during the last 5 years with similar design and rating

16.1.7	Manufacturer's quality assurance plan and certification for quality standards
16.1.8	Type test reports for the same type, size & rating of Meter offered
16.1.9	Complete product catalogue and Manual.
16.1.10	Details of recommended accessories / software or any other hardware for five years of operation.
16.2	Seller has to submit following drawings for buyer's Approval/ Reference after award of contract -
16.2.1	Program for production and testing
16.2.3	4 no's samples along with software and accessories for Lab testing
16.2.4	Guaranteed Technical Particulars
16.2.5	GA / cross sectional drawing of Meter showing all the dimensions
16.2.6	Tamper logic sheet.
16.2.7	Makes of components
16.2.8	Terminal arrangement with dimensions
16.2.9	Detailed installation and commissioning instructions
16.2.10	Quality assurance plan
16.3	Submittals required prior to dispatch
16.3.1	Inspection and test reports, carried out in manufacturer's works
16.3.2	Test certificates of all bought out items
16.3.3	Operation and maintenance Instruction as well as trouble shooting charts/ manuals
16.3.4	Drawing and document sizes Standard size paper A4
16.3.5	Duly signed & stamped copies of the drawings / documentation
16.3.6	Consolidated report including routine test, seal record and initial reading record as per BSES format.
16.3.7	Other documents: a. Completely filled-in Technical Parameters b. General arrangement drawing of the meter c. Rating plate d. Terminal Block dimensional drawing e. Mounting arrangement drawings f. Meter box drawing and dimensions g. Display parameter h. PIN configuration of Optical to RJ11 connector i. Manual and SOP/DWI for operation

ANNEXURE – A - GUARANTEED TECHNICAL PARTICULARS (DATA BY SUPPLIER)

Bidder shall furnish the GTP as per format provided below. All the clauses of the specification shall be covered in GTP. Any deviation or comments shall be specifically mentioned against each clause. No comments or deviation will be treated as acceptance.

Complete GA drawing, technical literature, operation and maintenance manual of hardware/ software shall be provided with technical bid.

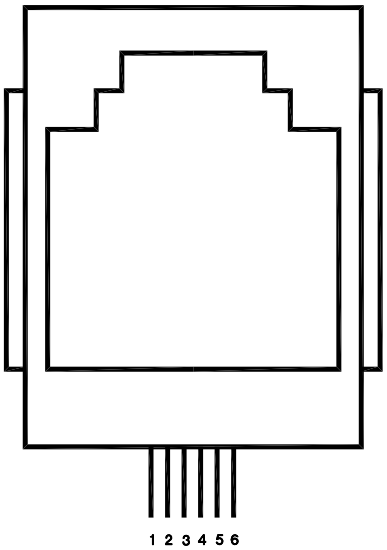
Incomplete technical bids are liable to be rejected without any intimation.

Clause no	Description	Compliance of the clause YES / NO	Deviation / Remarks
1			
2			
3			
4			
5			
6			

Bidder / Vendor seal / signature ----------

Name of the bidder	
Address of bidder	
Name of contact person	
Telephone no & email id	

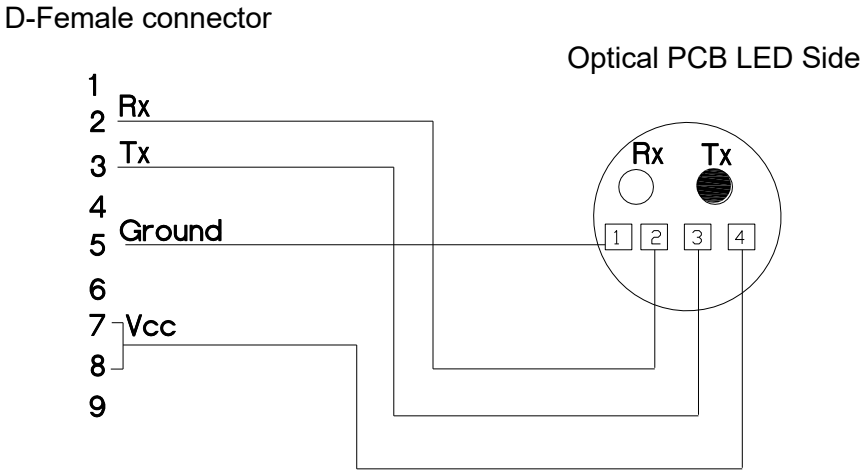
ANNEXURE – B – RJ11 PORT DETAILS



RJ- 11 PORT

PIN OUT DETAIL		
PIN	SIGNAL	DISCRIPTION
1	NC	———
2	GND	GROUND
3	TXD	RS 232 TRANSMIT
4	GND	GROUND
5	RXD	RS 232 RECEIVE
6	NC	———

ANNEXURE – C – CONFIGURATION OF OPTICAL CABLE



Technical Specification for

Grid Meters

Specification no – BSES-TS-142-GEM-R0

Rev		**0**
Date		**April 13, 2023**
Prepared BY	Ashish Joshi	
Reviewed BY	Puneet Duggal	
	Vikas Srivastava	
	Lalit Mukhriya	
Approved BY	Gaurav Sharma	
	Manish Jain	

CONTENTS

1. SCOPE

IEC compliant, Class- 0.2S, Three phase Four wire, 63.5 volts (Phase to Neutral), -/1 Amp and -/5 Amp Static (Electronic), 4 Quadrant Tri-vector Energy Meter and Software for meter reading and analysis.

This specification covers design, manufacturing, testing and supply of high precision 3 phase 4 wire static tri-vector energy meter of accuracy class 0.2s capable of performing functions of energy audit in EHV /sub transmission system and software for meter reading and analysis.

2. STANDARDS APPLICABLE

The meters shall be of class 0.2s class accuracy and shall meet all the requirements specified in standard IEC specifications.

Standard	Details
IS 14697: 1999	Specification for A.C Static Transformer operated Watt Hour & VAR – Hour meters, class 0.2s
CBIP Technical Report No. 325	Specification for A.C. Static Electrical Energy Meters.
IS 15959 (Companion specification)	DLMS Indian Companion Standard – Category 'B' for Ring fencing/Boundary/ABT Metering

3. TECHNICAL REQUIREMENTS AND SPECIFICATION

Meters are required for installation substations, the basic system parameters wherein these meters will be installed shall be as under: -

3.1 Secondary voltage: 63.5 V (P-N) for 3 phase 4 wire Secondary current: -/1 A or -/5 A (as per tender requirement)

3.2 The meter shall be designed for -/1 A or -/5 A (as per tender requirement) CT secondary and 200% overloading.

3.3 The meters shall make use of non volatile memory for storage of all data including billing and tamper data and data shall be retained even if any component fails.

3.4 The meter should not be dependent on the PT supply and should have the provision of auxiliary power supply. 48V to 110V DC/ 230VAC and shall continue to communicate other remaining parameters on auxiliary power supply.

3.5 Computation of demand shall be on the basis of Real Time Clock of the meter.

3.6 Meters covered under this specification shall be fully static type with non volatile memory to register various billing parameters and complete with other features as detailed out in this specifications. Any other design meeting technical specification requirements or features / accuracy etc. better than this specification requirement manufactured as per relevant IEC /Technical Specification shall also be acceptable.

3.7 Meters shall be suitable for accurate measurement and display of energy and other billing parameters within the specified limits of errors under balanced and unbalanced loads conditions in a poly phase network.

3.8 Power factor Range: Meters shall be suitable for measurement of billing parameters with specified accuracy for full power factor range i.e. zero lag unity zero lead.

3.9 KVAh computation shall be on the basis of power factor lag + lead principle.

3.10 Multiplying factor for the CTs & PTs ratios shall be external.

3.11 The display of energy & also demand shall have minimum seven digits with fixed decimal. The energy and demand shall be displayed in kWh, kVAh, kVARh& kW, kVA, kVARh respectively.

3.14 Provision shall be made to read various billing parameters and also load survey data through a meter reading instrument. This arrangement can be through an optical coupler or any other suitable device galvanically isolated from meter circuit. Provision shall be made to seal the optical coupler to ensure proper security.

3.15 Meter shall indicate the connection status on the display for proactive maintenance.

3.15 Meters shall be designed for satisfactory operation with the following supply voltage / frequency 50 Hz).

Voltage – V. ref +20% to -30 %

Frequency – 47.5 Hz to 52.5 Hz (ref. frequency 50 Hz)

(For above voltage and frequency range the meters shall measure, register and display various parameters accurately).

3.16 **Display Parameters**

The data shall be displayed on LCD display which shall be clearly visible from distance in 7 segments 7 digit.

The display parameters on Auto Scroll as well as Push Button shall be as follows:

SN	Parameter
1.	LCD Segment Check
2.	Meter Serial Number
3.	Real Date And Time
4.	Incoming Active Energy (Total)
5.	Outgoing Active Energy (Total)
6.	Incoming Reactive Energy (Total)
7.	Outgoing Reactive Energy (Total)
8.	Incoming Apparent Energy (Total)
9.	Outgoing Apparent Energy (Total)
10.	Three Phase Power Factor (Instantaneous) With Sign
11.	Line Current L1 (Instantaneous)

12.	Line Current L2 (Instantaneous)
13.	Line Current L3 (Instantaneous)
14.	Phase to Neutral Voltages L1 (Instantaneous)
15.	Phase to Neutral Voltages L2 (Instantaneous)
16.	Phase to Neutral Voltages L3 (Instantaneous)
17.	Phase wise Power Factor
18.	Connection status Flag
19.	Frequency
20.	Incoming Active Demand (Instantaneous)
21.	Outgoing Active Demand (Instantaneous)
22.	Incoming Apparent Demand (Instantaneous)
23.	Outgoing Apparent Demand (Instantaneous)
24.	Incoming Reactive Demand (Instantaneous)
25.	Outgoing Reactive Demand (Instantaneous)
26.	Present PT status
27.	Present CT status
28.	Last occurred and restored tamper with date and time
29.	High resolution active import energy
30.	High resolution active export energy
31.	High resolution reactive import energy
32.	High resolution reactive export energy
33.	High resolution apparent import energy
34.	High resolution apparent export energy

3.17 Meter Reading during Power Outage
It shall be possible to read the meter if there is No Power to the meter.

3.18. Maximum Demand Registration
Maximum demand computation shall be based on block interval concept with integration period of 15 minutes.

3.19 The MD integration cycle shall be on the basis of real time.

3.20. **Tamper Features**

Missing Potential – To indicate loss of potential in any or two phases of potential supply. The identification of phase date and time of first occurrence, date and time of last tamper restore and cumulative number of tampering shall be indicated.

Current Unbalance – To indicate there has been unbalance of current beyond the prescribed limits. (As approved by BSES)

Voltage Unbalance – To indicate there has been unbalance of Voltage beyond the prescribed limits. (As approved by BSES)

CT Short/ Open – The meter shall be capable of detecting and recording occurrences and restoration of shorting (bypassing) / opening of any one or two phases of CT.

Current Reversal – The meter shall be capable of detecting and recording occurrence and restoration with date and time if the current is flowing in reverse direction in one or more phases.

Power On/Off – The meter shall be capable to record power on /off events in the meter memory. All potential failure should record as power off event.

Over Current –When load condition at any phase i.e. Line current at any phase goes more than defined limit (as approved by BSES), this will be detected as Over current condition.

High and Low Voltage –The meter should detect under and over voltage events respectively if voltage falls / rise from defined limits. (As approved by BSES)

Snapshots (numerical values) should have Phase wise value of given parameters as voltage, current (Line, Active, Reactive), power factor and active, reactive & apparent energy readings with direction tag as well as the date and time of logging of the occurrence and restoration of all tamper events, subject to meter-memory space as described herein under, should be logged in the meter-memory and available for retrieving through local communication using CMRI or remote communication using the MDAS/HES.

Minimum 200 events (occurrence and restoration where occurrence and restoration shall be counted as separate events) of all tampers with date and time shall be available in the meter memory on first-in, first-out basis.

The values for voltage, current and P.F. etc. for the purpose of logging occurrence and restoration of various types of tamper shall be mentioned.

3.21 Provision should be made for automatic reset of max demand at the end of pre-defined period (eg. Beginning of month, every16th of month etc). Default resetting date is 00:00 hrs, 1st of every month. Billing parameters should be available for last 12 months.

3.22 **Load Survey Capability**

It should be possible to store previous data of 40 days for interval of 15 minutes for parametersand snapshots of energies at 24:00hours as mentioned below:

Load Survey Parameters (15 minute integration for last 40 days)	
S.N0	**Description**
1	Average Active Demand (Outgoing)
2	Average Active Demand (Incoming)
3	Reactive Demand lag While Active Import
4	Reactive Demand lead While Active Import
5	Reactive Demand lag While Active Export
6	Reactive Demand lead While Active Export
7	Average Apparent Demand (Outgoing)
8	Average Apparent Demand (Incoming)
9	Average Active Energy (Outgoing)
10	Average Active Energy (Incoming)
11	Reactive Energy lag While Active Import
12	Reactive Energy lead While Active Import
13	Reactive Energy lag While Active Export
14	Reactive Energy lead While Active Export
15	Average Apparent Energy (Outgoing)
16	Average Apparent Energy (Incoming)
17	Phase Voltage (Instantaneous & Average) L1
18	Phase Voltage (Instantaneous & Average) L2
19	Phase Voltage (Instantaneous & Average) L3
20	Phase Current (Instantaneous & Average) L1
21	Phase Current (Instantaneous & Average) L2
22	Phase Current (Instantaneous & Average) L3
23	Phase wise Power factor
24	Frequency
25	Phase wise Average Active Demand (Outgoing)
26	Phase wise Average Active Demand (Incoming)
27	Power off minutes in integration period

Mid Night Parameters (Snapshot at 24:00 hours for last 40 days)	
1	Active Energy (Import)
2	Active Energy (Export)
3	Reactive Energy (Import)
4	Reactive Energy (Export)
5	Apparent Energy (Import)
6	Apparent Energy (Export)
7	Reactive lag While Active Import
8	Reactive lead While Active Import
9	Reactive lag While Active Export
10	Reactive lead While Active Export

3.23 It should be possible to down load parameters, daily midnight readings and load survey data using BCS and obtain full details of demand and consumption

3.24 Meters shall be four quadrant meters capable of recording active reactive and apparent energy and also demand in all the four quadrants.

