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/20-21/SV/RS/SN/875

Date : 25.02.2021

Due Date for Submission of Bids : 17.03.2021(1500 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

SECTION - I

REQUEST FOR QUOTATION

Tender Notification : CMC/BR/20-21/SV/RS/SN/875

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

Date : 25.02.2021

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![BSES Rajdhani Power Limited logo]

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 METERvide TENDER NOTICE CMC/BR/20-21/SV/RS/SN/875 DUE FOR SUBMISSION ON DT. 17.03.2021", 1500 HRS.**

Sl. No.	Item Description	Specification	Requirement Total Qty. (Nos)	Estimated Cost
	BRPL,DELHI			
1	**MTR,PWR,3PH,20-100A**		*15718*	
2	**3PH Meter Small with Box**		*1000*	
3	**LT CT Meter (3P-4W, 240Volts, CL- 0.5s)**		1000	
4	**HT Meter (3P-4W, 63.5V, 5A, CL-0.5s)**		*100*	
5	**HT Meter (3P-4W, 63.5V, 1A, CL-0.2s)**	**SECTION V**	*5*	*5.55 Cr*
6	**HT Meter 63.5V, 3PH, 4.0 0.5s; HVDS**		300	
7	**DT METER**		1000	
8	**Grid Meter /1A,3P 4W**		250	
9	**Grid Meter /5A,3P 4W**		250	
10	**MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 1 AMP & 5 Amp)**		30	
11	**MTR,ENERGY,LTCT,INBUILD MODM, BOX CT**		200	

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 25.02.2021 onwards on all working days upto 17.03.2021. 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/20-21/SV/RS/SN/875 ".**This envelope should accompany the Bid Documents.

1.00   Offers will be received upto **15:00 Hrs. on dt. 17.03.2021**as indicated earlier and will be opened at the address given below dt **17.03.2021at 15:30 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.

<div align="center">

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

</div>

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 5,55,000/-** 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. 2017-18,18-19 & 19-20). 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 17.03.2021
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	17.03.2021, At 1500 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	17.03.2021, At 1500 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.**	17.03.2021, At 1500 Hrs
5	Performance gaurantee quality system report	• As per RFQ	Only for successful bidders.
6	Opening of technical bid	• As per RFQ	17.03.2021, At 15:30 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.

4.00 Award 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. Gopal Nariya**	**Mr. Robin.Sebastian**
Address	2nd Floor , B-Block, BSES Bhawan Nehru Place , New Delhi -111019	1st Floor , C-Block, BSES Bhawan Nehru Place , New Delhi -111019
Email Id	Gopal.Nariya@relianceada.com	Robin.Sebastian@relianceada.com

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/20-21/SV/RS/SN/875

Date : 25.02.2021

Due Date for Submission of Bids : 17.03.2021

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 5,55,000/**. 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 **1500 Hrs on 17.03.2021**

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 the Total 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. The Technical 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 Bidder 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/20-21/SV/RS/SN/875

Date : 25.02.2021

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		*15718*	
2	3PH Meter Small with Box		*1000*	
3	LT CT Meter (3P-4W, 240Volts, CL- 0.5s)		1000	
4	HT Meter (3P-4W, 63.5V, 5A, CL-0.5s)		*100*	
5	HT Meter (3P-4W, 63.5V, 1A, CL-0.2s)		*5*	
6	HT Meter 63.5V, 3PH, 4.0 0.5s; HVDS	SECTION V	300	*5.55 Cr*
7	DT METER		1000	
8	Grid Meter /1A,3P 4W		250	
9	Grid Meter /5A,3P 4W		250	
10	MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 1 AMP & 5 Amp)		30	
11	MTR,ENERGY,LTCT,INBUILD MODM, BOX CT		200	

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/20-21/SV/RS/SN/875

Date : 25.02.2021

BSES
BSES Rajdhani Power Ltd

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

BSES
BSES Rajdhani Power Ltd

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……………………

Technical Specification of 3P4W LT-CT operated DT Meter

Document number: GN101-03-SP-180-00

Prepared By	Reviewed by	Approved By	
			Rev. No.: 0
			Date: 01.08.19
Md. Akhtar Ansari	Rishi Goyal	Sheshadri Krishnapura	

VERSION CONTOL

SN	Date	Previous Version No.	Current Version No.	Author
1	01.08.19	NA	GN101-03-SP-180-00	Md. Akhtar Ansari, Rishi Goyal

CONTENTS

1.0   SCOPE

This specification covers the design, manufacture, assembly, inspection, testing and before supply of Accuracy Class 0.5S (Active & Reactive), 3 x 240 V and -/5 A static energy meter for DT. The meter shall be AMR compatible and BCS software for local and remote data download and data analysis purpose, as per BRPL requirement.

2.0   STANDARDS

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.	CEA Regulation:2006 and latest amendments	Installation and Operation of meters or latest amendment
c.	IS15959 and its latest amendment	Data Exchange for Electricity Meter, Reading, Tariff and Load Control – Companion Specification
d.	IEC 62056	Electricity metering data exchange- The DLMS/COSEM Suit- Part 5-3: DLMS/ COSEM application layer
e.	CBIP Manual (Pub no.-325)	Standardization of AC Static Electrical Energy Meters
f.	CBIP Manual 88	Latest amendments of CBIP Manual no. 88

3.0   TECHNICAL SPECIFICATION

SN	Parameters	Technical Requirements
1	Voltage	240 V (P-N), 415 V (P-P) with +20% to -40% However the meter should withstand the maximum system voltage.
2	Current	-/5 A, Max. continuous current 10 A
3	Power factor range	Zero lag – Unity – Zero lead
4	Display	LCD , Scrolling, 6 sec. for each parameter
5	Display parameters	a) Display parameters: LCD test, date & time, cumulative and phasewise kWh, kVAh & kVARh, MD in kW & kVA, PF, V, I and Neutral current b) Phasor diagram/ wiring error: Meter should indicate/ display

SN	Parameters	Technical Requirements
		wiring error with fault type. Fault related to phase association error should be clearly tagged. c) EL display with LED or LCD
6	Measuring parameters	d) Basic parameters: Date, Real time, Self diagnostics. e) Energy and power parameters: Cumulative & Phase wise kWh, kVAh, kVARh, MD in KW, kVAR and kVA. Note (kVAR lead and lag shall be clearly identified able) f) Instantaneous parameters: Phase wise V, I, pf., Neutral current g) Phasor diagram: Both for amplitude and angle of all 3V & I wrt to R phase voltage. h) Power On/off: Calendar month wise power ON/ Off time.
7	History data	Last 12 months data regarding energy, power factor, power On/OFF and MD shall be stored in meter.
8	MD Registration	Meter shall store MD in every 30 for all three type of Power. MD should reset on 00:00 hrs on define date. By default this date is 1st day of month however it should be programmable.
9	Load Survey	30 min integration period, load profile of phasewise voltage and current, phasewise active & reactive power, cumulative active energy & power off in IP for 45 days.
10	Diagnostic Feature	Self-diagnostic for time, calendar, RTC battery all display segments and NVM.
11	Security Feature	Meter should have enough security specially in context to write/ parameter change facility. All write transaction should be logged.
12	Software & communication compatibility	Optical port with RS232 compatible to transfer the data locally through CMRI & remote through GPRS/GSM/LPR/Optical fibre to the main computer. 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.
13	Additional communication port	An additional RS 232 hardwired port (construction RJ 11) to be provided in terminal block for AMR GPRS/GSM/Optical fibre to the main computer.
14	Memory	Non-volatile memory independent of battery backup, memory should be retained upto 10 years in case of power failure.
15	Climatic conditions	Max Temp – 60°C, relative humidity – 96%. In general meters will be installed in box in outdoor condition and thus exposed to worst weather condition
16	Calibration	Adjustment of error shall not be possible at site by any means.
17	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.
18	Digital Output (DO),	a) Meter should have 2 no. of Digital Output (DO) ports to remotely connect/ disconnect the load via suitable mechanism.

SN	Parameters	Technical Requirements
	Digital Input (DI) , Analog Input (AI)	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.

Note: Regarding definition of MD, Power OFF, TOD, Load survey, kVAh, meter output, Phasor diagram for field testing – also refer draft CBIP proposal for meter standardization. Same needs to be followed.

4.0   CONSTRUCTIONAL SPECIFICATIONS

SN	Parameters	Technical Requirements
1	Body of Meter	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 polycarbonate of LEXAN 143A/943AA or equivalent grade 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	"DT Meter" should be BOLDLY marked on name plate. Design of Name plate will be approved by BRPL.
6	Meter Sealing	Supplier shall affix minimum one OWN hologram seal on side of meter body. Additionally will fix seals as provided by BRPL and record should be forwarded to BRPL.
7	Warrantee	66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier.
8	Insulation	Meter shall withstand an insulation test of 8kV.

5.0   TAMPER & ANTI-FRAUD DETECTION/ EVIDENCE FEATURES
The meter shall not be affected by any remote control device & extra high voltage/ field shall continue recording energy under any one or combinations of the following conditions:

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

b. **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. It is

preferred if Meter can compute energy based on other phase data and store in separate register as ASSESSED ENERGY.

c. Reversal of C.C. (Current Coil) Polarity: Meter shall register the energy consumed correctly and only in forward direction with any one, two or all three phase C.C. reversal.

d. Abnormal voltage condition: Meter shall record the occurrences of voltage level beyond the tolerance limit with date & time. Default tolerance limit is <200V or ore than 250V.

e. C.C. Shorting/ open: Meter shall record C.C. terminal shorting/ open with time and date and time of restoration. . It is preferred if Meter can compute energy based on other phase data and store in separate register as ASSESSED ENERGY.

f. Power On/Off: Meter shall detect power OFF (minimum power off period 5 mins) if any of phase voltages are not present. This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded. This logging shall be available in Tamper details along with cumulative time of failure.

g. 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.

h. Meter shall log all three phases voltage, current, power factor etc. at the time of tamper attempt for all such occurrences. Meter should never record energy in "Punishment/ Deterrent" mode.

5.1 Influence Quantities

The meter shall work satisfactorily with guaranteed accuracy limit under the presence of the following influence quantities as per IEC-1036 and CBIP Technical Report no. 88 with latest amendment.

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

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 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 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.	Everlight Truly semiconductor, Tianma/ Haijing Electronics, China/ Hitachi, Japan / Sony / Philips Or any other repeated make
6.5	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. c) 9 pin connector of optical port shall be FCI copper type.	Everlight, Osram, Agillent, NFC Or any other repeated make
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	SMPS Type (It should take care of relevant clause under Tech.

SN	Component Function	Requirement	Makes and Origin
		maximum voltage of the system appears to the terminals due to faults or due to wrong connections.	Specifications)
6.7	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. LED	USA: National Semiconductors, Atmel, Phillips, Texas Instruments, ST, Onsemi Japan: Hitachi, Oki, AVX or Ricoh Korea: 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
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.

7.0   DRAWINGS AND DOCUMENTS

Following drawings & Documents shall be submitted with the bid:
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. 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. Manual and SOP/DWI for operation

8.0   DISPLAY SEQUENCE FOR THE PARAMETERS

8.1 Default Display (Auto Mode)
Display Parameters
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.   Current Max. demand in kW & kVA
x.   TOD MD for kWh and kVAh
xi.   TOD MD occurrence for kWh and kVAh
xii.   TOD Reactive Lag and Lead Forward MD Register
xiii.   Inst. Avg. Power Factor (3 phase)
xiv.   Inst. Voltage R,Y,B (Phase- Neutral)
xv.   Inst. Line current R,Y, B
xvi.   Neutral Current
xvii.   Instantaneous kW, kVAR, kVA
xviii. Temperature
xix.   Cumulative Power-Off duration
xx.   Cumulative Power-On duration
xxi.   Front cover open count

8.2 On-demand Display
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.	TOD MD for kWh and kVAh
xi.	TOD MD occurrence for kWh and kVAh
xii.	Instantaneous Power factor
xiii.	Instantaneous voltage R phase
xiv.	Instantaneous voltage Y phase
xv.	Instantaneous voltage B phase
xvi.	Instantaneous current R phase
xvii.	Instantaneous current Y phase
xviii.	Instantaneous current B phase
xix.	Last month billing Date
xx.	Last month billing kWh reading
xxi.	Last month billing kVARh reading
xxii.	Last month billing kVAh reading
xxiii.	Last month billing Maximum Demand in kW
xxiv.	Last month billing Maximum Demand in kW occurrence Date
xxv.	Last month billing Maximum Demand in kW occurrence Time
xxvi.	Last month billing Maximum Demand in kVA
xxvii.	Last month billing Maximum Demand in kVA occurrence Date
xxviii.	Last month billing Maximum Demand in kVA occurrence Time
xxix.	THD for both Voltage and Current
xxx.	Total Active Energy, Apparent Energy
xxxi.	Fundamental Reactive Lag and Fundamental Reactive Lead Energy
xxxii.	Neutral Current
xxxiii.	Temperature
xxxiv.	Battery status
xxxv.	PT/CT status
xxxvi.	Self diagnostic flag
xxxvii.	Cumulative Tamper count

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

9.0   ADDITIONAL FEATURES

9.1 Mid night data: The meter should record midnight Cumulative kWh & kVAh reading for last 45 days load survey data.

9.2 Total Harmonic Distortion: Meter to record harmonic components in both current and voltage circuits. And should be available in on demand display.

9.3 Mobile App (Optional): App for mobile reading to be supplied by the bidder.

9.4 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.

10.0 GENERAL REQUIREMENTS

10.1 On the meter name-plate:

   a. Manufacturer name and place of manufacturing
   b. Meter rating and Class
   c. Meter serial number should be of 8 digits
   d. Size of the digit of the meter serial number should be minimum 5mm X 3mm. (Laser printing shall be preferred)
   e. Bar code should be of fine quality printed below the meter serial number
   f. BIS registration mark (ISI mark)
   g. Property of "BRPL"
   h. Manufacturing date (mm/yy)
   i. Guaranty period
   j. Meter constant (Impulse/kWh)
   k. PO no. and date

10.2 Meter Sr. Nos. to be printed in black on the name plate, instead of embossing. (Good quality of printing)

10.3 The supplier should seal (double lock approved seal) meters on both sides. The Buyer shall approve the method of sealing.

10.4 The internal potential links should be in closed position or link less meters will be preferred and there shall not be any external link.

10.5 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)

10.6 Box number, meter serial number, type, rating should be mentioned on cases / cartons.

10.7 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.

10.8 In case battery removal/ total discharge same should not affect the working & memory of the meter.

10.9 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.

10.10 The supplier shall give 15 day advanced intimation to enable BRPL to depute representative for lot inspection.

10.11 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.

10.12 Delivery of software for reading through HHU/CMRI before meter delivery is required.

10.13 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.

--End of Doc--

Technical Specification of 3P4W
LT-CT Consumer Meter

Document number: GN101-03-SP-179-00

Prepared By	Reviewed by	Approved By	
			Rev. No: 0
			Date: 01.08.19
Md. Akhtar Ansari	Rishi Goyal	Sheshadri Krishnapura	

VERSION CONTOL

SN	Date	Previous Version No.	Current Version No.	Author
1	01.08.19	NA	GN101-03-SP-179-00	Md. Akhtar Ansari, Rishi Goyal

CONTENTS

1.0   SCOPE

This specification covers the design, manufacture, assembly, inspection, testing and before supply of 3 phase 4 wire , Accuracy Class 0.5s, 3 x 240 V and -/5 A static energy meters with optically isolated RS 232 Communication Port for outdoor use. The meter shall be capable to be read remotely through automatic meter reading (AMR) and BCS software for local and remote data download and data analysis purpose, as per BRPL requirement.