3.25 **Communication**

For the output ports available in the meter, standard communication interface shall only be adopted. The Meters shall be Modbus compliant. **However it is preferable if meter have both Modbus and DLMS (IS 15959) protocols selectable at site.** The energy meter shall have a hardwired RS 485 port for serial data communication and galvanically isolated optical communication port, so that it can be easily connected to hand held common meter reading instrument for data transfer with proper security and without error. The energy meter shall have an optional RS 232 port so that there is a provision to subsequently hook the meter directly to a remote metering device such as GPRS/3G/4G Modem etc. The optical port shall be located in front of the meter and shall have adequate sealing arrangement to seal it.Meters covered under this specification will be employed for metering at sub stations. In this case the instantaneous parameters load survey data and tamper information etc will be monitored remotely at central station.

In case any proprietary protocol is used in the meter, It will be obligatory on the part of the bidders to furnish complete details of proprietary protocol to the purchaser so that there may not be any difficulty in extraction of data from the meter through the available ports when connected to the communication bus (prepared for some other data communication purpose). Details of protocol used are necessarily required to be intimated / furnished by the suppliers to purchaser.

The meter supplier shall integrate the meters with existing / planned remote communication system or device, including devices (from any vendor) and set-up used in BSES. The supplier is required to provide an undertaking in this regard.

It shall be possible to download the following parameters from Remote location at a frequency of every 15 minutes -

SN	Description
1.	LCD Segment Check
2.	Meter Serial Number
3.	Real Date And Time
4.	Incoming Average Demand (Active Power) in Last Integration Period
5.	Outgoing Average Demand (Active Power) in Last Integration Period
6.	Incoming Average Demand (Reactive Power) in Last Integration Period
7.	Outgoing Average Demand (Reactive Power) in Last Integration Period
8.	Incoming Average Demand (Apparent Power) in Last Integration Period
9.	Incoming Average Demand (Apparent Power) in Last Integration Period

10.	Incoming Active Energy (Total)
11.	Outgoing Active Energy (Total)
12.	Incoming Reactive Energy (Total)
13.	Outgoing Reactive Energy (Total)
14.	Incoming Apparent Energy (Total)
15.	Outgoing Apparent Energy (Total)
16.	Three Phase Power Factor (Instantaneous) With Sign
17.	Connection status Flag
18.	Line Current L1 (Instantaneous)
19.	Line Current L2 (Instantaneous)
20.	Line Current L3 (Instantaneous)
21.	Phase to Neutral Voltages L1 (Instantaneous)
22.	Phase to Neutral Voltages L2 (Instantaneous)
23.	Phase to Neutral Voltages L3 (Instantaneous)
24.	Phase wise Power Factor
25.	Frequency
26.	Incoming Active Demand (Instantaneous)
27.	Outgoing Active Demand (Instantaneous)
28.	Incoming Apparent Demand (Instantaneous)
29.	Outgoing Apparent Demand (Instantaneous)
30.	Incoming Reactive Demand (Instantaneous) with Sign(“+” for Lag”-“ for Lead)
31.	Outgoing Reactive Demand (Instantaneous) with Sign(“+” for Lag”-“ for Lead)
32.	Cumulative tamper count
33.	Cumulative MD reset Count
34.	Cumulative reactive (Demand & Energy) lag While active import
35.	Cumulative reactive (Demand & Energy) lead While active import
36.	Cumulative reactive (Demand & Energy) lag While active Export
37.	Cumulative reactive (Demand & Energy) lead While active Export
38.	Number of power failures
39.	Cumulative power failure duration.
40.	Present PT status
41.	Present CT status
42.	Last occurred and restored tamper with date and time
43.	Incoming maximum Active demand (Previous Month)
44.	Outgoing maximum Active demand (Previous Month)

45.	Incoming maximum Reactive demand (Previous Month)
46.	Outgoing maximum Reactive demand (Previous Month)
47.	Incoming maximum Apparent demand (Previous Month)
48.	Outgoing maximum Apparent demand (Previous Month)
49.	Incoming Active Energy (Previous Month)
50.	Outgoing Active Energy (Previous Month)
51.	Incoming Reactive Energy (Previous Month)
52.	Outgoing Reactive Energy (Previous Month)
53.	Incoming Apparent Energy (Previous Month)
54.	Outgoing Apparent Energy (Previous Month)
55.	Incoming Active Energy (Previous Month Consumption)
56.	Outgoing Active Energy (Previous Month Consumption)
57.	Incoming Reactive Energy (Previous Month Consumption)
58.	Outgoing Reactive Energy (Previous Month Consumption)
59.	Incoming Apparent Energy (Previous Month Consumption)
60.	Outgoing Apparent Energy (Previous Month Consumption)

3.26 Output device: The meters shall have a test output in the form of a blinking of LED for testing of the meters accuracy. Testing shall also be possible through optical port accessible from the front and can be monitored with meter reading instrument having high resolution display. The meters shall give high resolution energy values directly to meter reading instruments. The resolution will be sufficient to enable conduction of the starting current and accuracy test in less time.

3.27 Meter shall operate and record satisfactorily independent of phase sequence of input supply so long as phase association between voltage and current circuit is in order.

3.28 The performance of meter should not be affected by the external electromagnetic interference such as Electricals discharge of cable and capacitor, harmonics, electrostatic discharges, external magnetic field and injection of DC current in AC circuits etc.

3.29 The basic meter shall be designed for overloading up to 200%.

3.30 No setting point/ setting register etc, shall be provided for adjustment of measurement errors.

4. CONSTRUCTION OF THE METER

Body of the meter shall be designed suitable for projection mounting. The meter should be made of high

quality raw material to ensure higher reliability and longer life. The meter should be compact and reliable in design e.g. to transport and immune to vibration and shocks involved in transportation / handling. The construction of the meter shall be suitable for this purpose in all respects and shall give assurance of stable and consistent performance under all conditions especially during dust storm / heavy rains / very hot days. All insulating material used in the construction of the meter shall be non hygroscopic non ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion.

SN	Parameters	Technical Requirements
1.	Meter Body	Normally top transparent and base opaque material polycarbonate of LEXAN 143A/943AA or equivalent grade. Should be ultrasonically welded.
2.	Terminal Block	Made of polycarbonate of grade 500R or equivalent grade, Integral part of the meter base, brass or copper current terminals with flat end screw.
3.	Terminal Cover	Transparent terminal cover with provision of sealing through sealing screw.
4.	Resistance of heat and fire	The terminal block and meter case shall have reasonable safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them.
5.	Marking on name plates	"GRID Meter" shall be boldly marked on name plate. Design of Name plate will be approved by BSES before supply of meters.
6.	Meter Sealing	Supplier shall affix minimum one OWN hologram seal on side of meter body. Additionally another seal will be fixed as provided by BSES.
7.	Guarantee	5 years from date of installation or 5.5 years from date of dispatch.
8.	Insulation	A meter shall withstand an insulation test of 8kV.

5. INFLUENECE QUANTITIES

The meter shall work satisfactorily with guaranteed accuracy limit under the presence of the following influence quantities:

a. External Magnetic Field
b. Electromagnetic Field Induction
c. Radio Frequency Interference
d. Unbalanced Load
e. Vibration
f. Waveform 10% of 3rd Harmonics
g. Phase Sequence
h. Voltage Unbalance
i. Electromagnetic H.F Field
j. Temperature & Humidity

6. COMPONENET SPECIFICATIONS

SN	Component Function	Requirement
6.1	Current Transformers	The Meters should be with the current transformers as measuring elements.
6.2	Measurement or computing chips	The Measurement or computing chips used in the Meter should be with the Surface mount type along with the ASICs.
6.3	Memory chips	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.
6.4	Display modules	a) The display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted at height of 0.5 meter as well as at the height of 2 meters c) The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). d) It should be trans-reflective HTN or STN type industrial grade with extended temperature range.
6.5	Communication modules	Communication modules should be compatible for the two RS 232 ports (one for optical port for communication with Meter reading instruments & the other - for the hardwired RS 232 port to communicate with various modems for AMR)
6.6	Optical port	Optical port should be used to transfer the meter data to meter reading instrument. The mechanical construction of the port should be such to facilitate the data transfer easily.
6.7	Power Supply	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections.
6.8	Electronic components	The active & passive components should be of the surface mount type & are to be handled & soldered by the state of art assembly processes.
6.9	Mechanical parts	a) The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b) The other mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.
6.10	Battery	Lithium with guaranteed life of 15 years
6.11	RTC & Micro controller	The accuracy of RTC shall be as per relevant standards

SN	Component Function	Requirement
6.12	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm

Note: The components used by manufacturer shall be of reputed make and shall have "Minimum Life"more than the 10 years. The vendor has to certify the same.

7. SEALING OF THE METER

Proper sealing arrangements shall be provided on the meter to make it tamper proof and avoid mishandling by unauthorized person. At least two (2) seals on the body, two (2) seal on the terminals blocks and one seal each on communication ports could be provided. All the seals shall be provided on the front side only.

The meter body cover should be ultrasonically welded with the base such that it would not be opened without breaking / damaging the meter body.

8. CONNECTION DIAGRAM AND TERMINAL MARKING

The connection diagram of the meter shall be clearly shown on inside portion of terminal cover and shall be of permanent nature, Meter terminals shall also be marked and this marking should appear in the above diagram.

8.1 Meter shall have a name plate clearly visible effectively secured against removal and indelibly and distinctly marked with all the essential particulars as per relevant standards i.e.

a. Manufacturer's name and trademark
b. Meter serial number*
c. Type and description
d. Rated current voltage and frequency
e. Relevant IS/ IEC No should be printed along with ISI certification mark.
f. Manufacturer's meter constant shall invariably be indicated duly printed.
g. Name of the utility – "Property of BSES"
h. Purchase order no.
i. Month and year of manufacturing
j. Guarantee Period

Meter serial nos shall be shared by BSES

9. GUARANTEE

The meter shall be guaranteed for the period of five years from the date of commissioning or five and half year from the date of dispatch, whichever is earlier. The meters and also software / MRIs found defective within the above guarantee period shall be replaced / repaired by the supplier free of cost within one month of receipt of intimation.

10. TESTS

10.1 Type Testing of Meters: The offered meter should be strictly in conformance to the tender specification. The offered meters should be fully type tested at NABL accredited Laboratory as per relevant standards.

10.2 Acceptance Test: All acceptance test as per relevant standard shall be carried out in the meter

10.3 Routine Test: All routine testsas per relevant standard shall be carried out in the meter

10.4 Pre Dispatch Inspection: All acceptance tests and inspection of meter / software shall be carried out at the place of manufacture unless otherwise specially agreed upon by the manufacturer and purchaser at the time of purchases. 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 materials is being supplied in accordance with this specifications. The Company's representative / Engineer attending the above testing will carry out testing as relevant Standard and this specification and issue test certificate approval to the manufacturer and given clearance for despatch.

Minimum Testing Facility: Manufacturer should posses fully computerized meter test bench system for carrying out routine and acceptance tests as per relevant standard. In addition this facility should produce test reports for each and every meter.

11. MANUFACTURING ACTIVITIVES

Meter should be manufactured using SMT (surface mount technology) component and by deploying automatic SMT price and place machine and reflow solder process. Further the bidder should own or have assured access (though hire, lease or subcontract) of above facility. Quality should be ensued at the following stages.
(a) At PCB manufacturing stage, each Company shall be subjected to computerized bare Company testing.
(b) At insertion stage all components should under go computerized testing for confirming to design parameters and orientation.
(c) Complete assembled and soldered PVC should under go functional testing using automatic test equipments (ATEs).
(d) Prior to final testing and Calibration all meters shall be subjected to aging test (i.e. metes will be kept in ovens for 72 hours at 55 deg. cent temperature and atmospheric humidity under real life condition at its full load current. After 72 hours meters should works satisfactorily) to eliminate infant mortality. The calibration of meters shall be done in house.The bidders should submit the list of all components used in meter along with the offer.
The suppliershall give 15 days advanced intimation to enable BSES to depute representative for lot inspection and complete all integration activities required by BSES before shipment of material.

12. PACKING

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

13. DRAWING & TECHNICAL LEAFLETS

Following drawings & Documents shall be submitted with the offer:

a. Detailed dimensional drawing of the meter
b. Rating plate
c. Terminal Block dimensional drawing ‘
d. Mounting arrangement drawings, connection diagram
e. Meter box drawing and dimensions
f. Component list
g. Display parameter
h. Type Test Certificates from NABL approved laboratories.
i. Tamper details
j. PIN configuration of Optical to RJ11 connector
k. Manual and SOP/DWI for operation
l. 01 no Meter sample

14. General Requirement for MDAS/HES

MDAS / HES shall have following minimum features -

1. MDAS / HES shall be scalable to meet BSES requirement
2. MDAS / HES shall be hosted / deployed at BSES data center only
3. MDAS / HES shall have User Access Rights Management System so that as per capability and requirement of user, rights could be provided and security keeps maintained.
4. MDAS / HES shall have option to export CDF as per MIOS standard as well as user defined report generation in format of Excel, PDF, XML and CSV for further integration with system
5. MDAS / HES shall maintain the audit trail of all transaction/changes with date and time.
6. Facility for On Demand acquisition of meter data and at user selectable periodicity
7. MDAS / HES application should have cyber security features as per standards
8. Support secure communication at all interface points

9. Store raw meter data for defined duration
10. Maintain time sync with meter and provision to correct RTC as per defined roles
11. Handling of Control signals / event messages on priority
12. Setting of meter configurable parameters
13. Remote configuration of meter parameters as per defined user roles, firmware upgrades remotely, MIS reports and exceptions reports.
14. Selective meters data can be scheduled to pull from MDAS / HES as desired.
15. Ensure data availability of 99.5% at MDAS / HES
16. Ability to attempt meter reading to recover missed reads and intermittent meter reads
17. Ability to receive and store outage and restoration event data from smart meters and outage systems and to log all such events for analysis
18. The MDAS / HES shall enable BSES to deliver reports in standard digital format such as PDF, Excel, etc.
19. MDAS / HES shall have User dashboard for alarms, events, communication status and provision to send email, SMS etc.
20. Display via a GUI the energy usage profile for a single meter or group of meters. The load profile shall illustrate energy consumption and peak demand in user defined intervals for a user-specified time period.