2.0   STANDARDS

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.	CEA Regulation:2006 and latest amendments	Installation and Operation of meters or latest amendment
c.	IS15959 and its latest amendment	Data Exchange for Electricity Meter, Reading, Tariff and Load Control – Companion Specification
d.	IEC 62056	Electricity metering data exchange- The DLMS/COSEM Suit-Part 5-3: DLMS/ COSEM application layer
e.	CBIP Manual (Pub no.-325)	Standardization of AC Static Electrical Energy Meters
f.	CBIP Manual 88	Latest amendments of CBIP Manual no. 88
g.	IEC 62052-11	General Requirement
h.	IEC 62053-22	For class 0.5

3.0   TECHNICAL SPECIFICATION

SN	Parameters	Technical Requirements
1	Voltage	240 V (P-N), 415 V (P-P) with +20% to -40% However the meter should withstand the maximum system voltage.
2	Current	-/5 A, Max. continuous current 10 A
3	Power factor range	Zero lag – Unity – Zero lead
4	Display	a) LCD (Seven digits) b) Height: 10 mm X 6 mm min c) Pin Type

SN	Parameters	Technical Requirements
		d) Viewing angle min. 60 degrees
5	Display parameters	a) Display parameters: LCD test, date & time, cumulative and phasewise kWh, kVAh & kVARh, MD in kW, kVAr & kVA, PF, V, I and Neutral current
		b) Phasor diagram/ wiring error: Meter should indicate/ display wiring error with fault type. Fault related to phase association error should be clearly tagged.
6	Power Consumption	As per relevant IS
7	Starting Current	0.1% Ib
8	Running with NO load	Meter shall not record any energy under no-load condition.
9	Frequency	50 Hz with +/- 5% variation
10	Process Technology	Surface Mounting Technology or better
11	Test Output Device	Separate kWh & kVAh Flashing LED visible from the front
12	Billing Data	a) Display parameters: LCD test, date & time, cumulative kWH, cumulative kVAh & kVARh, MD in kW. kVAr & kVA, PF, V, I b) Display order shall be as per "Display Sequence" section
13	MD Registration	a) Meter shall store MD in every 30 min. period along with date & time with sliding window (5 min interval) programmable. At the end of every 30 min, new MD shall be previous MD and store whichever is higher and the same shall be displayed. b) It should be possible to reset MD automatically at the defined date (or period) or through CMRI
14	Auto reset of MD	Default auto reset date: 00:00 hrs on 1st day of the month however provision shall be made to change MD reset date through MRI even after installation of meter on site.
15	ToD metering	Meter shall be capable of doing TOD metering for kWh, kVARh, kVAh and MD in kW, kVAR and kVA with 7 time zones (programmable on site through CMRI). Reactive parameter should be recorded separately for Lag and Lead. Bidder to ensure latest DERC Tariff as well as specific requirement of BRPL to be updated in meters before delivery.
16	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.
17	Time required data downloading on PC	a) Meter data consisting of all parameters and 90 days load survey for above parameters shall be read by CMRI/AMR and downloaded on desktop PC in minimum possible time and it shall

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SN	Parameters	Technical Requirements
		be indicated at the time of finalizing GTP. (The meter reading time should not be more than 5 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.
18	Diagnostic Feature	Self-diagnostic for time, calendar, RTC battery all display segments and NVM.
19	Security Feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, communication write etc.
20	Software & communication compatibility	a) Optical port with RS 232 compatible to transfer the data locally through CMRI & remote through Optical fiber / GSM / GPRS 3G/4G any other technology to the main computer. The optical communication should not be affected by the normal day light or any other light source surrounding the installed meter. 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 OS. The software should have polling feature with optional selection of parameters to be downloaded for AMR application. c) Necessary provision shall be made in the software for converting all the parameters available for new and old meters if supplied earlier. 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 *. Vendor to jointly work with BRPL IT team to develop CMRI software for meter downloading and further uploading on computer
21	Additional communication port	An additional RS 232 hardwired port to be provided in sealable area for AMR Optical fiber/GSM/GPRS/3G/4G to the main computer.
22	Memory	Non-volatile memory independent of battery backup, memory should be retained upto 10 years in case of power failure.
23	Climatic conditions	The meter should function satisfactorily in India with temperature ranging from -10 ºC - 60ºC and humidity upto 96%.
24	Calibration	Meters shall be software calibrated at factory and modification in calibration shall not be possible at site by any means.
25	Battery	In case battery removal or total discharge same should not effect the working & memory of the meter.
26	kVAh definition	kVAh is computed based on kVARh and kWh value. If PF=1, or leading, then kVAh = kWh. At no instance kVAh < kWh
27	CT and Voltage terminals	Meter height, pitch for CT and voltage terminals should align with the LT CT meter box used in BRPL. Following are the dimensions:-

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SN	Parameters	Technical Requirements
		• Pitch for CT and voltage terminals- 11.5 mm • PIN height – 28 mm, PIN diameter -4.5 mm, distance of center from base of meter - 31 mm (tolerance- 0.5 mm)
28	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.

Note: Regarding definition of MD, Power OFF, TOD, Load survey, kVAh, meter output, Phasor diagram for field testing – also refer draft CBIP proposal for meter standardization. Same needs to be followed.

4.0   CONSTRUCTIONAL SPECIFICATIONS

SN	Parameters	Technical Requirements
1	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.
2	Terminal Block	Made of polycarbonate of grade 500 R or equivalent grade and shall form Integral part of the meter base, brass or copper duly plated current terminals with flat-head brass screws.
3	Terminal cover	Transparent terminal cover polycarbonate of LEXAN 143A/943AA or equivalent grade with provision of sealing through sealing screw.
	Diagram of connections	Diagram of external connections to be shown on terminal cover
4	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.
5	Marking on name plates	Meter should have clearly visible, indelible and distinctly name plate marked in accordance with IS & BRPL specifications.
6	Meter Sealing	Supplier shall affix one Buyer seal on side of Meter body as advised and record should be forwarded to Buyer.
7	Guarantee	66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier
8	Insulation	A meter shall withstand an insulation test of 4 kV and impulse test at 8 kV

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SN	Parameters	Technical Requirements
9	IP Rating	The meter shall conform to degree of protection IP51 (as specified in IS 12063) for protection against ingress of dust, moisture and vermin

5.0   TAMPER & 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 be affected by any remote control device & extra high voltage/ field shall continue recording energy under any one or combinations of the following conditions. Meter shall log all three phase voltage, current (line, active and reactive), Reading (Active and Apparent) power factor, **neutral current** etc. at the time of tamper attempt for all such occurrences.

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

b. **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 value of voltage should be agreed before delivery. .

c. **Reversal of C.C. (Current Coil) Polarity:** Meter shall record the reversal of CC polarity with time and date and also the time of restoration. Meter shall register the energy consumed correctly and only in forward direction with any one, two or all three phase C.C. reversal.

d. **C.C. Shorting/ Bypass:** Meter shall record C.C. terminal shorting/ bypass with time and date and time of restoration. The threshold value of currents should be programmable. Logging of neutral current is most important.

e. **Unbalance Voltage:** Meter shall record all events when the voltage difference between the two phase is more than 20V.

f. **Low Voltage:** Meter shall record all events when any of the three voltages are beyond 20% of Vref.

g. **Power On/Off:** Meter shall detect power OFF (minimum power off period 5 mins). This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded. This logging shall be available in Tamper

details along with cumulative time of failure. Meter should have provision to record last 100 such events minimum.

h. **Snap Shots:** Meter shall log all three-phase voltage, current (line, active and reactive), Reading (Active and Apparent), power factor, neutral current etc. at the time of tamper attempt for all such occurrences.

i. **Neutral Disturbance**: Meter shall record correctly in case of any AC, DC high frequency signal injected in the neutral circuit of meter. Meter should log the event. Meter shall record correctly in case of missing neutral connection.

j. **External Magnetic tampers:** Meter should log on the events of attempt of tampering by external magnetic field as mentioned in the relevant IS. The 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.

k. **Protection against HV spark/ ESD:** Meter shall continue to record energy or log the event, incase it is disturbed externally using a spark gun/ ignition coil. Upto 35 KV meter should be immune.

l. **Over Load:** Meter shall record Over Load as an event, incase the current in any phase persist for more than rated current that is 5Amp.

m. **Abnormal power off:** Meter shall record case of abnormal power off with date and time. In general meter should not get off, if AC supply is available.

n. **Abnormal voltage/ load:** meter shall record abnormal voltage and / or abnormal current if either the angle between two phases is beyond 120 +/- 20 deg or angle between two current is less than 30deg.

o. **Top cover open:** The meter shall have top cover opening detection mechanism. The top cover opening event shall be indicated display continuously in auto scroll mode with kWh and kVAh or through additional LED and 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.

p. **Manufacturing Detail in memory:** Meter shall have manufacturing month and year in the memory and should come in data downloading.

q. **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 appear and get logged in meter.

Note:

- Vendor has to define Tamper Logic, Occurrence and restoration time before supply.
- Tamper and fraud protection test shall be part of acceptance test.
- Cumulative power off hours shall be logged by the meter.
- Meter shall log all three phases voltage, current, power factor etc. at the time of tamper attempt for all such occurrences. *Meter should never record energy in "punishment/ Deterrent" mode.*
- Bidder to extend complete support to generate XML file according to BRPL requirement and may vary from time to time.

5.1 Influence Quantities

The meter shall work satisfactorily with guaranteed accuracy limit under the presence of the following influence quantities as per IEC-1036 and CBIP Technical Report no. 88 with latest amendment.

   a) External Magnetic Field (0.2 Tesla)
   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

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 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 display modules should be well protected from the external UV radiations. b) The display visibility should be sufficient to read the Meter mounted at	Everlight Truly semiconductor, Tianma/ Haijing Electronics, China/ Hitachi, Japan / Sony /

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SN	Component Function	Requirement	Makes and Origin
		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.	Philips Or any other repeated make
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 Germany: Siemens
6.6	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. c) 9 pin connector of optical port shall be FCI copper type.	Everlight, Osram, Agillent, NFC Or any other repeated make
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.	SMPS Type (It should take care of relevant clause under Tech. Specifications)
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. 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, ST, Onsemi Japan: Hitachi, Oki, AVX or Ricoh Korea: Samsung EPCOS, Vishay

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SN	Component Function	Requirement	Makes and Origin
		LED	Everlight, Agillent
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.	Texcell, SAFT, Varta
6.11	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
6.12	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 suppliers – fresh approval is needed for all deviations.

7.0   DRAWINGS AND DOCUMENTS

Following drawings & Documents shall be submitted with the bid:
  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. Component list
  h. Display parameter
  i. Type Test Certificates from NABL approved laboratories.
  j. Tamper details
  k. Manual and SOP/DWI for operation

8.0   DISPLAY SEQUENCE FOR THE PARAMETERS

8.1 Default Display (Auto Mode)
Display Parameters
  i.   LCD test

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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.   Temperature

xv.   Total tamper count

8.2 On-demand Display

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

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.

9.0 ADDITIONAL FEATURES
9.1 Mobile App (Optional): App for mobile reading to be supplied by the bidder.
9.2 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.**

10.0 GENERAL REQUIREMENTS
10.1 On the meter name-plate:
a. Manufacturer name and place of manufacturing
b. Meter rating and Class
c. Meter serial number should be of 8 digits
d. Size of the digit of the meter serial number should be minimum 5mm X 3mm. (Laser printing shall be preferred)
e. Bar code should be of fine quality printed below the meter serial number
f. BIS registration mark (ISI mark)
g. Property of "BRPL"
h. Manufacturing date (mm/yy)
i. Guaranty period
j. Meter constant (Impulse/kWh)
k. PO no. and date

10.2 Meter Sr. Nos. to be printed in black on the name plate, instead of embossing. (Good quality of printing)

10.3 The supplier should seal (double lock approved seal) meters on both sides. The Buyer shall approve the method of sealing.

10.4 The internal potential links should be in closed position or link less meters will be preferred and there shall not be any external link.

10.5 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)

10.6 Box number, meter serial number, type, rating should be mentioned on cases / cartons.

10.7 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.

10.8 In case battery removal/ total discharge same should not affect the energy recording in the meter.

10.9 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. Alternatively bidder can provide physical copy of the test results.

10.10 Delivery of software for reading through HHU/CMRI before meter delivery is required.

10.11 The supplier shall give 15 day advanced intimation to enable BRPL to depute representative for lot inspection.

10.12 Vendor shall ensure that future upgrades of software required for HHU/CMRI shall be provided within 4 weeks of intimation. Vendor shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline.

10.13 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.

--End of Doc--

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Technical Specification for 3P4W HT Meter

Document number: GN101-03-SP-181-00

Prepared By	Reviewed by	Approved By	Rev. No: 0
			Date: 01.08.19
Md. Akhtar Ansari	Rishi Goyal	Sheshadri Krishnapura	

VERSION CONTROL

SN	Date	Previous Version No.	Current Version No.	Author
1	01.08.19	NA	GN101-03-SP-181-00	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. 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 GSM, GPRS, 3G/4G.

The Purchaser wishes to have these energy meters installed to measure & log energy with other associated electrical parameters, at CONSUMER Installation for energy accounting & operational data collection. Majority of the substations are of open terminal air insulated type. Feeders emanating from these substations, supply the energy to the HT Consumers. 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, AC static transformer operated watt-hr and Var-hr meters Class 0.2s, 0.5s specifications
2	IEC 687 for Class 0.5
3	CBIP Manual – No. 325 with latest amendments - Standardization of AC Static Electrical Energy Meters
4	IS 9001:2008
5	IEC 62056 Electricity metering data exchange- The DLMS/COSEM Suit- Part 5-3: DLMS/ COSEM application layer
6	IS15959 and its latest amendment - Data Exchange for Electricity Meter, Reading, Tariff and Load Control – Companion Specification
7	IEC 62053-22 For class 0.5
8	CEA Regulation:2006 and latest amendments, Installation and Operation of meters or latest amendment

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
3.3	Display	LCD, scrolling
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

SN	Parameters	Technical Requirements
		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
3.7	Frequency	50 Hz with + / - 5% variation
3.8	Process technology	SMT or better
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 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	Default auto reset date: 00:00 hrs on 1st day of the month however 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). Bidder to ensure latest DERC Tariff as well as specific requirement of BRPL to be updated in meters before delivery TOD parameters as per DERC should be programmable on site through CMRI or AMR remotely. At Display as well as BCS end meter TOD values shall be shown as per cumulative values of TOD Zones of respective registers.
3.14	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.)

SN	Parameters	Technical Requirements
		Apparent Energy, load, PF, THD in both current and voltage, phase-wise demand, power-off time integration period.
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 /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.
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/3G/4G 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/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.
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

SN	Parameters	Technical Requirements
		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   CONSTRUCTION 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	Guarantee	66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier.
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.

5.0   TAMPER AND ANTI-FRAUD 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.

- **C.C. Shorting/ Bypass:** Meter shall record C.C. terminal shorting/ bypass with time and date and time of restoration. The threshold value of currents should be programmable. Logging of neutral current is most important.
- **Unbalance Voltage:** Meter shall record all events when the voltage difference between the two phase is more than 8%.

- **Power On / off: -** Meter shall detect power OFF (minimum power off period 5 mins). This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded. This logging shall be available in Tamper details along with cumulative time of failure. Meter should have provision to record last 100 such events minimum.
- **Snap shots:** Meter shall log all three-phase voltage, current (line, active and reactive), Reading (Active and Apparent), power factor etc. at the time of tamper attempt for all such occurrences.
- **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. 325 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.325 with latest amendment.

  - The influence quantities are:
    - External Magnetic field – 0.2 tesla (with log on feature)
    - Electromagnetic field induction,
    - Radio frequency interference,
    - Unbalanced load,
    - Vibration etc,
    - Wave form 10% of 3rd harmonics,
    - Phase sequence,
    - Voltage unbalance,
    - 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.

- **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 top cover opening detection mechanism. The top cover opening event shall be indicated display continuously in auto scroll mode with kWh and kVAh or through additional LED and 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.

- **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 appear and get logged in meter.

Note:
- Vendor has to define Tamper Logic, Occurrence and restoration time before supply.
- Tamper and fraud protection test shall be part of acceptance test.
- Cumulative power off hours shall be logged by the meter.
- Meter shall log all three phases voltage, current, power factor etc. at the time of tamper attempt for all such occurrences. *Meter should never record energy in "punishment/ Deterrent" mode.*
- Bidder to extend complete support to generate XML file according to BRPL requirement and may vary from time to time

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,	USA: Atmel, National Semiconductors, Texas

SN	Component Function	Requirement	Makes and Origin
		high voltage spikes or electrostatic discharges.	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 voltage of the system appears to the terminals due to faults or due to wrong connections.	SMPS Type
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,

SN	Component Function	Requirement	Makes and Origin
			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	

7.0 GENERAL REQUIREMENTS

7.1 On the meter nameplate:
   a. Manufacturer name and place of manufacturing
   b. Meter rating and Class
   c. Meter serial number should be of 8 digits
   d. Size of the digit of the meter serial number should be minimum 5mm X 3mm. (Laser printing shall be preferred)
   e. Bar code should be of fine quality printed below the meter serial number
   f. BIS registration mark (ISI mark)
   g. Property of "BRPL"
   h. Manufacturing date (mm/yy)
   i. Guaranty period
   j. Meter constant (Impulse/kWh)
   k. PO no. and date

7.2 Meter Sr. Nos. to be printed in black on the name plate, instead of embossing. (Good quality of printing)

7.3 The supplier should seal (double lock approved seal) meters on both sides. The Buyer shall approve the method of sealing.