15. AFTER SALES SERVICE

In order to provided prompt and smooth after sales support /service etc. It shall be preferred to post / engage an engineer/ technician in Delhi by the manufacturer, to attend any minor defects immediately and to educate the user about proper installation of meter and programming of MRI base computer taking reading billing data load survey tamper information etc. through MRI and down load to PCs.
Manufacturer shall undertake to replace meter in case of failure within the guarantee period. The meters which are found defective/inoperative within the guarantee period, shall be replaced within six weeks of receipt of report for such defective/inoperative meters. If the defective meters are not replaced within the specified period then the same shall be treated as breach of performance and shall be liable for penalty. Delivery of software for HHU/CMRI before meter delivery is required. Vendor shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline at both MDAS/HES and CMRI. For any false events recorded in meter, vendor shall depute their representative for field visit within one week and provide the root cause analysis in 2 weeks time.

--End of Doc--

BSES

Technical Specification For

ABT Meters

Specification No. –

BSES-TS-37-GABTM-R0

Rev		0
Date		April 26, 2022
Prepared BY	Ashish Joshi	
Reviewed BY	Puneet Duggal	
	Vikas Srivastava	
	Lalit Mukheriya	
Approved BY	Gaurav Sharma	
	Manish Jain	

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RECORD OF REVISION

Revision No	Revision Date	Item / clause no.	Nature of Change	Approved By

1.0 SCOPE OF SUPPLY

a. Design, engineering, manufacture, assembly, testing, inspection at manufacturer's works before dispatch, packing and delivery of ABT/ Grid meter tri-vector CT-PT operated energy audit meter.
b. Any accessories / hardware required for installation and operation for the meter.
c. Software required for operation of meter and its interfacing with BSES system.
d. All relevant drawings/documents/manuals for the meters and its accessories

2.0 CODES & STANDARDS

Following codes and standards (with latest amendments) are applicable-

S No.	Code/Standard	Title
2.1	Latest Edition	Indian Electricity Rules 1956
2.2	Latest Edition	Indian Electricity Act 1910
2.3	CEA	Regulation for installation and operation of meters
2.4	CBIP 325	CBIP Guide on static energy meters- Specification and testing
2.5	IS 14697	AC Static Transformer Operated Watthour & Var-hour Meter
2.6	IS 11448	Application Guide for AC Electricity Meters
2.7	IS 15707	Testing, Evaluation, Installation and maintenance of AC electricity meters.
2.8	IS 1401	Protection of Persons and Equipment by Enclosure
2.9	IS 15959 Part 1	Data Exchange for Electricity meter- Reading Tariff and Load control- Companion specification
2.10	IS 4905	Methods of Random Sampling
2.11	IEC 60050	International Electro Technical Vocabulary
2.12	IEC 60736	Testing Equipment for Electrical Energy Meters
2.13	IEC 61000	Electromagnetic Compatibility
2.14	IEC 62052	Electricity Metering Equipment General Requirement, Tests & Test Conditions
2.15	IEC 62053	Electricity Metering Equipment Particular Requirements
2.16	IEC 62058	Electricity Metering Equipment - Acceptance Testing

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

i. Guaranteed Technical Particulars (GTP)
ii. Specification including applicable codes & standards
iii. Approved Vendor Drawings
iv. Other documents

3.0 SERVICE CONDITIONS

3.1	Temperature Range	Operation range: -10 Deg C to 55 Deg C Limit range of operation: -25 to 60 Deg C Limit range of storage / transport : -25 to 70 Deg C

3.2	Relative Humidity	0 to 96 % addonprocessing@sbicard.com

4.0 DISTRIBUTION SYSTEM DATA

4.1	Supply	3 phase 4 wire system
4.2	Voltage	11KV/ 33 kV/ 66 kV
4.3	Frequency	50 Hz ± 5%
4.4	System neutral	Solidly Earthed

5.0 ELECTRICAL AND ACCURACY REQUIREMENTS

5.1	Meter Type	Solid state, CT PT operated, 3 phase 4 wire, suitable for energy audit purpose
5.2	Accuracy Class	0.2s as per IS-14697 for both active and reactive energy
5.3	Connection	CT and PT operated
5.4	Rated Voltage	3 x 63.5V (+30% & -40%) 110V (P-P) (+20% & -30%)
5.5	Rated basic current	- / 1A or - / 5A as per purchaser's requirement
5.6	Rated maximum Current	Shall be two times of basic current.
5.7	Rated Frequency	50Hz +/- 5%
5.8	Power factor range	Bidirectional Unity to Zero (all power factor lag / or lead)
5.9	Power Consumption in Voltage circuit	Less than 1 Watt & 5 VA per phase
5.10	Power consumption in Current circuit	1 VA per phase
5.11	Starting current	0.1% of Ib
5.12	Meter constant	To be specified by bidder
5.13	Calibration	Meter shall be software calibrated at factory and modification in calibration shall not be possible at site by any means or external influence.
5.14	Test Output Device	Separate kWh & kVAh/kVArh Flashing LED visible from the front
5.15	Process Technology	Surface Mounting Technology or better
5.16	Temperature	The standard reference temperature for performance shall be 27 °C. The mean temperature co-efficient shall not exceed 0.03%.
5.17	Insulation Level	Meter shall withstand an insulation test of 4 KV and impulse test at 8 KV
5.18	Accuracy	Meter shall comply as per IS 14697 and / or IEC 62053-22 (in case of conflict more stringent test procedure / results shall be acceptable)
5.19	Repeatability of error test	As per IS 14697
5.20	Starting and Running with No-Load	Meter shall be fully functional within 5 seconds of applying rated voltage to meter terminals. Meter shall not produce more than one output pulse count when voltage is applied with no current flowing in the current circuit. Meter shall pass test for No-load condition.
5.21	Voltage dips and interruptions	Voltage dips and interruptions shall not produce a change in the register of more than 0.001KWH and test output shall not produce a signal more than 0.001KWH as per IS 14697.
5.22	Short time over current	Meter shall not get damaged due to short time over currents. Meter shall perform correctly when back to its initial working conditions and the variation in error shall not exceed 0.1% @

		I_b and unity power factor. Meter shall be able to carry a short time over current of 20 times the maximum current for a period of 0.5 second as per IS 14697.
5.23	Influence of heating and self-heating	The temperature rise of the meter surface shall not exceed by more than 20K with an ambient at 45 DEG C. Meter shall comply clause for % error due to self heating as per table 10 of IS 14697.
5.24	Immunity to earth/phase fault	As per IS 14697
5.25	Limits of error due to Current variation	As per IS 14697
5.26	Limits of error due to influence quantities	Meter shall work within guaranteed accuracy as per IS 14697/ IEC62053/ CBIP325 (most stringent standard to be followed) under and after influence of following :- a. Voltage variation b. Frequency variation c. 10% third harmonic in current d. Reversed phase sequence e. Voltage unbalance f. Harmonic components in current and voltage circuit g. DC and even harmonics in AC current circuit h. Odd harmonics in AC current circuit i. Sub harmonics in AC current circuit j. Continuous (DC) “stray” magnetic induction of 67mT+/-5%. k. Continuous (DC) “abnormal” magnetic induction of 0.27T+/-5%. l. Alternating (AC) “stray’ magnetic induction of 0.5mT+/-5% m. Alternating (AC) “abnormal’ magnetic induction of 10mT. n. Alternating (AC) “abnormal’ magnetic induction of 0.2T+/-5%. o. External magnetic field 0.5 T p. Electromagnetic HF fields q. Radio frequency interference r. DC immunity test
5.27	Limits of error due to ambient temperature variation	As per IS 14697
5.28	Electromagnetic compatibility	Meter shall remain immune to electrostatic discharge, electromagnetic HF field and fast transient burst as per IS 14697
5.29	Radio Interference	Meter shall not generate conducted or radiated noise which interferes with other equipment

6.0 CONSTRUCTION REQUIREMENTS

6.1	General	Construction should be in accordance with IS14697.
6.2	Base Body	Opaque, UV stabilized polycarbonate of grade LEXAN

		142A/ 943AA or Equivalent with V0 inflammability level
6.3	Top Cover	Transparent, UV stabilized polycarbonate of grade LEXAN 142A/ 943AA or Equivalent with V0 inflammability level It should so be designed so as the internal components should not be visible.
6.4	Assembly of base body and top cover	By ultrasonic welding
6.5	Terminal block	a. Material - Flame retardant glass filled polycarbonate of grade 500 R or equivalent. b. Terminal block shall form Integral part of the meter base c. Terminal block shall be capable of passing the tests as per ISO-75 for a temperature of 135C and pressure of 1.8MPa. The terminals shall be designed so as to ensure adequate and durable contact such that there is no risk of loosening or undue heating.
6.6	Terminal Cover	a. Material - UV stabilized transparent polycarbonate cover LEXAN 143A/943AA or equivalent grade b. Provision of sealing at two points through sealing screw. c. Provision for cable entry from bottom. d. Diagram of external connections should be embossed on terminal cover. Sticker is not acceptable.
6.7	Terminals	a. Suitable for 6mm^2 wire terminals with ring type lugs. b. Material of terminals, screws and washers should be brass or tinned copper. MS terminals are not acceptable. c. Current terminal connectors shall be provided with automatic CT shorting feature such that in event of disengagement, CT circuit is not get open circuited. d. Meter shall have either in-built or separate test terminal block for site testing. e. Terminals shall be tested for continuous current of 150 % Imax. f. Terminals shall be clearly marked for CT/PT etc.
6.8	Ingress Protection	IP 51 or better, but without suction in the meter.
6.9	Output device	Meter should have flashing LED visible from the front as output device to represent energy recording. The resolution shall be such that satisfactory accuracy test can be conducted at the lowest load in less than 5 minutes and starting current test in less than 10 minutes. Separate MWH/MVAH and MVARH LEDs are desirable.
6.10	Alarm LED	Meter shall have flashing LED visible from the front for alarms.
6.10	RTC	The meter shall have internal real time clock to set date and time with internal battery with accuracy of +/- 2 min or better in a year. All clock correction if done at site shall be registered in the meter's memory. Meter should have facility for RTC synchronization through AMR system.
6.11	Battery	Lithium ion battery with guaranteed shelf life of 10 years and capacity life of 15 years. Battery removal or total discharge

		should not affect the working of the meter.
6.12	Memory	Non volatile memory independent of battery backup to store complete meter data. Data should be retained in the memory up to 10 year without any auxiliary power.
6.13	Self Diagnostic feature	Meter shall have self diagnostic for the following a. Date and RTC b. Battery c. Non volatile memory d. Display
6.14	Clearance and Creepage distance	As per IS 14697
6.15	Mounting	Surface / Flush mounted
6.16	Resistance against heat and fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per IS 14697.
6.17	Electronic components	All active & passive components should be surface mounting type and shall be assembled by state of the art assembly processes.
6.18	Power Supply	The power supply should comply with the relevant standards. Power supply unit of the meter should not be affected in case maximum voltage of the system appears across the terminals due to faults or due to wrong connections.
6.19	Measurement/ computing chips	Measurement/computing ASICs should be surface mounting type.
6.20	Protection against Corrosion	a. Internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b. Mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.
6.21	Meter Sealing Arrangement	Sealing should be in accordance with IS and CEA metering regulations with latest amendments. Approval shall be taken from purchaser for location of seals.
6.21.1	Manufacturer's Seals	One Polycarbonate seal to be provided on meter cover.
6.21.2	BSES Seals	a. Minimum one seal as Hologram type, numbered with hologram transfer on tamper proof paper seal. Seal should not be just Hologram sticker (100% hologram). Meter sides should not have sharp edges to avoid damage to hologram seals b. One Hologram seal should be provided on each side of meter i.e two hologram seals should be provided. Meter sides should not have sharp edges to avoid damage to hologram seals. c. Polycarbonate seal should be provided on top cover. Seals will be issued to manufacturer free of cost.
6.21.3	Seal record	Record of all seals shall be forwarded to purchaser with each lot.
6.21.4	Insulation	A meter shall withstand an insulation test of 4 KV and impulse test at 6 KV
6.22	Guarantee/ Warranty	66 months from the date of dispatch or 60 months from date

		of commissioning, whichever is earlier

7.0 FUNCTIONAL REQUIREMENTS

7.1	Instantaneous parameters	Following parameters shall be continuously updated by the meter hardware/software as per internal sampling and computation time and last updated value shall be available for downloading as and when required. a. RTC; Date and Time b. Current – R phase c. Current – Y Phase d. Current – B Phase e. Voltage - VRN f. Voltage – VYN g. Voltage – VBN h. Signed Power Factor – R phase i. Signed Power Factor – Y phase j. Signed Power Factor – B phase k. System Power Factor – PF l. Frequency m. Signed Active Power – kW (+ Import, - Export) n. Signed Reactive Power – kVAr (+ Import, - Export) o. Apparent Power – kVA p. Cumulative Active Energy (KWH import) q. Cumulative Active Energy (KWH export) r. Cumulative Apparent Energy (While KWH import) s. Cumulative Apparent Energy (While KWH export) t. Cumulative Kvarh – Quadrant 1* u. Cumulative Kvarh – Quadrant 2* v. Cumulative Kvarh – Quadrant 3* w. Cumulative Kvarh – Quadrant 4* x. Average RMS Voltage in % of reference voltage i.e. 63.5 V (Phase to Neutral) (Please refer clause 7.10) y. Total Voltage Harmonic Distortion VTHD z. Total Current Harmonic Distortion ITHD aa. Number of power failure bb. Cumulative power-failure duration cc. Cumulative tamper count dd. Phase angles ee. Phase wise THD in percentage for voltage and current ff. Cumulative programming count Note: 1. *Refer Annexure ‘C’ for quadrant definitions. 2. The energy values at sl no. (p) To (w) shall be cumulative readings from the date of manufacturing of meter.
7.2	load survey parameters	Following parameters shall be measured and recorded at the end of each 15 min interval for last 60 days. a. Real time clock date and time b. Frequency c. Voltage R-Phase d. Voltage Y-Phase e. Voltage, B-Phase f. Current R-Phase