7.4 The internal potential links should be in closed position or link less meters will be preferred and there shall not be any external link.

7.5 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.
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7.11 The supplier shall give 15 day advanced intimation to enable BRPL to depute representative for lot inspection.

7.12 Vendor shall ensure that future upgrades of software required for HHU/CMRI shall be provided within 4 weeks of intimation. Vendor shall also ensure to deliver solution to meet DERC mandate within mutually agreed timeline.

7.13 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.

8.0 DRAWINGS AND DOCUMENTS

Following drawings & Documents shall be submitted with the bid:

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. Component list
h. Display parameter
i. Type Test Certificates from NABL approved laboratories.
j. Tamper details
k. Manual and SOP/DWI for operation

9.0   ANNEXURE 1: DISPLAY SEQUENCE FOR THE PARAMETERS

9.1   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. TOD Total Active Forward MD Register (Reg 0-24hrs)
7. Reactive Lag Forward Energy Register
8. Instantaneous Average Power Factor
9. Phase To Neutral Voltage R
10. Phase To Neutral Voltage Y
11. Phase To Neutral Voltage B
12. R Phase Line Current
13. Y Phase Line Current
14. B Phase Line Current
15. TOD Apparent Forward MD Register(Reg 0-24hrs)
16. TOD Total Active Forward Energy Register(Reg 1)
17. TOD Total Active Forward Energy Register(Reg 2)
18. TOD Total Active Forward Energy Register(Reg 3)
19. TOD Total Active Forward Energy Register(Reg 4)
20. TOD Total Active Forward Energy Register(Reg 5)
21. TOD Total Active Forward Energy Register(Reg 6)
22. TOD Total Active Forward Energy Register(Reg 7)
23. TOD Total Active Forward Energy Register(Reg 8)
24. TOD Apparent Forward Energy Register(Reg 1)
25. TOD Apparent Forward Energy Register(Reg 2)
26. TOD Apparent Forward Energy Register(Reg 3)
27. TOD Apparent Forward Energy Register(Reg 4)

28. TOD Apparent Forward Energy Register(Reg 5)
29. TOD Apparent Forward Energy Register(Reg 6)
30. TOD Apparent Forward Energy Register(Reg 7)
31. TOD Apparent Forward Energy Register(Reg 8)
32. TOD Reactive Lag Forward Energy Register(Reg 1)
33. TOD Reactive Lag Forward Energy Register(Reg 2)
34. TOD Reactive Lag Forward Energy Register(Reg 3)
35. TOD Reactive Lag Forward Energy Register(Reg 4)
36. TOD Reactive Lag Forward Energy Register(Reg 5)
37. TOD Reactive Lag Forward Energy Register(Reg 6)
38. TOD Reactive Lag Forward Energy Register(Reg 7)
39. TOD Reactive Lag Forward Energy Register(Reg 8)

9.2   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.   History 1 Total Active Forward Energy Register
h.   History 1 Reactive Lag Forward Energy Register
i.   History 1 Apparent Forward Energy Register
j.   History 1 TOD Total Active Forward MD Register(Reg 0-24hrs)
k.   History 1 TOD Total Active Forward MD Occurrence Time and Date(Reg 0-24hrs)
l.   History 1 TOD Apparent Forward MD Register(Reg 0-24hrs)
m.   History 1 TOD Apparent Forward MD Occurrence Time and Date(Reg 0-24hrs)
n.   Cumulative Tamper Count
o.   Present PT Status
p.   Present CT Status
q.   Present Others Status
r.   Meter Serial Number BIS
s.   Manufacturer name/identity
t.   Date of manufacturing
u.   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.

--End of document--

Technical Specification for 3P4W HT Meter For HVDS application

Document number: GN101-03-SP-182-00

Prepared By	Reviewed by	Approved By	Rev. No: 0
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Md. Akhtar Ansari	Rishi Goyal	Sheshadri Krishnapura	

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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.

5.0 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:

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

5.2 **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.

5.3 **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.

5.4 **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 each power OFF. At the same time power 'ON 'event shall be recorded. This logging shall be available in Tamper details along with date & time.

5.6 **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.

5.7 **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.

5.8 **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)

5.9 **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.

5.10 **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

5.11 **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.

5.12 **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.

5.13 **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.

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

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

5.16 **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.

5.17 **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	

7.0   GENERAL REQUIREMENTS

7.1 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)
7.2 The supplier shall supply software suitable for energy measurement through CMRI.
7.3 Only one Meter Sr. No. should be of 8 alpha numeric digits should be printed in black on the name plate.
7.4 Supplier should seal meters on both sides.
7.5 Offered meter should have linkless design.
7.6 Terminal cover should be fixed on Meter before dispatch.
7.7 Meter Sr. Nos. shall be printed in black on the name plate.
7.8 Box number, Meter serial number, type, rating should be mentioned on cases / cartons.
7.9 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.

8.0   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

8.1   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

8.2   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	

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Technical Specification of Three Phase Four Wire Static Trivector Grid Meter -/5 Amp

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VERSION CONTOL

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1	17.07.19	NA	BR/19-20/M/GRID-/5A/V1	Md. Akhtar Ansari, Rishi Goyal

CONTENTS

1.   SCOPE

IEC compliant, Class- 0.2S, Three phase Four wire, 63.5 volts (Phase to Neutral), -/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: -/5 A

3.2   The meter shall be designed for -/5 A 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/ 230V AC 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)

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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 BRPL)

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

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 BRPL), 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 BRPL)

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, every 16th 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 parameters and snapshots of energies at 24:00 hours as mentioned below:

Load Survey Parameters (15 minute integration for last 40 days)	
S.N0	Description
1	Average Active Demand (Outgoing)

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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**

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For the output ports available in the meter, standard communication interface shall only be adopted. The Meters shall be Modbus compliant. 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 BRPL. 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)

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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 BRPL 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 BRPL.
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.

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SN	Component Function	Requirement
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
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.

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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.   Manufacturer's 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 BRPL"
   h.   Purchase order no.
   i.   Month and year of manufacturing
   j.   Guarantee Period

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

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10.3 Routine Test: All routine tests as 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 supplier shall give 15 days advanced intimation to enable BRPL to depute representative for lot inspection and complete all integration activities required by BRPL 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

14. General Requirement 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 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.

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--

Technical Specification of Three Phase Four Wire Static Trivector Grid Meter -/1 Amp

Document number: BR/19-20/M/GRID-1A/V1

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Prepared By	Reviewed by	Approved By
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VERSION CONTOL

SN	Date	Previous Version No.	Current Version No.	Author
1	17.07.19	NA	BR/19-20/M/GRID-1A/V1	Md. Akhtar Ansari, Rishi Goyal

CONTENTS

1. SCOPE

IEC compliant, Class- 0.2S, Three phase Four wire, 63.5 volts (Phase to Neutral), -/1 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

3.2 The meter shall be designed for -/1 A 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/ 230V AC 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 BRPL)

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

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 BRPL), 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 BRPL)

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, every 16th 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 parameters and snapshots of energies at 24:00 hours as mentioned below:

Load Survey Parameters (15 minute integration for last 40 days)	
S.N0	**Description**
1	Average Active Demand (Outgoing)

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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**

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For the output ports available in the meter, standard communication interface shall only be adopted. The Meters shall be Modbus compliant. 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 BRPL. 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)

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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.

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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 BRPL 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 BRPL.
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.

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SN	Component Function	Requirement
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
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. Manufacturer's 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 BRPL"
> > h. Purchase order no.
> > i. Month and year of manufacturing
> > j. Guarantee Period

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

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10.3 Routine Test: All routine tests as 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 supplier shall give 15 days advanced intimation to enable BRPL to depute representative for lot inspection and complete all integration activities required by BRPL 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

14. General Requirement 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 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.