		g. Current Y-Phase h. Current B-Phase i. Energy Active Import (with & without harmonics) j. Energy Active Export (with & without harmonics) k. Energy Apparent Import (with & without harmonics) l. Energy Apparent Export(with & without harmonics) m. Energy Reactive Import with voltage as per ABT requirement n. Energy Reactive Export with voltage as per ABT requirement o. THD for phase wise voltage, current, power p. Average and phase wise power factor q. Net active energy (+ for import and – for export) r. Reactive energy, KVARH (Quadrant 1)* s. Reactive energy, KVARH (Quadrant 2)* t. Reactive energy, KVARH (Quadrant 3)* u. Reactive energy, KVARH (Quadrant 4)* v. Apparent Energy, KVARH (While active import) w. Apparent Energy, KVAH (While reactive export) x. Power Off duration in integration period Note: y. *Refer Annexure 'C' for quadrant definitions. z. The parameters at sl no. (b) To (e) are the average values of 15 min block and stored at the end of that time block. aa. The parameters at sl no. (f) to (n) are the actual energy consumption during the 15 min time block. bb. Cumulative power interruption count in all history data cc. Meter should store previous 12 month billing data into meter memory. Meter shall record 5/15 minutes (configurable) successive integration block for the period of minimum of 60 days.
7.3	Daily Load Profile	Following parameters shall be measured and recorded at each midnight i.e. 00:00 hrs for last 60 days. a. RTC, Date and time b. Cumulative Active Energy (KWH import) c. Cumulative Active Energy (KWH export) d. Cumulative Apparent Energy (While KWH import) e. Cumulative Apparent Energy (While KWH export) f. Cumulative Kvarh – Quadrant 1* g. Cumulative Kvarh – Quadrant 2* h. Cumulative Kvarh – Quadrant 3* i. Cumulative Kvarh – Quadrant 4* j. Net Cumulative KVARH while V > 103 % (+ for Import and – for export) k. Net Cumulative KVARH while V < 97 % ((+ for Import and – for export). Note: 1. *Refer Annexure 'C' for quadrant definitions. 2. Parameters 'b' to 'K' is the cumulative values since

		manufacturing of meter.
7.3.1	**MD Reset**	The meter shall have provision to store Maximum Demand occurred during the integration period selected for kW, kVA and kVAr parameters during a month. The meter shall monitor the demand during the period set and record for each of the TOD zones the maximum registered values during the particular month. Default demand integration period shall be 15 min. The meter shall have any of the following MD resetting options: 1. Automatic reset at the end of a certain predefined period (say, end of the month) 2. MD reset through authenticated transaction 3. Sliding window- 5 min.
7.3.2	TOD Metering	a. Meter shall be capable of doing TOD metering in minimum 4 tariff rate registers programmable for minimum 8 time zones and 4 seasonal profiles. b. Meter shall be capable of doing TOD metering for kWh, kVARh, kVAh and MD in kW, kVAR and kVA . Reactive parameter should be recorded separately for Lag and Lead. c. TOD programmable on site through CMRI or AMR remotely. d. At Display as well as BCS end meter TOD values shall be shown as per cumulative values of TOD Zones of respective registers. e. TOD metering shall be implemented by the activity colander method of IS 15959 Part 1 clause 9/ DLMS UA-1000-1 f. Special Day table shall be defined as per IEC/ DLMS UA-1000-1 g. Default TOD programming shall be as per latest DERC guidelines. Prior approval shall also be taken from BSES for the same. h. Tariff rate registers shall be as follow R1: Rate register for Peak R2: Rate register for Normal R3: Rate Register for Off Peak

7.4	General Purpose Parameters	Following parameters shall be provided in Non Volatile memory (NVM) of the meter.
7.4.1	Name plate details	a. Meter SL no. b. Manufacture's name c. Firmware version for meter d. Meter type (3P-3W/3P-4W) e. Internal CT ratio f. Internal PT ratio g. Month and Year of manufacture
7.4.2	Programmable parameters	Following parameters can be programmed by BCS or CMRI via proper security. Every transaction shall be logged in non volatile memory of the meter with date and time stamp. a. Real time clock, date and time b. Demand integration period c. Profile capture period d. Single action schedule for billing dates e. Activity calendar for time zones f. Image transfer
7.5	Security	Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication etc.
7.6	Multiplying factor	Meter shall be capable to calculate MF internally as per PT / CT ratio configuration. User shall get the energy values directly from the meter with any external MF.

8.0 EVENT AND TAMPER MONITORING

S No.	Parameters	BSES Requirement
8.1	Top Cover Open	Meter shall have top cover open detection and same shall be logged. Detection and logging mechanism shall work even when the meter is de-energized. Top cover open event should not get reset.
8.2	External Magnetic tamper	Meter should either be immune or should log the events of attempt of tampering by external magnetic field as per relevant IS14697/ CBIP 325 with latest amendments.
8.3	Protection against HV spark/ESD	If the meter is subjected to HV spark/ ESD, meter shall continue to record energy or log the event. Upto 35 KV meter should remain immune. Communication port shall also be immune upto 35KV. Bidder should have valid test report from Sameer/ UL lab for the same.
8.4	Neutral disturbance	Meter should log the event when AC/DC/ Pulsating voltage is injected in neutral circuit.
8.5	Phase sequence reversal	Meter should work accurately irrespective of the phase sequence of the supply. Meter should log the event.
8.6	Detection of missing potential	Absence of potential on any phase should be logged. Restoration of normal supply shall also be recorded. The threshold value of voltage should be programmable at factory end
8.7	Low Voltage	Meter should log low voltage event if average voltage is below 75% of Vref.

8.8	High Voltage	Meter should log high voltage event if average voltage is above 115% of Vref.
8.9	Voltage Imbalance	Meter should log voltage imbalance event when the difference between minimum and maximum phase voltage is more than 10% of Vref.
8.10	Abnormal/Invalid Voltage	Meter should log invalid voltage if phase angle between voltages deviates from the standard values by more than +/-10 degrees i.e. 120 +/- 10 degrees.
8.11	Reversal of Current Coil Polarity	Meter should log the event of reversal of C.C polarity. Meter should register energy consumed correctly with any one, two or all three current coils reversed.
8.12	Current Circuit Shorting / Bypass	Meter should log the event of current coil shorting/bypass. Threshold value of current should be programmable at factory end.
8.13	Current Circuit Open	Meter should log the event of current coil open. Threshold value of current should be programmable at factory end.
8.14	Over current	If the current in any phase exceeds the rated current, meter should log overcurrent event.
8.15	Current Imbalance	Meter should log current imbalance event when the difference between minimum and maximum phase current is more than 30% of I average.
8.16	Invalid Phase Association	Meter should log invalid phase association event if the voltage sequence does not match with the current sequence.
8.17	Power On/Off	Meter shall detect power OFF (minimum power off period 5 mins) if all phase voltages are absent. This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded.
8.18	Tamper Logging	Last 200 nos. tamper events shall be recorded in meter memory on FIFO basis excluding top cover open. Last 20 events of top cover open tamper should be recorded in the memory including the first occurrence.
8.18.1	Parameter Snapshot	Snapshot of Date, time, voltage, Phase current, neutral current, power factor, active power, apparent power, cumulative kWH, cumulative KVAH etc should be recorded for each tamper event
8.18.2	Tamper Indication	For each tamper event, appropriate Indication/Icon should appear on the meter display either continuously or in auto display mode. Icons appearing continuously are preferable.
8.19	THD Logic	• Phase wise voltage THD% more than 5% for 5 min • Phase wise current THD% more than 8% for 5 min.
8.20	Tamper Logics	• Logic sheet for tamper/ event detection and logging should be submitted for purchaser's approval. Following details should be provided for each tamper in tabular form • Detailed Tamper logic • Threshold values • Persistence time

		• Restoration time

Note : The meter shall keep records for the minimum last 250 events (occurrence + restoration) for above abnormal conditions. Each event shall be logged with date and time of occurrence/restoration.

9.0 DISPLAY

9.1	Type	STN Liquid crystal, Pin type with backlight
9.2	Viewing angle	Minimum 160 degrees
9.3	UV Protection	The display modules should be well protected from the external UV radiations
9.4	Size	Minimum 10X5mm
9.5	Digits	Minimum 8 digits
9.6	Language	English
9.7	Display Parameters	Parameters to be displayed are given below
9.7.1	Auto scroll mode	• Meter SL No. • Display test • Real Date • Real Time • Instantaneous load in kW, kVAr & kVA • Phase wise voltage and current (R, Y, B phases) • Phase wise and average signed PF • Cumulative active energy import • Cumulative active energy export • Cumulative Apparent Energy (While KWH import) • Cumulative Apparent Energy (While KWH export) • Cumulative Kvarh – Quadrant 1 • Cumulative Kvarh – Quadrant 2 • Cumulative Kvarh – Quadrant 3 • Cumulative Kvarh – Quadrant 4 • Net active energy (+ for import and – for export) for previous block • Average RMS Voltage in % of reference voltage i.e. 63.5 V (Phase to Neutral) (Please refer clause 7.10) • TOD Total Active Forward Energy Register(Reg 1) • TOD Total Active Forward Energy Register(Reg 2) • TOD Total Active Forward Energy Register(Reg 3) • TOD Total Active Forward Energy Register(Reg 4) • TOD Total Active Forward Energy Register(Reg 5) • TOD Total Active Forward Energy Register(Reg 6) • TOD Total Active Forward Energy Register(Reg 7) • TOD Total Active Forward Energy Register(Reg 8) • TOD Apparent Forward Energy Register(Reg 1) • TOD Apparent Forward Energy Register(Reg 2)

		• TOD Apparent Forward Energy Register(Reg 3) • TOD Apparent Forward Energy Register(Reg 4) • TOD Apparent Forward Energy Register(Reg 5) • TOD Apparent Forward Energy Register(Reg 6) • TOD Apparent Forward Energy Register(Reg 7) • TOD Apparent Forward Energy Register(Reg 8) • Number of power failure • Cumulative power-failure duration • Cumulative tamper count • Cumulative programming count • Last tamper occurrence and restoration detail • Scroll time should be 6 Sec
9.7.2	Manual Display mode (push button mode)	Following parameters should be displayed in addition to parameters displayed in Auto display mode – Parameters: • Meter Serial No. • Real Date • Real Time • Current – R phase • Current – Y Phase • Current – B Phase • Voltage - VRN • Voltage – VYN • Voltage – VBN • Signed Power Factor – R phase • Signed Power Factor – Y phase • Signed Power Factor – B phase • System Power Factor – PF • Frequency • Signed Active Power – kW (+ Import, - Export) • Signed Reactive Power – kVAr (+ Import, - Export) • Apparent Power – kVA • Cumulative Active Energy (KWH import) • Cumulative Active Energy (KWH export) • Cumulative Apparent Energy (While KWH import) • Cumulative Apparent Energy (While KWH export) • Cumulative Kvarh – Quadrant 1 • Cumulative Kvarh – Quadrant 2 • Cumulative Kvarh – Quadrant 3 • Cumulative Kvarh – Quadrant 4 • Average RMS Voltage in % of reference voltage i.e. 63.5 V (Phase to Neutral) (Please refer clause 7.10) • Number of power failure • Cumulative power-failure duration • Cumulative tamper count • Cumulative programming count • Net active energy (+ for import and – for export) for previous block • Average Frequency of previous block. • THD for both Voltage and Current • Battery status

		• PT/CT status • Self-diagnostic flag • Cumulative Tamper count • Reactive high energy(V>103 percent) • Reactive low energy (V<97 percent) • High resolution active import energy • High resolution active export energy • High resolution reactive lag While active import • High resolution reactive lead while active import • High resolution reactive lag While active Export • High resolution reactive lead While active Export • High resolution apparent forwarded energy • High resolution apparent import energy • High resolution apparent export energy The meter should have visual quadrant representation on the LCD for energy measurement. Relevant quadrant in which metering is taking place should be in on state for ease of understanding. Bidder to submit details of display with technical bid. The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated for more than 10 seconds. Scroll lock facility should be provided by pressing scroll push button for long duration (10-15 sec). Lock should be released by repeat action.
9.7.3	Tamper indications	As per clause 8.18.2.
9.7.4	Self Diagnostic Indications	Appropriate indication for each self diagnostic feature should be displayed continuously irrespective of display mode (auto/manual).
9.7.5	Connection check	Appropriate indication to be displayed continuously in case of current/voltage connection error

10.0 SOFTWARE AND COMMUNICATION

10.1	Base computer software	Meter shall be supplied along with Base computing software (BCS) compatible with windows based system. BCS should enable meter data downloading from optical / RS 485 port using hand held device and AMR system. BCS should also enable data upload from hand held device to PC. The data shall be stored in binary format only. The BCS shall ensure that data downloaded / displayed cannot be tampered. BCS shall be able to display data in tabular (text) as well as graphical format. Software shall have polling feature with optional selection of parameters to be downloaded through AMR in daily / weekly / monthly / annual format. Any software upgrade shall also be provided free in future by the bidder. Licensed Software with the following features should be supplied for free
10.1.1	Operating System	BCS should be compatible for Windows XP, Vista, 7, 8 and 10.

10.1.2	Security	System shall be password protected where user can login only if login ID is provided by administrator. BCS shall have rights management system so that access rights can be provided as per requirement to maintain security.
10.1.3	Data access	BCS shall be capable of accessing complete data stored in meter memory locally through PC and remotely through modem (RF/NBIOT/ 4G/GPRS etc.) for connectivity to AMR.
10.1.4	Database	BCS shall maintain master database according to desired area, location, and region etc.
10.1.5	Reporting	a. BCS shall have option of user defined report generation in format of Excel, Word and CSV, XML, PDF etc. b. BCS shall have capability to export data in ASCII, CSV and XML format at desired location so that the same could be integrated with our billing data for processing. c. All the data available in the meter shall be convertible to user defined ASCII, CSV and XML file format. d. All the data available in the meter shall be convertible to user defined ASCII file format. e. BCS shall have capability to export data in ASCII format at desired location so that the same could be integrated with BSES billing data for processing.
10.2	CMRI Software	Manufacturer has to provide software capable of downloading data through CMRI. Software required for CMRI shall be supplied by the supplier for free of cost. Training in the use of software shall be provided by the manufacturer. The software shall be compatible to latest windows systems.
10.2.1	Integration	In the event of order, bidder shall work with BSES IT team to integrate CMRI software with BSES AMR and billing system i.e meter downloading, uploading data on computer etc. Meter reading protocols shall be shared with BSES.
10.2.2	Data access	CMRI software should be capable of downloading complete data stored in the meter memory. Software should have option for selection of parameters to be downloaded from meter i.e billing data, event/tamper logging data etc. Billing data should be downloadable using CMRI within 1 minute.
10.2.3	Suitability	CMRI software shall work both on SANDS & Analogic make CMRI.
10.3	Training	Manufacturer shall impart training to BSES personnel for usage of software
10.4	Communication Ports	Communication ports required in meter are as follows
10.4.1	RS-485 Port	Meter shall have RS485 port capable for communication on open MODBUS protocol. Meter with modular type construction suitable to fit in different modems (RF/NBIOT/ 4G/GPRS etc.) as per need will be preferred.
10.4.2	Optical Port	In addition to RS485 port, meter shall have optical port in the front for data download. Portable hand held device shall also be provided along with meter for meter reading. One no hand held device shall be provided for every 5 meters and multiple thereof.

10.4.3	Port protection	All ports shall be galvanically isolated from the power circuit.
10.4.4	Operation	Both ports should work independently. Failure of one port (including display) should not affect the working of other port.
10.5	Communication protocol	DLMS protocol. Integration of meters with BSES system will be supplier's responsibility.
10.6	Data transfer rate	BCS and communication ports should support data transfer rate of 9600 bps (minimum).
10.7	Software & communication compatibility	a) Optical port with RS 232 compatible to transfer the data locally through CMRI & remote through (RF/NBIoT/4G/GPRS etc.) technology to the main computer. b) The supplier shall supply Software required for CMRI & for the connectivity to AMR modules. The supplier shall also provide training for the use of software. The software should be compatible to Microsoft Windows systems (latest). Reading can be done through scheduling in BCS or through manual polling for AMR. c) Necessary provision shall be made in the software for converting all the parameters available for all open protocol meters. d) The data transfer (from meter to CMRI / AMR equipment) rate should be 9600 bps or more. e) Offered meter be DLMS protocol compliant. Bidder shall share additional vendor specific protocol if used in meter.
10.8	Memory	Non volatile memory independent of battery backup, memory should be retained up-to 10 year in case of power failure.

11.0 NAME PLATE

11.1	Meter Serial number shall be of 8 digits. Serial number shall be printed in black colour. Embossing is not acceptable. (Should also be stored in meter memory and should be downloadable)
11.2	Size of the digit shall be minimum 5X3mm Laser printing shall be preferred.
11.3	Bar code shall be printed Below the meter serial number.
11.4	BIS registration mark (ISI mark)
11.5	'BSES' logo should be printed above LCD display. Property of BSES to be printed
11.6	BSES PO No. & date
11.7	Manufacturers name and country of origin
11.8	Model type / number of meter
11.9	Month and Year of manufacturing (Should also be stored in meter memory and should be downloadable)
11.10	Reference voltage and current rating
11.11	The number of phases and the number of wires for which the meter is suitable. Graphical symbol as per IS 12032 can be used.
11.12	Principal units in which meter reads
11.13	Meter constant Impulse/kWh, Impulse/ kVAh, Impulse/ kVArh
11.14	Class index of meter

11.15	Reference frequency
11.16	Warranty period
11.17	Reference temperature if different from 27 Deg C
11.18	Connections, diagrams and terminals shall be marked / provided in accordance with Indian Standard.

12.0 APPROVED MAKES OF COMPONENTS

12.1	Measurement or computing chips	Analog Devices, Cyrus Logic, Atmel, Phillips, Texas Instruments, SAMES, NEC
12.2	Memory chips	USA: Atmel, National Semiconductors, Texas Instruments, Phillips, ST,Microchip Japan: Hitachi or Oki
12.3	Display modules	Japan: Hitachi, Sony Holland / Korea: Phillips Truly Semiconductor Tianma/Hijing Electronics
12.4	Communication modules	USA: National Semiconductors, HP, Optonica,ST, Holland / Korea: Phillips Japan: Hitachi Germany: Siemens
12.5	Optical port	USA: National Semiconductors ,HP Holland / Korea: Phillips Japan: Hitachi, Truly Semiconductor, Agillent, OSRAM, Everlight
12.6	Power supply unit	SMPS Type, reputed make
12.7	Active & passive components	USA: National Semiconductors, Atmel, Phillips, Texas Instruments, ST, Onsemi, Japan: Hitachi, Oki, AVX or Ricoh, Samsung, Everlight, Agillent
12.8	Battery	Varta, Texcell, SAFT
12.9	RTC	USA: Philips, Dallas Atmel, Motorola, Microchip , NEC or Oki
12.10	Note	a. Manufacturer shall intimate deviation if any from make of components. Any deviation is subject to approval of BSES based on supporting documents and performance feedback of the components. b. Manufacturer should have complete tracking of material used in meter. BSES reserve the right to carry out audit of inventory/ manufacturing process at manufacturer's works and sub vendor's work.

13.0 QUALITY ASSURANCE, INSPECTION AND TESTING

13.1	Quality Assurance Plan (QAP)	To be submitted for Purchaser's approval.
13.1.1	Inspection Hold-Points	To be mutually identified, agreed and approved in QAP.
13.1.2	Sampling Method	Sampling Method for quality checks shall be as per relevant IS/ IEC/ CBIP guidelines and Purchaser's prior approval shall be taken for the same.
13.2	Type Tests	a. The meter shall be of type tested quality as per relevant IS/IEC/CBIP. Type test conducted at CPRI/ ERDA labs will be treated as valid. b. The test report should not be more than 5 years old. In case any modification affecting only part of meter

		is made after type test, only specific type tests on the affected parts shall be repeated. c. Type test certificate should be submitted along with offer for scrutiny. d. For a manufacturer supplying meter for the first time, complete type tests will have to be carried out on sample randomly selected from the lot offered for inspection in event of order. 35kV ESD test will also be carried out on the sample at Sameer/UL lab. e. For regular suppliers, revalidation of meter design should be carried out by repeating the type tests on sample randomly selected from BSES lot at CPRI/ERDA every three years f. Any other component supplied in addition to meter shall also be type tested as per IS /IEC if applicable.
13.3	Routine tests	All test marked “R” as per IS14697
13.4	Acceptance Tests	a. All tests marked “A” as per IS14697. b. Dimensional and drawing verification. c. Display parameters/ sequence. d. Data Downloading from CMRI and PC. e. Tamper detection/logging features as per approved documents. Tamper conditions will be simulated at varying load up to Imax. Accuracy will also be checked during tamper simulation. f. Burn in chamber test. g. Component verification. h. Purchaser reserves the right to formulate any other test method to verify guaranteed parameters of Meter.
13.5	Inspection	a. Purchaser reserves the right to inspect /witness all tests on the meters at Seller’s works at any time, prior to dispatch, to verify compliance with the specification/ standards. b. Manufacturer should have all the facilities/ equipments to conduct all the acceptance tests as per IS during inspection. All the testing equipment should be calibrated. c. In-process and / or final inspection call intimation shall be given at least 15 days in advance to the purchaser.

14.0 SHIPPING, HANDLING AND SITE SUPPORT

14.1	Packing	Every meter shall be properly sealed / packed in environmental friendly boxes/ cartons for protection against damage, vibration and ingress of dust and moisture.
14.2	Packing for accessories and spares	Robust wooden non returnable packing case with all the above protection & identification Label.
14.3	Marking	Following details are required on each packing case: a. Individual serial number b. Purchaser’s name c. PO number (along with SAP item code, if any) & date d. Equipment Tag no. (if any)

		e. Destination f. Manufacturer / Supplier's name g. Address of Manufacturer / Supplier / it's agent h. Type , rating and other description of equipment i. Country of origin j. Month & year of Manufacturing k. Case measurements l. Gross and net weights in kilograms m. All necessary slinging and stacking instructions
14.4	Test reports	Routine test report to be provided with each meter
14.5	Shipping	The seller shall be responsible for all transit damage due to improper packing.
14.6	Handling and Storage	Manufacturer instruction shall be followed. Detail handling & storage instruction sheet /manual to be furnished before commencement of supply.

15.0 DEVIATIONS

15.1	Deviation	Deviations from this Specification shall be stated in writing with the tender by reference to the Specification clause/GTP/Drawing and a description of the alternative offer. In absence of such a statement, it will be assumed that the bidder complies fully with this specification.

16.0 DOCUMENT AND DRAWING SUBMISSION

16.1	The seller has to submit following along with bid
16.1.1	GTP (duly filled-in) (as per Annexure — A)
16.1.2	Deviation sheet, if any.
16.1.3	GA / cross sectional drawing of Meter showing all the dimensions
16.1.4	1 no's samples along with software and accessories.
16.1.5	Tamper logic sheet.
16.1.6	Detailed reference list of customers using the offered product during the last 5 years with similar design and rating
16.1.7	Manufacturer's quality assurance plan and certification for quality standards
16.1.8	Type test reports for the same type, size & rating of Meter offered
16.1.9	Complete product catalogue and Manual.
16.1.10	Details of recommended accessories / software or any other hardware for five years of operation.
16.2	Seller has to submit following drawings for buyer's Approval/ Reference after award of contract -
16.2.1	Program for production and testing
16.2.3	1 no's samples along with software and accessories for Lab testing
16.2.4	Guaranteed Technical Particulars
16.2.5	GA / cross sectional drawing of Meter showing all the dimensions
16.2.6	Tamper logic sheet.
16.2.7	Makes of components
16.2.8	Terminal arrangement with dimensions
16.2.9	Detailed installation and commissioning instructions
16.2.10	Quality assurance plan
16.3	Submittals required prior to dispatch
16.3.1	Inspection and test reports, carried out in manufacturer's works
16.3.2	Test certificates of all bought out items
16.3.3	Operation and maintenance Instruction as well as trouble shooting charts/ manuals
16.3.4	Drawing and document sizes Standard size paper A4

16.3.5	Duly signed & stamped copies of the drawings / documentation
16.3.6	Consolidated report including routine test, seal record and initial reading record as per BSES format.
16.3.7	Other documents: a. Completely filled-in Technical Parameters b. General arrangement drawing of the meter c. Rating plate d. Terminal Block dimensional drawing e. Mounting arrangement drawings f. Meter box drawing and dimensions g. Display parameter h. PIN configuration of Optical to RJ11 connector i. Manual and SOP/DWI for operation

METER REPLACEMENT

1. Manufacturer shall undertake to replace meter and box in case of failure within the guarantee period.
2. Faulty meters under Guarantee shall be verified by manufacturer at site at their own cost.
3. Manufacturer will replace the meters with the Serial numbers provided by BRPL and manufacturer shall provide an excel sheet with details of returned meters, replaced meter, PO no., PO date, seals etc for mapping purpose by BRPL. Format of the same can be taken from Stores if required.
4. Manufacturer shall lift the Faulty Meters from BSES Stores within 30 days of intimation.
5. Manufacturer shall inspect the meter within 5 days of intimation at Stores and inform authorized representative of BRPL of any observation in writing. If manufacturer fails to inform BRPL then all meters will be considered for replacement.
6. The meters which are found defective/inoperative within the guarantee period, shall be replaced within six weeks of receipt of report for such defective/inoperative meters.
7. If the defective meters are not replaced within the specified period then the same shall be treated as breach of performance and shall be liable for penalty.
8. Following are minimum conditions for replacement of meters and boxes under Guarantee:

Vendor return Cases for Meters and Boxes	
Sr no	**Case**
1	Display faulty
2	Erratic pulse
3	Meter data not downloaded through optical port
4	No Pulse
5	Abnormal active energy (jump in reading)
6	Data Corruption
7	Tamper not restored
8	RTC Fail
9	Wrong or No serial number download

GENERAL CONDITIONS

1. Guarantee of the meter shall be 5 years from date of installation or 5.5 years from date of dispatch.
2. Meters shall be suitably packed with environmental friendly material in order to avoid damage or disturbance during transit or handling and to prevent ingress of moisture/dust.
3. Delivery of software for PDS/CMRI and approval of BCS software before meter delivery is required. 5 new parameters are added to the existing list to download using CMRI, they are High temperature, Neutral miss, Abnormal Power On/Off, Abnormal/low voltage and Earth load. These parameters are compulsorily to be downloaded along with existing parameters using PDS/CMRI without any impact on the downloading time.
4. The supplier shall give 15 days advanced intimation to enable BRPL to depute representative for lot inspection.
5. Vendor shall ensure that patch required for CMRI or android based devices shall be provided within 4 weeks. Bidder shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline.
6. For any false events recorded in meter, vendor shall depute their representative for field visit within one week and provide the root cause analysis in 4 weeks time.
7. GTP shall be signed and approved at the time of order and any changes subsequently shall be done through change management process

GENERAL FEATURES FOR MDAS/BCS

MDAS / HES shall have following minimum features -

1. MDAS / HES shall be scalable to meet BRPL requirement
2. MDAS / HES shall be hosted / deployed at BRPL data center only
3. MDAS / HES shall have User Access Rights Management System so that as per capability and requirement of user, rights could be provided and security keeps maintained.
4. MDAS / HES shall have option to export CDF as per MIOS standard as well as user defined report generation in format of Excel, PDF, XML and CSV for further integration with system
5. MDAS / HES shall maintain the audit trail of all transaction/changes with date and time.
6. Facility for On Demand acquisition of meter data and at user selectable periodicity
7. MDAS / HES application should have cyber security features as per standards
8. Support secure communication at all interface points
9. Store raw meter data for defined duration
10. Maintain time sync with meter and provision to correct RTC as per defined roles
11. Handling of Control signals / event messages on priority
12. Setting of meter configurable parameters
13. Remote configuration of meter parameters as per defined user roles, firmware upgrades remotely, MIS reports and exceptions reports.
14. Selective meters data can be scheduled to pull from MDAS / HES as desired.
15. Ensure data availability of 99.5% at MDAS / HES

16. Ability to attempt meter reading to recover missed reads and intermittent meter reads
17. Ability to receive and store outage and restoration event data from smart meters and outage systems and to log all such events for analysis
18. The MDAS / HES shall enable BRPL to deliver reports in standard digital format such as PDF, Excel, etc.
19. MDAS / HES shall have User dashboard for alarms, events, communication status and provision to send email, SMS etc.
20. Display via a GUI the energy usage profile for a single meter or group of meters. The load profile shall illustrate energy consumption and peak demand in user defined intervals for a user-specified time period.