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
BSES Rajdhani Power Ltd

Technical Specification of Three Phase Four Wire CT operated Static Tri-vector ABT Meter

Document number: GN101-03-SP-224-00

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VERSION CONTOL

SN	Date	Previous Version No.	Current Version No.	Author
1	05.03.21	NA	**GN101-03-SP-224-00**	Rishi Goyal

CONTENTS

1. SCOPE

This specification shall cover design, engineering, manufacture, assembly, inspection, testing at manufacturers works before dispatch, supply and delivery to BRPL, Class 0.2s accuracy class static 3 phase–4 wire CT operated three-vector energy meter. The meter shall be suitable for measurement of energy and power, demand requirement in an AC balanced/unbalanced system over a power factor range of zero lag to unity in export mode and import mode. These meters should have communication port to interface for remote meter reading.

2. STANDARDS

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.

The CT operated energy meter shall be of accuracy Class 0.2 for active/ reactive / apparent energy and conform to relevant clauses of following standards or report: -

IS 14697 and its latest amendments	Specification for A.C Static Transformer operated Watt Hour & VAR – Hour meters, class 0.2s & 0.5s
CBIP Technical Report No. 304 with	Specification for A.C. Static Electrical Energy Meters.
IS 15959 and its latest amendments	Data Exchange for Electricity Meter, Reading, Tariff and Load Control – Companion Specification

3. TECHNICAL SPECIFICATION

SN	Parameters	Technical Requirements
1	Rated Secondary Voltage	63.5 V (Phase to Neutral)
2	Rated secondary Current (I Basic)	1A or 5 A (as mentioned in the purchase order)
3	Maximum Current	200% of Ib
4	Rated Frequency	50 Hz.
5	Accuracy class	• 0.2s for active and reactive energy
6	Power Factor	Unity to Zero (all power factor lag / or lead)
7	Temperature	The standard reference temperature for performance shall be 27 °C. The mean temperature co-efficient shall not exceed 0.03%.

The meter shall start and continue to register on application of 0.1% of basic current at Unity P.F., as per relevant standards and shall work satisfactorily up to maximum continuous current of 2 times rated basic current with the following supply system variation:

        Voltage: Vref ± 30%

Frequency: 50 Hz ±5%

4.   STARTING CURRENT

The meter shall start and continue to register at the current 0.1% of Ib.

5.   RUNNING WITH NO LOAD

When the 115% of rated voltage is applied with no current flowing in the current circuit, the meters shall not register any energy and test output of the meter shall not be more than one pulse/count on "no load".

6.   POWER CONSUMPTION

The active and apparent power consumption in each voltage circuit of the CT Operated   meters at reference voltage; temperature and frequency shall not exceed 1.0 W and 4 VA per phase respectively.

The apparent power consumption in each current circuit for the CT Operated   meters at basic current, reference frequency and reference temperature shall not exceed 1.0 VA per phase.

7.   CALIBRATION & TEST OUTPUT

All the meters shall be tested, calibrated and sealed at works before dispatch. Further, no modification of calibration shall be possible at site by any means.

However, it shall be possible to check the accuracy of kWh and kVArh energy measurement of the meter in the field by means of LED/LCD output on meter for accuracy. Resolution of the test output shall be sufficient to enable the starting current test in less than 10 minutes

8.   CONNECTION DIAGRAM

The connection diagram of the meter shall be clearly shown for 3 phase 4 wire system, on the terminal cover. The meter terminals shall also be marked and this marking should appear in the above diagram.

9.   QUANTITIES TO BE MEASURED

The meter shall be able to provide the following data:
1. Instantaneous Parameters (Phase wise THD in % for Voltage and Phase wise THD in % for Current).
2. Block Profile / Load Survey data
3. Daily load profile/Mid night data
4. Name Plate Details and Programmable parameters
5. Event Conditions.(Parameter snapshot of Phase wise THD% in Current and Voltage along with other parameters & kWh (total & fundamental), kVAh, Phase wise Current and Voltage for 3rd, 5th, 7th and 9th Harmonics).

Meter should store previous 12 month billing data into meter memory.

10.   LOAD SURVEY

Following parameters shall be made available for last 60 days with integration period of 15 min.

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1. Frequency
2. Three Phase Average Voltage
3. R Phase Voltage
4. Y Phase Voltage
5. B phase Voltage
6. Phase R Current
7. Phase Y Current
8. Phase B Current
9. Energy Active Import (with & without harmonics)
10. Energy Active Export (with & without harmonics)
11. Energy Apparent Import (with & without harmonics)
12. Energy Apparent Export(with & without harmonics)
13. Energy Reactive Import with voltage as per ABT requirement
14. Energy Reactive Export with voltage as per ABT requirement
15. Energy Net Active Energy
16. THD for phase wise voltage, current, power
17. Average and phase wise power factor

These load survey and history data can be retrieved with the help of Meter Reading Instrument on local interrogation or remotely using the remote communication interface (Rs232/RS485/Fibre etc).

11. MID NIGHT ENERGY PARAMETER

The parameters shall be logged at midnight (00:00 hrs).The meter should store these parameters for 35 days.

1. Real time clock , date and time
2. Cumulative Energy , kWh Import
3. Cumulative Energy , kWh Import
4. Reactive energy high (V>103 percent)
5. Reactive energy low (V<97 percent)

12. MD RESET

The meter shall have provision to store two Maximum Demand occurred during the integration period selected for kW / kVA 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. Manual resetting arrangement (MD reset button) with sealing facility.
3. MD reset through authenticated transaction

13. SELF DIAGNOSTIC FEATURE

The meter shall be capable of performing complete self-diagnostic check to monitor the circuits for any malfunctioning to ensure integrity of data memory location at all time. The meter shall have indication for unsatisfactory/non-functioning/malfunctioning of the following:

1. Time and date on meter display

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2. All display segments on meter display
3. Self diagnostic (RTC, NVM information) on display

14. OTHER SALIENT FEATURES OF METER

1. 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. Parameters include Cumulative Total active energy import & export, cumulative active energy lag & lead while active import & export.
2. It should be possible to check the healthiness of phase voltages by phase indicator available on meter display.
3. The meter shall have provision for TOD tariff as per latest DERC regulations. The following features.
4. Programmable for 8 Energy and 2 Demand register.
5. Programmable for minimum 4 seasons per year.
6. The meter should work accurately irrespective of phase sequence of the supply.
7. The meter shall compute the reactive power on 3-phase, 4-wire principle, with an accuracy as per relevant IS/ IEC standards, and integrate the reactive energy algebraically into two separate reactive energy registers, one for the period for which the average RMS voltage is greater than 103% (Reactive High), and the other for the period for which the average RMS voltage is below 97.0% (Reactive Low). When lagging reactive power is being sent out from substations bus bars, reactive registers shall move forward. When reactive power flow is in the reverse direction, reactive registers shall move backwards.
8. The meter shall continuously compute the average of the RMS values of the three line-to-neutral VT secondary voltages as a percentage of 63.51 V, and display the same on demand.

15. ABNORMALITY EVENTS DETECTION

The meter should have features to detect the occurrence and restoration of, at least, the following common abnormal events:

1. Missing Potential: The meter shall be capable of detecting and recording occurrence and restoration with date and time the cases of Potential failure (one phase or two phases). All potential missing cases shall be considered as power failure.
2. Current imbalance: The meter shall be capable of detecting and recording occurrence and restoration with date and time of Current unbalance (for more than a defined persistence time).
3. 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.
4. 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.
5. Voltage unbalance – Meter shall detect voltage unbalance if there is unbalance in voltages.

6. Over Current – When load condition at any phase i.e. Line current at any phase goes more than defined limit , this will be detected as Over current condition.
7. CT Open – The meter should detect phase wise current circuit open when the circuit is opened from meter side.
8. CT Bypass – The condition should be detected whenever the current terminal is bypassed in the meter
9. High and Low Voltage: The meter should detect under and over voltage events respectively if voltage falls / rise from defined limits.
10. Phase wise voltage THD% more than 5% for 5 min
11. Phase wise current THD% more than 8% for 5 min.

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. It shall be possible to retrieve the abnormal event data locally using a hand held unit (HHU) through the meter's optical port & same can be viewed / analyzed at base computer end in simple and easily understandable format.

16. TEST REPORTS

1. Type test reports shall be submitted for the tests conducted on 3 phase 4 wire, 1Amp / 5 Amp, 0.2s class HT static tri-vector meters according relevant clause of IS 14697 certified by Govt approved testing laboratory within 3 years from the date of the offer.
2. Acceptance test: All acceptance tests as per relevant standards shall be carried out in the presence of utility representatives.
3. Routine Test: All the routine tests as per – IS 14697 shall be carried out and routine tests certificates shall be submitted for approval of purchaser.

17. COMMUNICATION PORT

1. LOCAL COMMUNICATION PORT

The energy meter shall have a galvanically isolated optical communication port located in front of the meter for data transfer to or from a hand held Data Collection Device. The sealing provision should be available for optical port.

2. REMOTE COMMUNICATION PORT

Meter shall have an additional communication port (RS 232) in the form of RJ11 port to interface external modem for remote data collection. RS232 port should have sealing provision. It should facilitate to read meter remotely via GPRS and 4G modem.

3. DATA DOWNLOADING CAPABILITY

Meter shall support a minimum baud rate of 9600 on optical port as well as RS 232 remote communication port. It shall be possible to read selective data from the meter. Bidder shall supply software to download the meter using hand held device such as CMRI and compatible Windows based BCS (base computer software) to view the meter files for all type of data.

18. DISPLAY OF MEASURED VALUE

The measured value(s) shall be displayed on seven segments, six digit Liquid Crystal Display (LCD) display unit/register, having minimum character height of 10 mm.

The data should be stored in non-volatile memory. The non-volatile memory should retain data for a period of not less than 10 years under unpowered condition. Battery back-up memory will not be considered as NVM.

It should be possible to easily identify the single or multiple displayed parameters through symbols/legend on the meter display. The register shall be able to record and display starting from zero, for a minimum of 1500 hours, the energy corresponding to rated maximum current at reference voltage and unity power factor. The register should not roll over in between this duration. The principle unit for the measured values shall be Wh/kWh for active energy, VArh/kVArh for reactive energy & Vah / kVAh for apparent energy based on secondary current. Bidder shall mention the scale in which the meter displays the energy values.

19. ELECTROMAGNETIC COMPATIBILITY

The static energy meters shall conform to requirements listed in relevant standards and shall also be protected against radiated interference from either magnetic or radio-frequency source.

8.1 IMMUNITY TO ELECTROMAGNETIC DISTURBANCE

The meter shall be designed in such a way that conducted or radiated electromagnetic disturbance as well as electrostatic discharge do not damage or substantially influence the meter and meter shall work satisfactorily under these conditions as per relevant standards

NOTE: the disturbances to be considered are: -
(a)   Harmonics
(b)   Voltage dips and short interruptions
(c)   Conducted transients
(d)   D.C. and A.C. magnetic fields
(e)   Electromagnetic fields
(f)   Electrostatic discharges

8.2 RADIO INTERFERENCE SUPPRESSIONS

The meter shall not generate noise, which could interfere with other equipment, and meter shall work satisfactorily as per relevant standards

8.3 INFLUENCE OF HIGH MAGNETIC FIELD

The meters shall be provided appropriate magnetic shielding so that any external magnetic field (AC/DC electromagnet) as per CBIP Technical Report no. 304 applied on meter would not affect the proper functioning of the meter and meter shall work satisfactorily as per relevant standards.

20. 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

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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

21.   DRAWINGS AND DOCUMENTS

Following drawings & Documents shall be submitted with the bid:

1. Complete Technical Parameters.
2. General arrangement drawing of the meter
3. Rating plate
4. Terminal Block dimensional drawing '
5. Mounting arrangement drawings
6. Meter box drawing and dimensions
7. Component list
8. Display parameter
9. Type Test Certificates from NABL approved laboratories.
10. Tamper details
11. PIN configuration of Optical to RJ11 connector
12. PIN out diagram for RJ11 to 9 pin serial male connector
13. Manual and SOP/DWI for operation

22.   CONSTRUCTIONAL SPECIFICATION

The case, winding, voltage circuit, sealing arrangements, registers, terminal block, terminal cover & name plate etc, shall be in accordance with the relevant standards. The meter should be compact & reliable in design, easy to transport & immune to vibration & shock involved in the transportation & handling. The construction of the meter should ensure consistence performance under all conditions especially during storms/heavy rains/very hot weathers. The insulating materials used in the meter should be non-hygroscopic, non-ageing & have tested quality. The meter should be sealed in such a way that the internal parts of the meter become inaccessible.

The meter should employ latest technology such as Application Specific Integrated Circuit (ASIC) to ensure reliable performance. The mounting of the components on the PCB should be Surface Mounted Technology (SMT) type except some power supply related component. The electronic components used in the meter should be of high quality.

4.1   GENERAL MECHANICAL REQUIREMENT

The construction of the meter shall be rigid & suitable to withstand shock & vibration involved in transportation & handling, as specified in IS14697. Meter shall be designed and constructed in

such a way as to avoid introducing any danger in normal use and under normal conditions, so as to ensure especially personal safety against electric shook, safety against effect of excessive temperature, protection against spread of fire, protection against penetration of solid objects, dust and water. The design of meter shall conform to IP51 class degree of protection against dust and moisture as per relevant standards.

4.2 TROPICAL TREATMENT

All parts, which are subject to corrosion under normal working conditions, shall be protected effectively. Any protective coating shall not be liable to damage by ordinary handling or damage due to exposure to air, under normal working conditions. Meters shall withstand solar radiation. The meters shall be suitably designed and treated for normal life & satisfactory operation under the hot and hazardous tropical climatic conditions as specified in clause no. 2. The meter shall work from -10°C to +55°C and RH 95% non-condensing type.

4.3 METER CASE

The housing of the meter shall be safe high-grade Engineering plastic or any other high quality insulating material and shall be very compact in design. All the insulation materials used in the construction of meter shall be non-hygroscopic, non ageing & of tested quality, capable of withstanding resistant to heat & fire. The construction of the meter offered shall be such that it can be sealed independently and the cover cannot be removed with the use of a tool, without breaking the seal. The case of offered meters shall be so constructed that any non-permanent deformation shall not prevent the satisfactory operation of the meter.

4.4 TERMINALS -TERMINAL BLOCK

a. The base of the meter shall have a terminal block at the bottom made out of high grade engineering plastic so as to facilitate bottom connection and houses solid nickel plated brass terminals having capability to carry maximum value of current.

b. The material of the terminal block shall be capable of passing the tests given in IS14697: 1999.

c. The terminal holes in the insulating material shall be of sufficient size to accommodate the insulation of the conductors. The diameter of the terminal hole for current terminals shall not be less than 5.0 mm & shall be of adequate length in order to have proper grip of conductors / crimping pins with the help of two screws.

d. The terminal block shall satisfy all the conditions such as clearance & creepage distance between terminals & surrounding part of the meter as specified in relevant clause of IS 14697: 1999.

e. The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there shall have no risk of loosening or undue heating. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life of the meter shall be such that the risk of corrosion resulting from contact with any other metal part is minimized. Electrical connections shall be so designed that contact pressure shall not be transmitted through insulating material.

4.5 TERMINAL BLOCK COVER

The terminals block cover for the energy meters shall be extended transparent type, which can be sealed independently of the meter cover. The ETBC shall have a clear space of min 30+5mm, thus allowing sufficient clearance space for inserting cables. The terminals, their fixing screws and the insulated compartment housing them shall be enclosed by extended terminal cover in such a way that no part of meter or accessories at terminal block shall be accessible from the front of the meter. There shall be provision of fixing of seals so that screws cannot be loosened without breaking the seals. The terminals shall not be accessible without removing the seal(s) of terminal cover when energy meter is mounted on the meter board.

4.6   WINDOW
The energy meter cover shall be made of high-grade engineering plastic with one window. The window shall be of transparent material ultrasonically welded with the meter cover such that it cannot be removed undamaged without breaking the meter cover seals.

4.7   QUALITY
Overall the quality of the meter should be good and the service life of the meter shall be more than the guarantee period. The material, components used for manufacturing the meter shall be of premium quality. The LCD display shall not fade with time and the display annunciators should be visible. Functionality of the meter shall not be affected by the harsh environmental conditions. Quality meters shall be given preference and the performance of previous installed meters shall be analyzed before awarding the tender. Aesthetically, the meter shall be of premium quality.