ANNEXURE – A GUARANTEED TECHNICAL PARTICULARS (DATA BY SUPPLIER)

Bidder shall furnish the GTP as per format provided below. All the clauses of the specification shall be covered in GTP. Any deviation or comments shall be specifically mentioned against each clause. No comments or deviation will be treated as acceptance.

Complete GA drawing, technical literature, operation and maintenance manual of hardware/ software shall be provided with technical bid.

Incomplete technical bids are liable to be rejected without any intimation.

Clause no	Description	Compliance of the clause YES / NO	Deviation / Remarks
1			
2			
3			
4			
5			
6			

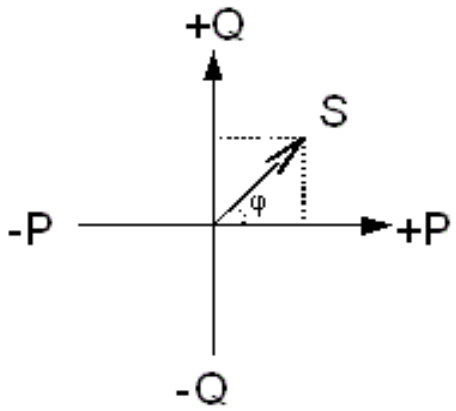
Bidder / Vendor seal / signature ----------

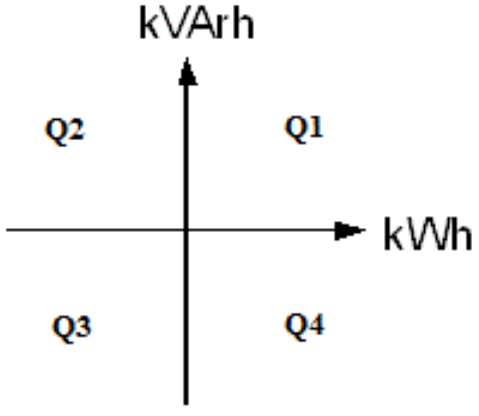
Name of the bidder	
Address of bidder	
Name of contact person	
Telephone no & email id	

ANNEXURE – B RECOMMENDED ACCESSORIES / SPARES (DATA BY SUPPLIER)

S No	Description of spare part	Unit	Quantity
1			
2			
3			
4			
5			
6			

ANNEXURE – C – QUADRANT DEFINITIONS:





Technical Specifications for LTCT type Thread-through meter with inbuilt 4G modem and CT's

Document number: GN101-03-SP-222-00

Mar 2021

Prepared By	Reviewed by	Approved By
		
Rishi Goyal	Gopal Nariya	Bharat B Sharma

TECHNICAL SPECIFICATION FOR LTCT/THREAD THROUGH METER

1 Contents

Record of Revision

SN	Date	Previous Version No.	Current Version No.	Author
1	05.03.21	NA	**GN101-03-SP-222-00**	Rishi Goyal

1. SCOPE OF SUPPLY

1.1. Design, engineering, manufacture, testing, inspection at manufacturer's works before dispatch, packing and delivery of LTCT meter/thread through meter in accordance with this specification.
1.2. Any accessories / hardware required for installation and operation for the meter.
1.3. Software required for operation of meter and its interfacing with BSES system.
1.4. All relevant drawings/documents/manuals for the meters and its accessories.

2. CODES & STANDARDS

Following codes and standards (with latest amendments) are applicable-

The meter shall be ISI marked (vendor shall be BIS certified) and conform to CEA Metering (Installation and Operation of Meters) Regulation 2006 and latest amendments, Indian Electricity Acts and Indian Electricity Rules.

SN	Standard	Title
a.	IS14697	AC static transformer operated watt-hr and Var-hr meters Class 0.2s, 0.5s specifications
b.	IS13779	A.C Static Watt Hour meters
c.	CEA Regulation:2006 and latest amendments	Installation and Operation of meters or latest amendment
d.	IS15959 and its latest amendment	Data Exchange for Electricity Meter, Reading, Tariff and Load Control – Companion Specification
e.	CBIP Manual (Pub no.- 325)	Standardization of AC Static Electrical Energy Meters
f.	CBIP Technical Report No. 304 with	Specification for A.C. Static Electrical Energy Meters.
g.	IEC 62052-11	Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment
h.	IEC: 62053-21	Electricity metering equipment (AC) - Particular requirements - Part 21: Static meters for active energy (classes 1 and 2)
i.	IEC 62056	Electricity metering data exchange- The DLMS/COSEM Suit- Part 5-3: DLMS/ COSEM application layer
j.	IS 14772	General requirements for enclose for accessories for household and similar
k.	IS 4249	Classification and methods of test for non-ignitable and self extinguishing properties of solid electrical insulating materials
l.	IS 11731	Method of test for determination of flammability of solid electrical insulating material when exposed to an igniting source

In the event of direct conflict between various order documents, the precedence of authority of documents shall be as follows -

a. Guaranteed Technical Particulars (GTP)
b. Specification including applicable codes & standards
c. Approved Vendor Drawings
d. Other documents

3. TECHNICAL SPECIFICATIONS

SN	Parameters	Technical Requirements
1.	Meter Type	3 phase, 4 wire thread through meter with inbuilt CTs suitable
2.	Voltage	240 V (P-N), 415 V (P-P), +20% to -40% Vref
3.	Rated Current	40 A – 200 Amps
4.	Frequency	50 Hz
5.	Power factor range	Zero lag –unity- zero lead
6.	Power Consumption	Less than 1 W & 4 VA per phase in voltage circuit, 2 VA in current circuit.
7.	Starting current	0.2 % of I_b
8.	Accuracy Class	0.5 or 1.0 for the equipment, CT shall have accuracy of 0.5.
9.	Meter Constant	To be specified by manufacturer
10.	Calibration	Meter shall be software calibrated at factory and modification in calibration shall not be possible at site by any means or external influence
11.	Insulation	A meter shall withstand an insulation test of 4 KV and impulse test at 8 KV.
12.	Influence of heating	As per relevant IS
13.	Immunity to earth / phase fault	As per relevant IS
14.	Limits of error due to current variation	As per relevant IS
15.	RTC	Meter shall have internal real time clock to set date and time. Time accuracy should be as per relevant IS/IEC.
16.	Time Synchronization	Meter should have facility for time synchronization locally through CMRI. Metering equipment shall have facility for remote synchronization. Any time correction events shall be registered in meter's memory and data acquisition software.
17.	Battery	Lithium ion battery with guaranteed shelf life of 3 years and operational life of 10 years.
18.	Test Output LED	Meter should have flashing LED visible from the front to represent energy recording. LED shall be configurable for KWh, KVAh and KVArh. Resolution shall be such that satisfactory accuracy test can be conducted at the lowest load in less than 5 minutes and starting current less than 10 minutes.
19.	LCD unit	Minimum 60 degrees viewing angle, LCD test and self diagnostic
20.	Ingress Protection	IP 54 or better, but without suction in the meter
21.	Connection Status	Appropriate indication to be displayed continuously in case of connection error.
22.	Body of Meter	a) Top transparent and base opaque material polycarbonate of LEXAN 143A/943AA or equivalent grade. b) Front cover & base should be ultrasonically welded. c) Top cover should be designed so as the internal components should not be visible.

SN	Parameters	Technical Requirements
23.	Connection	Provision should be made to pass the connection power cable directly through the meter (Thread through type) for measurement. There should be no need to remove insulation of connecting cable for current measurement. Meter should not have provision for meter terminal connection as well as terminal block similar to conventional meters. A set of piercing screws shall be used in the meter for voltage connection. Meter shall be suitable to accommodate XLPE insulated aluminum cable up to 180 mm2.
24.	Diagram of connections	Diagram of external connections to be shown on terminal cover
25.	Marking on name plates	Meter should have clearly visible, indelible and distinctly name plate marked in accordance with IS & BRPL specifications.
26.	Meter Sealing	Supplier shall affix one Buyer seal on side of Meter body as advised and record should be forwarded to Buyer. Sealing should be in accordance with IS and CEA Arrangement metering regulations with latest amendments.
27.	Seal Record	Record of all seals shall be forwarded to purchaser with each lot.
28.	Resistance of heat and Fire	The terminal block and Meter case shall have safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per the relevant IS 14697.
29.	Security feature	a. Programmable facility to restrict access rights to the meter data i.e. read only, write only, read/write etc. b. Only RTC and TOD zone programmable in field. Every transaction for RTC and TOD change shall be logged in memory of the meter with date and time.
30.	Climatic conditions	Operation range: -10 Deg C to 55 Deg C, Storage / transport range: -25 to 70 Deg C, Relative Humidity: 0 to 96 %
31.	Protocol	Protocol shall be standard DLMS as per IS 15959.
32.	CMRI downloading	Manufacturer has to provide software capable of downloading data through CMRI.
33.	Ports	Meter shall have Optical port and physical serial port for remote data communication. All ports shall be galvanically isolated from the power circuit. Both ports would work independently. Failure of one port (Including display) would not affect the working of other port.
34.	Communication compatibility	Thread through meters shall have in built 4G modem (fall back to 2G) compatible for accessing complete meter data through AMR of energy meters installed at site. The modem will be accessible only after opening the front cover of the meter. SIM Card Holder will be accessible only after removal of terminal cover.

4. FUNCTIONAL REQUIREMENT

SN	Parameters	Technical Requirements
1.	Display parameters	a) Display parameters: LCD test, date & time, cumulative kWh, cumulative kVAh & kVARh, MD in kW & kVA, PF, phase wise V, I and Neutral current, cumulative tamper count, Present PT status, CT status. Display order shall be approved before delivery of the meters.
2.	Billing data	a. Meter serial number b. Date and time c. Cumulative forwarded active energy d. Cumulative reactive energy (lag) e. Cumulative reactive energy (lead) f. Cumulative forwarded apparent energy g. Cumulative TOD energy values h. Cumulative Maximum Demand in kW and Kva with date and time i. Last tamper occurrence and restoration detail j. History for last 12 months i.e. kWh, kVArh, kVAh, k. MD (in kW and kVA with date and time), TOD energy readings. Monthly power on/off data for last 12 months. 12 billing histories to be maintained.
3.	Load survey	30 min integration period, load profile of phase voltage (R, Y, B) with instant and average value and line, active and reactive current (R, Y, B) with instant and average value, and all three phase active, reactive (lag and lead) and apparent power and energy of 90 days (MD integration should be 30 min.) Apparent Energy, load, PF, THD in both current and voltage, phase-wise demand, power-off time integration period
4.	Other Features	Mid night data: The meter should record midnight Cumulative kWh & kVAh, kVARh lag and kVARh lead reading for last min 60 days. Total Harmonic Distortion: Meter to record harmonic components in both current and voltage circuits. And should be available in on demand display. Meter to record events in case harmonic component in both V&I if it exceeds predefined limits.
5.	Tariff basis	Lag only
6.	MD Registration	Meter should store and display maximum demand in kW/kVA with date and time. Demand integration period should be 30 minutes. It is preferred that MD is computed by difference of initial and final energy counter.
7.	Auto Reset of MD	Default auto reset date should be 00:00Hrs 1st day of month. Date and Time of MD reset should be programmable through CMRI duly authenticated.
8.	Diagnostic feature	Self diagnostic for time, calendar, RTC battery all display segments and NVM.

9.	TOD metering	Meter shall be capable of doing TOD metering for kWh, kVAh and kVArh along with MD in kW and kVAh with upto 8 time zones and three seasons (programmable at site through CMRI) after valid authentication. TOD shall be as per the latest DERC guidelines.
10.	Event Logging	Logic sheet for tamper/ event detection and logging should be submitted for purchaser's approval. Following details should be provided for each tamper in tabular form: a. Detailed Tamper logic b. Threshold values c. Persistence time d. Restoration time Nomenclature used for any event logging/ flags/ parameters/ alarms shall be clear and correct**.** All events logged by meter shall be convertible to CSV/ ASCII/ XML format. Bidder to extend complete support to generated file according to BRPL requirement that may vary from time to time. BCS shall be capable to draw correct phasor diagram. For each tamper event, appropriate Indication/Icon should appear on the meter display.
11.	Mounting	Thread through unit shall be compatible for Surface and Wall mounting
12.	Guarantee	66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier.
13.	Time required for data uploading/ downloading meter data	Remote and local data downloading of entire load survey shall not take more than 5 minutes.
14.	Meter data acquisition software / head end software	.

5. DISPLAY PARAMETER LIST

Following parameters should be displayed in addition to parameters displayed in Auto display mode -

1. Meter Serial no.
2. Date and time
3. Cumulative kWh
4. Cumulative kVARh
5. Cumulative kVAh
6. Current MD in kW
7. Current MD in kVA
8. TOD MD for kWh and kVAh
9. TOD MD occurrence for kWh and kVAh
10. Instantaneous phase wise power factor with sign for lag/lead
11. Frequency
12. Instantaneous voltage R phase
13. Instantaneous voltage Y phase

14. Instantaneous voltage B phase
15. Instantaneous current R phase
16. Instantaneous current Y phase
17. Instantaneous current B phase
18. Cumulative power on hours
19. Cumulative power off hours
20. Number of power failures
21. Cumulative Billing counts
22. Cumulative programming count
23. Last month billing Active energy reading
24. Last month billing Reactive energy reading-Lag
25. Last month billing apparent energy reading
26. Last month billing Maximum Demand in Active with date and time
27. Last month billing Maximum Demand in Apparent with date and time
28. High resolution active forwarded energy
29. High resolution reactive lag forwarded energy
30. High resolution reactive lead forwarded energy
31. High resolution apparent forwarded energy
32. Last occurred and restored tamper with date and time
33. Phase wise THD for both Voltage and Current
34. Neutral Current
35. Temperature

The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated for more than 10 seconds. Scroll lock facility should be provided by pressing scroll push button for long duration (5 sec). Lock should be released by repeat action or midnight.

6. EVENT AND TAMPER MONITORING

Ser no.	Event	Description
1.	Top Cover Open	The meter shall have top cover opening detection mechanism. The top cover opening event shall be indicated on display/LED continuously in auto scroll mode with kWh, kVAh shall be logged in memory. The detection and logging mechanism shall work even when meter is not energized. In case of indication of display, meter display shall get reset in 150 days, cumulative tamper count to be maintained.
2.	Neutral disturbance	Meter shall log all events when AC/DC/ Pulsating voltage is injected in neutral circuit especially when same can disturb the recording of energy.

3.	External Magnetic tamper	Meter should log on the events of attempt of tampering by external magnetic field as mentioned in the relevant IS. Meter shall record as per actual load once the external abnormal magnetic field is removed. In such conditions the Meter shall log the event for presence of abnormal external magnetic field and its restoration If the working of meter gets affected under the influence of external magnetic field, meter should record energy at Imax. Meter should not compute MD during this period. The meter shall record energy as per actual load once the magnetic field is removed.
4.	Protection against HV spark/ESD	Meter shall continue to record energy or log the event, in case it is disturbed externally using a spark gun/ ignition coil. Up to 35 kV meter and communication port should be immune.
5.	Phase sequence reversal	The meters shall work accurately irrespective of the phase sequence of the supply. Indication of the same on display. Absence of potential on any phase should be logged.
6.	Detection of missing potential	In case someone intentionally takes out a potential lead, the date and time of such occurrence shall be recorded by the meter. The restoration of normal supply shall also be similarly recorded. The threshold for the voltages should be programmable. (refer draft CBIP on meter standards).
7.	Low Voltage & High Voltage	Meter shall have feature to log an event in case any of phase voltage is <180 V. Meter should log high voltage event if any phase voltage is above 115% of Vref.
8.	Voltage Imbalance	Meter should log voltage imbalance event when the difference between minimum and maximum phase voltage is more than 10% of Vref.
9.	Invalid Voltage	Meter should log invalid voltage if phase angle between voltages deviates from the standard values by more than +/-10 degrees i.e. 120 +/- 10 degrees.
10.	Reversal of Current Coil Polarity	Meter shall record the reversal of C.C. polarity with time and date, and also the time of restoration. Meter shall however register the energy consumed correctly with any one, two or all three phase c.c. reversal.
11.	Current Circuit Shorting / Bypass	Meter shall record C.C. terminal shorting with time and date and time of restoration. The threshold of the current should be programmable.
12.	Current Circuit Open	Meter should log the event of current coil open. Threshold value of current should be programmable at factory end.
13.	Overcurrent	If the current in any phase exceeds the rated current by 10% for 10 min continuously, meter should log overcurrent event.

14.	Current Imbalance	Meter should log current imbalance event when the difference between minimum and maximum phase current is more than 30% of Ibasic.
15.	High Neutral Current	The meter shall be capable of recording incidences of excess neutral current with date and time.
16.	Power On/Off	Meter shall detect power OFF (minimum power off period 5 mins) if all phase voltages are absent. This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded.
17.	Tamper Logging	Last 200 nos. tamper events shall be recorded in meter memory on FIFO basis excluding top cover open. Last 20 events of top cover open tamper should be recorded in the memory including the first occurrence.
18.	Parameter Snapshot	Meter shall log all three-phase voltage, current (line, active and reactive), cumulative reading (Active and Apparent), power factor, neutral current etc. at the time of tamper attempt for all such occurrences with Date and time.

7. RATING PLATE

a. Marking on the meter shall be approved before supply of the meters. The marking shall include the following:

1. Manufacturer name and place of manufacturing
2. Meter reference voltage, rated secondary current and Class
3. Meter serial number should be of 8 digits
4. Size of the digit of the meter serial number should be minimum 5mm X 3mm (Laser printing shall be preferred)
5. Bar code of fine quality should be printed below the meter serial number.
6. BIS registration mark (ISI mark)
7. Property of BRPL
8. Manufacturing date (mm/yyyy)
9. Guaranty period
10. Meter constant (imp/kWh, kVAh)
11. PO no. and date

8. COMPONENT SPECIFICATIONS

SN	Component Function	Requirement	Makes and Origin

SN	Component Function	Requirement	Makes and Origin
6.1	Current Transformers	The meters should be with the current transformers as measuring elements. The current transformer should withstand as per specifications/standards.	The current transformer should withstand as per specifications/standards.
6.2	Measurement or computing chips	The measurement or computing chips used in the Meter should be with the Surface mount type along with the ASICs.	Any branded make- to be specified by meter manufacturer before hand
6.3	Memory chips	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	Any branded make- to be specified by meter manufacturer beforehand.
6.4	Display modules	a) The LCD display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted at height of 0.5 meter as well as at the height of 2 meters (refer 3.2.d for Viewing angle). c) The construction of the modules should be such that the displayed quantity should not disturbed with the life of display (PIN Type). d) It should be trans-reflective HTN or STN type industrial grade with extended temperature range minimum 70 ºC.	Truly semiconductor, Tianma, Haijing Electronics, China, Blaze
6.5	Optical port	Optical port should be used to transfer the meter data to meter reading instrument. The mechanical construction of the port should be such to facilitate the data transfer easily. 9 pin connector of optical port shall be FCI copper type.	Everlight, Osram, Agillent, NFC
6.6	Power Supply	The power supply should be with the capabilities as per the relevant standards. The power supply unit of the meter should not be affected in case the maximum voltage of the system appears to the terminals due to faults or due to wrong connections.	SMPS Type (It should take care of clause 3.1 and 3.5)
6.7	Electronic	The active & passive components should	National Semiconductors,

SN	Component Function	Requirement	Makes and Origin
	components	be of the surface mount type & are to be handled & soldered by the state of art assembly processes. The PTH components should be positioned such a way that the leads of components should not be under stress and not touching the internal wires.	Atmel, Phillips, ST, Texas Instruments, Microchip, Onsemi, Adesto Hitachi, Oki, AVX or Ricoh, ROHM, Samsung, EPCOS, Vishay, Everlight, Agillent
6.8	Mechanical parts	a) The internal electrical components should be of electrolytic copper & should be protected from corrosion, rust etc. b) The other mechanical components should be protected from rust, corrosion etc. by suitable plating/painting methods.	
6.9	Battery	Lithium with guaranteed life of 15 years.	Texcell, SAFT, Varta, Eve, Xeno
6.10	RTC & Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	Any branded make- to be specified by meter manufacturer before hand
6.11	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	

Note:

i. The components used by manufacturer shall have “Minimum Life” more than the 10 years.
ii. Incase vendor want to use other make components; same shall be approved by BRPL before use. Deviation of component make is not allowed without prior approval.
iii. Even for existing/ par suppliers – fresh approval is needed for all deviations.

9. DRAWINGS AND DOCUMENTS

Following drawings & Documents shall be submitted with the bid:

a. Complete Technical Parameters.
b. General arrangement drawing of the meter
c. Rating plate
d. Terminal Block dimensional drawing ‘
e. Mounting arrangement drawings
f. Meter box drawing and dimensions
g. Component list
h. Display parameter
i. Type Test Certificates from NABL approved laboratories.
j. Tamper details
k. PIN configuration of Optical to RJ11 connector
l. PIN out diagram for RJ11 to 9 pin serial male connector

m. Manual and SOP/DWI for operation

- **Type Test Reports:**

The meter shall be of type tested quality as per relevant IS/IEC/CBIP. Type test conducted at Govt approved laboratories such as CPRI/ ERDA/ ERTL etc will be treated as valid. The test report should not be more than 3 years old. In case any modification affecting only part of meter is made after type test, only specific type tests on the affected parts shall be repeated. Type test certificate should be submitted along with offer.

- **Routine Test**

Routine test report shall be provided with each meter. Following reports are requested to be submitted:

a. All tests marked "A" as per IS13779.
b. Dimensional and drawing verification.
c. Display parameters sequence.
d. Tamper detection/logging features as per approved documents.
f. Burn in chamber test.
g. Component verification.
h. Purchaser reserves the right to formulate any other test method to verify guaranteed parameters of Meter.

- **Inspection**

Purchaser reserves the right to inspect /witness all tests on the meters at Seller's works at any time, prior to dispatch, to verify compliance with the specification/ standards. Manufacturer should have all the facilities / equipments to conduct all the acceptance tests. In-process and / or final inspection call intimation shall be given at least 15 days in advance to the purchaser. Data Downloading locally and remotely shall be part of the inspection. .

10. METER REPLACEMENT

1. Manufacturer shall undertake to replace meter and box in case of failure within the guarantee period.
2. Faulty meters under Guarantee shall be verified by manufacturer at site at their own cost.
3. Manufacturer will replace the meters with the Serial numbers provided by BRPL and manufacturer shall provide an excel sheet with details of returned meters, replaced meter, PO no., PO date, seals etc for mapping purpose by BRPL. Format of the same can be taken from Stores if required.
4. Manufacturer shall lift the Faulty Meters from BSES Stores within 30 days of intimation.
5. Manufacturer shall inspect the meter within 5 days of intimation at Stores and inform authorized representative of BRPL of any observation in writing. If manufacturer fails to inform BRPL then all meters will be considered for replacement.
6. The meters which are found defective/inoperative within the guarantee period, shall be replaced within six weeks of receipt of report for such defective/inoperative meters.
7. If the defective meters are not replaced within the specified period then the same shall be treated as breach of performance and shall be liable for penalty.
8. Following are minimum conditions for replacement of meters and boxes under Guarantee:

Vendor return Cases for Meters and Boxes	
Sr no	**Case**
1	Display faulty
2	Erratic pulse
3	Meter data not downloaded through optical port
4	No Pulse
5	Abnormal active energy (jump in reading)
6	Data Corruption
7	Tamper not restored
8	RTC Fail
9	Wrong or No serial number download

11. GENERAL CONDITIONS

1. Bidder shall submit 2 nos. as sample on non returnable basis along with software and accessories.
2. Guarantee of the meter shall be 5 years from date of installation or 5.5 years from date of dispatch.
3. Meters shall be suitably packed with environmental friendly material in order to avoid damage or disturbance during transit or handling and to prevent ingress of moisture/dust. The seller shall be responsible for all transit damage.
4. Each carton shall be clearly marked with meter serial no. range, purchaser name and delivery address, PO number and date.
5. Delivery of software for CMRI and approval of BCS software before meter delivery is required.
6. The supplier shall give 15 days advanced intimation to enable BRPL to depute representative for lot inspection.
7. Vendor shall deliver CMRI software / any other mobile app for meter downloading and further uploading on computer at the time of delivery.
8. Vendor shall ensure that patch required for CMRI or android based devices shall be provided within 4 weeks. Bidder shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline.
9. For any false events recorded in meter, vendor shall depute their representative for field visit within one week and provide the root cause analysis in 4 weeks time.
10. GTP shall be signed and approved at the time of order and any changes subsequently shall be done through change management process

12. GENERAL FEATURES FOR MDAS/HES

MDAS / HES shall have following minimum features -

1. MDAS / HES shall be scalable to meet BRPL requirement
2. MDAS / HES shall be hosted / deployed at BRPL data center.
3. The remote meter reading software should be compatible to Microsoft Windows systems and shall be web based.
4. MDAS / HES shall have User Access Rights Management System so that as per capability and requirement of user, rights could be provided and security keeps maintained.
5. MDAS / HES shall have option to export CDF as per MIOS standard as well as user defined report generation in format of Excel, PDF, XML and CSV for further integration with system
6. MDAS / HES shall maintain the audit trail of all transaction/changes with date and time.

7. Facility for On Demand acquisition of meter data and at user selectable periodicity
8. MDAS / HES application should have cyber security features as per standards
9. Support secure communication at all interface points
10. Store raw meter data for defined duration
11. Maintain time sync with meter and provision to correct RTC as per defined roles
12. Handling of Control signals / event messages on priority
13. Setting of meter configurable parameters
14. Remote configuration of meter parameters as per defined user roles, firmware upgrades remotely, MIS reports and exceptions reports.
15. Selective meters data can be scheduled to pull from MDAS / HES as desired.
16. Ensure data availability of 99.5% at MDAS / HES
17. Ability to attempt meter reading to recover missed reads and intermittent meter reads
18. Ability to receive and store outage and restoration event data from smart meters and outage systems and to log all such events for analysis
19. The MDAS / HES shall enable BRPL to deliver reports in standard digital format such as PDF, Excel, etc.
20. MDAS / HES shall have User dashboard for alarms, events, communication status and provision to send email, SMS etc.
21. Display via a GUI the energy usage profile for a single meter or group of meters. The load profile shall illustrate energy consumption and peak demand in user defined intervals for a user-specified time period.
22. The Supplier shall also provide manuals, troubleshooting guide and training for the use of software.

--End of Doc--

TECHNICAL SPECIFICATION FOR LTCT/THREAD THROUGH METER

ANNEXURE- A – GUARANTEED TECHNICAL PARTICULARS (DATA BY SUPPLIER)

Bidder shall furnish the GTP format with all details against each clause of this specification.
Bidder shall not change the format of GTP or clause description.
Bidder to submit duly filled GTP in hard copy format with company seal.

Clause No.	Clause Description	Manufacturer's Reply
1		
2		

Annexure B – GTP for Box Enclosure

Ser No.	Specifications	Bidder's remarks
1.	Box shall comply with IS 14772	
2.	Name of the firm and place of manufacturer	
3.	Grade of material shall be glass fibre reinforced polyester material	
4.	Box color shall be white / grey.	
5.	Box shall be suitable for outdoor application with ingress protection of IP-54.	
6.	Thickness of the box at the load bearing side and cover shall be min 3 mm.	
7.	Danger logo shall be printed on box that is easily visible	
8.	Box Enclosure shall be flame retardant and capable to withstand 100 deg Centigrade temperature for 5 minutes without distortion or softening	

Authorized Signatory (seal / signature) ----------

Name of the bidder…… Name of contact person ……..

Address of the bidder …….. Telephone number and email id……

BSES
RAJDHANI POWER LIMITED

Annexure - A

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed & stamped by the bidder along-with bid)

BSES Rajdhani Power Ltd (BRPL) intends to use reverse auction through SAP-SRM tool as an integral part of entire tendering process. All bidders who are techno-commercially qualified on the basis of tender requirements shall participate in the reverse auction.

The following terms and conditions are deemed as accepted by the bidder on participation in the bid:-

1. In case of bidding through Internet medium, bidders are advised to ensure availability of all associated infrastructure as required to participate in the reverse auction event. Inability to bid due to telephone glitch, internet response issues, software & hardware hangs/failures, power failures or any other reason shall not be the responsibility of BRPL.

2. In case bidder fails to participate in the reverse auction event due to any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid submitted by them as a part of tender shall be considered as bidder's Final No Regret offer. Any off-line price bids received from a bidder in lieu of non-participation in the reverse auction event shall be rejected by BRPL.

3. The bidder is advised to understand the auto bid process t safeguard themselves against any possibility of non-participation in the reverse auction event.

4. The bidder shall be prepared with competitive price quotes during the day of reverse auction event.

5. The prices quoted by bidder in reverse auction event shall be on FOR Landed cost BRPL Store/site basis inclusive of all relevant taxes, duties, levies, transportation charges etc.

6. The prices submitted by the bidder during reverse auction event shall be binding on the bidder.

7. The bidder agrees to non-disclosure of trade information regarding bid details e.g. purchase, identity, bid process/technology, bid documentation etc.

8. BRPL will make every effort to make the bid process transparent. However award decision of BRPL will be final and binding on the bidder.

9. The prices submitted during reverse auction event shall be binding on the bidder.

10. No request for Time extension of the reverse auction event shall be considered by BRPL.

Annexure -I

BID FORM

RATE CONTRACT FOR SUPPLY OF 3 PHASE METER WITH BOX & WITHOUT BOX , LTCT METER, HT METER, GRID METER, PRODIGY METER & ABT METER

To

Head of the Department
Contracts & Materials
BSES Rajdhani Power Ltd
BSES Bhawan, Nehru Place
New Delhi– 110019
Sir,

1 We understand that BSES RAJDHANI POWER LTD is desirous of procuring different types of 'Meter's ' in it's licensed distribution network area in Delhi.

2 Having examined the Bidding Documents for the above named works, we the undersigned, offer to deliver the goods in full conformity with the Drawings, Conditions of Contract and specifications for the sum of AS PER PRICE BID ENCLOSED or such other sums as may be determined in accordance with the terms and conditions of the contract .The above Amounts are in accordance with the Price Schedules attached herewith and are made part of this bid.

3 If our Bid is accepted, we under take to deliver the entire goods as per delivery schedule given by you from the date of award of purchase order/letter of intent

4 If our Bid is accepted, we will furnish a performance bank guarantee for an amount of 10% (Ten) percent of the total contract value for due performance of the Contract in accordance with the General Conditions of Contract.

5 We agree to abide by this Bid for a period of 120 days from the date fixed for bid opening under clause 9.0 of GCC , and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

6 We declare that we have studied the provision of Indian Income Tax Law and other Indian Laws for supply of equipments/materials and the prices have been quoted accordingly.

7 Unless and until Letter of Intent isissued, this Bid, together with your written acceptance there of, shall constitute a binding contract between us.

8 We understand that you are not bound to accept the lowest, or any bid you may receive.

9 There is provision for Resolution of Disputes under this Contract, in accordance with the Laws and Jurisdiction of Contract, Clause 19 of GCC .

Dated this..... day of..... 20 .....

Signature..... In the capacity of .....

.....duly authorized to sign for and on behalf of

(IN BLOCK CAPITALS) .....

Annexure -II

FORMAT FOR BID SECURITY BANK GUARANTEE

(To be issued in a Non Judicial Stamp Paper of Rs.50/-purchased in the name of the bank)

Whereas [name of the Bidder](hereinafter called the Bidder") has submitted its bid dated [date of submission of bid] for the supply of [name and/or description of the goods] (hereafter called ''the Bid").

KNOW ALL PEOPLE by these presents that WE [name of bank]at[Branch Name and address],having our registered office at[address of the registered office of the bank](herein after called —the Bank"),are bound unto BSES Rajdhani Power Ltd., with it's Corporate Office at BSES Bhawan Nehru Place, New Delhi -110019 ,(herein after called —the Purchaser")in the sum of Rs._____ for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this_____ day of_____ 20____.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form ;or

2. If the Bidder, having been notified of the acceptance of its Bid by the Purchaser during the period of bid validity:

(a) fails or refuses to execute the Contract Form ,if required; or
(b) fails or refuses to furnish the performance security, In accordance with the Instructions to Bidders/GENERAL CONDITIONS.;

We undertake to pay to the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that is its demand the purchaser will note that amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or condition s.

This guarantee will remain in force up to and including thirty (30) days after the period of bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

(Signature of the bank)

Signature of the witness

BSES
RAJDHANI POWER LIMITED

Annexure –III

PRICE FORMAT

ENQUIRY NO & DATE: CMC/BR/25-26/FK/PR/MS/1234 DT : 04.02.2025

S.NO	HSN Code	Material Dispatch Location (GSTN no.)	Item Description	UOM	QTY (Nos.)	EX-WORKS RATE/No.	C GST (%)	C GST (Amt)	S GST (%)	S GST (Amt)	I GST (%)	I GST (Am)	FREIGHT	LANDED COST/No.	TOTAL LANDED COST
1			MTR,PWR,3PH,20-100A	*Nos*	18000										
2			LT CT Meter (3P-4W, 240Volts, CL- 0.5s)	*Nos*	1000										
3			HT Meter (3P-4W, 63.5V, 5A, CL-0.5s)	Nos	150										
4			HT Meter (3P-4W, 63.5V, 1A, CL-0.2s)	Nos	10										
5			HT Meter 63.5V, 3PH, 4.0 0.5s; HVDS	Nos	20										
6			DT METER	Nos	1000										
7			Grid Meter /1A,3P 4W	Nos	500										
8			Grid Meter /5A,3P 4W	Nos	300										
9			MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 1 AMP)	Nos	10										
10			MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 5 Amp)	Nos	20										

Pls attach the covering letter head alongwith the price format.

NAME OF THE BIDDER WITH STAMP

BSES
RAJDHANI POWER LIMITED

Annexure - IV

COMMERCIAL TERMS AND CONDITIONS

ENQUIRY NO & DATE : CMC/BR/25-26/FK/PR/MS/1234, DT:04.02.2025

S/NO	ITEM DESCRIPTION	AS PER BRPL	CONFIRMATION OF BIDDER
1	Validity of prices	120 days from the date of offer	
2	Price basis	a) Firm, FOR Delhi store basis. Prices shall be inclusive of all taxes & duties, freight upto Delhi stores. b) Unloading at stores shall be in vendor's scope c) Transit insurance in BRPL scope for Indian portion only	
3	Payment terms	100% payment within 45 days after receipt of material at stores	
4	Delivery schedule	As per our requirement	
5	Defect Liability period	60 months after commissioning or 66 months from the last date of supply,whichever is earlier	
6	Penalty for delay	1% (Ex- works value) per week of delay of undelivered units or part thereof subject to maximum of 10% of total PO value(Ex- works) of undelivered units	
7	Performance Bank Guarantee	10% of total PO value valid for 60 months after commissioning or 66 months from the last date of supply,whichever is earlier plus 3 months towards claim period	

ANNEXURE V

ENQUIRY NO & DATE : CMC/BR/25-26/FK/PR/MS/1234 DT: 04.02.2025

NO DEVIATION SHEET

SL NO	SL NO OF TECHNICAL SPECIFICATION	DEVIATIONS,IF ANY

SIGNATURE & SEAL OF BIDDER

NAME OF BIDDER

BSES
RAJDHANI POWER LIMITED

Annexure – VI

S.No	Qualification Criteria	Declaration by bidder with qualifying the fulfillment	Documentary Evidence attached page no. details
1	The bidder must be a meter manufacturer of static meter.		
2	The bidder shall either themselves be manufacturers of the equipment offered or accredited representatives of such manufacturers in India or of their Principals abroad with whom they may be having collaboration Such accreditation should be at least of one year preferably last year as on date of tender. Authority letter from manufacturer shall be attached along with bid.		
3	Relevant documents in support of the above must be furnished along with undertaking of the manufacturers. If these documents are not furnished along with the tenders the offer will be rejected summarily.		
4	Bidder should have supplied minimum 1000 meters each type of meters (except 3 phase whole current meters & Grid Meters) in last five years (from the date of technical bid opening) to Electricity Distribution Utility / Undertaking in India with electronic display and communication facility.	Order copies /completion certificates to be submitted	
5	Bidder should have supplied atleast 50,000 nos. 3 phase whole current meters and minimum 500 nos Grid Meters in last five years(from the date of technical bid opening) to Electricity Distribution Utility / Undertaking in India with electronic display and communication facility.	Order copies /completion certificates to be submitted	
6	Offered meters should be in successful operation atleast 2 year as on the date of opening of Bid.This should be supported by the copies of purchase orders and performance reports from the SEBs / Power utilities should be enclosed.		
7	The bidder must possess valid ISO 9001:2000 certification for meter manufacturing and possess possess valid BIS Licence.	ISO or equivalent Certification copy	
8	Firms who are debarred/blacklisted in other utilities in India will not be considered.	Self certification	
9	The Bidder should have average turnover of Rs.20 Crores in the last three financial years (i.e. 2021-22,22-23 & 23-24) . Bidder should submit report on financial standing such as profit and loss statement, balance sheets for the last three years as an supporting documents.	Copy of audited Balance Sheet and P&L Account to be submitted in this regard	
10	Bidder should have complete volume of type test reports as per IS 13779 (Including latest amendments if any) and magnet test as per CBIP-88 from any NABL accredited lab. The type test report should not be older than 5 years as on the date of opening of tender.		
11	The bidder must be a meter manufacturer of static meter.		
12	Computerized test bench: The manufacturer should have sufficient Nos of Computerized test benches. The benches should have electronic supply, Isolated CT/ PT system and data should be directly stored in central server.		
13	Seal tracking system: The manufacturer has to put both his own seal and BSES seal on the meter. He should have a seal tracking software to ensure tracking of seal and no duplication of seals and meter nos,.		
14	Meter Burn In system: In order to ensure the reliability of components and that there is no drift in meter accuracy with time; the manufacturer should have burn in facility --- Running meter with load at elevated temperature		
15	Routine test data: During lot acceptance, all routine test data should be made available to inspector. In fact as per BIS, STI all test data should be offered to inspector for verification. Routine test report should be packed with each meter.		
16	Test benches: During the lot acceptance, BSES inspector can test up to 5% of offered quantity. The manufacturer should agree to provide all test facility to do so. Further he should allow BSES inspector to check shop floor process.		
17	Test equipments: Since the meters has lot of anti theft features, the manufacturer should have test set up too check the working of all anti theft features.		
18	PCB assembly facility:- The PCB facility should have auto- pick n place machine, in- circuit testor, Protection against static charge/ dust etc.; and process to ensure no corrosion of solder points/ tracks. Incase service is taken from other vendor than bidder shall arrange inspection of facility. The bidder should be taking the service from the vendor since last two years and so far have procured & one million 50,000 3ph meter PCB from vendor.		

CHECK LIST

Sl No	Item Description	YES/NO
1	INDEX	YES/NO
2	COVERING LETTER	YES/NO
3	BID FORM (UNPRICED) DULY SIGNED	YES/NO
4	BILL OF MATERIAL (UNPRICED)	YES/NO
5	TECHNICAL BID	YES/NO
6	ACCEPTANCE TO COMMERCIAL TERMS AND CONDITIONS	YES/NO
7	FINANCIAL BID (IN SEALED ENVELOPE)	YES/NO
8	EMD IN PRESCRIBED FORMAT	YES/NO
9	DEMAND DRAFT OF RS 1180/- DRAWN IN FAVOUR OF	BSES……POWER LTD
10	POWER OF ATTORNEY/AUTHORISATION LETTER FOR SIGNING THE BID	YES/NO