23.   PARAMETERS
Following parameters should be made available on display, sequence to be decided before delivery:
1. Meter Serial Number
2. Real Time & Date
3. Line currents
4. Phase to Neutral Voltages
5. Phase wise Power Factor
6. Frequency
7. Active, Reactive and Apparent Power
8. Cumulative tamper count
9. Cumulative MD reset Count
10. Cumulative active import energy
11. Cumulative active export energy
12. Cumulative reactive lag While active import
13. Cumulative reactive lead While active import
14. Cumulative reactive lag While active Export
15. Cumulative reactive lead While active Export
16. Cumulative apparent import energy
17. Cumulative apparent export energy
18. Active net energy(Imp – exp)
19. Reactive net energy(Imp – exp)
20. Reactive high energy(V>103 percent)
21. Reactive low energy (V<97 percent)

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22. THD in % for Voltage R Phase
23. THD in % for Voltage Y Phase
24. THD in % for Voltage B Phase
25. THD in % for Current R Phase
26. THD in % for Current Y Phase
27. THD in % for Current B Phase
28. THD in % for Power R Phase
29. THD in % for Power Y Phase
30. THD in % for Power B Phase
31. Present PT status
32. Present CT status
33. High resolution active import energy
34. High resolution active export energy
35. High resolution reactive lag While active import
36. High resolution reactive lead while active import
37. High resolution reactive lag While active Export
38. High resolution reactive lead While active Export
39. High resolution apparent forwarded energy
40. High resolution apparent import energy
41. 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.

24.   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

25. 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

26. 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.

--End of Doc--

Technical Specification of 3Ph WC Meter

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VERSION CONTOL

SN	Date	Previous Version No.	Current Version No.	Author
1	01.08.19	NA	GN101-03-SP-178-00	Md. Akhtar Ansari, Rishi Goyal

CONTENTS

1. SCOPE

This specification covers the design, manufacture, testing and supply of Three-phase Four-wire Static LT Whole Current Energy Meters of Accuracy Class 1.0, 20-100 A, 3x 240 V for measurement of energy for power factor range from zero lag-unity-zero lead.

2. STANDARDS

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.	IS: 13779	AC Static Watt-hour Meters, Class 1 and 2 – Specification
b.	IEC:62052-11	Electricity metering equipment (AC) - General requirements, tests and test conditions - Part 11: Metering equipment
c.	IEC: 62053-21	Electricity metering equipment (AC) - Particular requirements - Part 21: Static meters for active energy (classes 1 and 2)
d.	IS 15959 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.	IEC 62056-5-3	Electricity metering data exchange- The DLMS/COSEM Suit- Part 5-3: DLMS/ COSEM application layer
g.	CEA Regulation:2006 and latest amendments	Installation and Operation of meters or latest amendment
h.	CBIP Manual 88	Latest amendments of CBIP manual 88
i.	IS 14772	General requirements for enclose for accessories for household and similar
j.	IS 4249	Classification and methods of test for non-ignitable and self extinguishing properties of solid electrical insulating materials
k.	IS 8623	Specification for low voltage switchgear and control gear assemblies
l.	IS 11731	Method of test for determination of flammability of solid electrical insulating material when exposed to an igniting source
m.	IEC 61000-4-2	Electromagnetic compatibility

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3. TECHNICAL SPECIFICATION

SN	Parameters	Technical Requirements
3.1	Voltage	Reference Voltage 240 V (P-N), +20% to -40% Vref. However the meter should withstand the maximum system voltage.
3.2	Display	a) LCD (Seven digits) b) Height: 9 mm X 4 mm min. c) Pin Type d) Viewing angle min. 120 degrees
3.3	Display parameters	a) Display parameters: LCD test, date & time, cumulative kWh, cumulative kVAh & kVARh, MD in kW & kVA, PF, V, I and Neutral current (All the energies are without decimal.) b) Display order shall be as per display sequence given in this document.
3.4	Power factor range	Zero lag –unity- zero lead
3.5	Power Consumption	Less than 1 W & 4 VA per phase in voltage circuit, 2 VA in current circuit.
3.6	Starting current	0.2 % of I_b
3.7	Frequency	50 Hz with (+ or -) 5% variation
3.8	Test Output Device	Flashing LED visible from the front for testing of all three energy in field also programmable for Active & Apparent.
3.9	Billing data	• Meter serial number, date and time, kWH, kVAh, kVARh, MD in kW kVA, kVar. No. of tamper counts, tamper occurrence with date & time, tamper restoration date & time with snap shots. History of kWh, kVAh, kVArh & MD with occurrence details for last 12 months along with TOD readings. • All the above parameters (namely kWh, kVAh, kVARh, MD in kW and kVA) are meter readings. • All these data shall be accessible for reading, recording and billing by downloading through optical port with CMRI (both Analogic & SANDS) or Laptop computers at site.
3.10	MD Registration	• Meter shall store MD in every 30 min. period along with date & time. At the end of every 30 min, new MD shall be compared with previous MD and store whichever is higher and the same shall be displayed. • Also refer Draft CBIP for meter standardization.
3.11	Auto Reset of MD	Auto reset date for MD shall be indicated at the time of finalizing GTP. Default re-setting date is 00:00 hrs, 1st of every month.
3.12	TOD metering	• Meter shall be capable of doing TOD metering for kWh, kVARh,

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SN	Parameters	Technical Requirements
		kVAh and MD in kW and kVA with 7 time zones (programmable on site through CMRI). • TOD should be as per latest DERC regulations and BRPL specific requirement before delivery.
3.13	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.
3.14	Time required for data uploading/ downloading meter data	Meter data consisting of all parameters and complete load survey for all parameters (Refer 3.13) shall be read by CMRI (both Analogic & SANDS) and downloaded on desktop PC in minimum possible time (not more than 5 minutes). Time for uploading and down loading, using both port., shall be indicated at the time of finalizing GTP.
3.15	Diagnostic feature	Self diagnostic for time, calendar, RTC battery all display segments and NVM.
3.16	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, communication write etc
3.17	Software & Communication compatibility	a) Optical port with RS 232 compatible to transfer the data locally through CMRI & remote through Optical fiber / Cellular or any other technology as decided by BRPL to the main computer. RJ11/MicroUSB configuration is required for RS 232 port. b) The Supplier shall supply Software required for CMRI (Analogic & SANDS make and any other make in future) & for the connectivity to AMR modules. c) The software should be compatible to Microsoft Windows systems. d) The software should have polling feature with optional selection of parameters to be downloaded for AMR application. e) The software shall have facility to export data to ASCII, MS Excel or CSV, cdf format etc. f) The Supplier shall also provide training for the use of software free of cost to BRPL. g) The Supplier shall provide API's or meter reading protocols as per BRPL's requirement. h) Protocol shall be as per IEC 62056/ IS15959 DLMS protocol. i) The bidder shall provide DLMS compliance for meter communication. j) The Supplier shall also provide manuals, troubleshooting guide and training for the use of software. k) Optional feature of Bluetooth low energy for data downloading. l) The Supplier shall provide meter reading protocol and password. Vendor to jointly work with BRPL IT team to develop CMRI software /

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SN	Parameters	Technical Requirements
		any other mobile app for meter downloading and further uploading on computer. The vendor has to give an undertaking in this regard.
3.18	Memory	Non volatile memory independent of battery backup, memory should be retained up-to 10 year in case of power failure
3.19	Climatic conditions	• The meter should function satisfactorily in India with temperature ranging from 0 - 60ºC and humidity upto 96%. • Also refer IS: 13779 for climatic conditions.
3.20	Calibration	Modification in calibration shall not be possible at site by any means.
3.21	Battery	• In case of battery removal or total discharge same should not affect the working & memory of the meter. • Shelf life of RTC battery should be 3 years, operating life of 10 years.
3.22	kVAh definition	kVAh is computed based on kVARh and kWh value. If PF=1, or leading, then kVAh = KWH. At no instance kVAh < kWh.
3.23	Communication port	**Optical Port**: • Vendor to provide optical cord for meter reading through CMRI and cord to read meters through mobile app. The cords should have a Guarantee of 5 years. • The Pin configuration should be as per BRPL standard and quantities to be finalized before supply. **Wired Port** • Wired port shall have provision for cover which can be sealed. • Both optical and wired port should work independently. • Failure of one port (including display) should not affect the other port down loading capabilities. • RJ11/Micro USB configuration is required for RS 232 port for remote reading using modem.
3.24	Event logging and Phasor diagram	• Nomenclature used for any event logging/ flags/ parameters/ alarms shall be clear and correct**.** All above as logged by meter shall be convertible to CSV/ ASCII/ XML format. Bidder to extend complete support to generated file according to BRPL requirement and may vary from time to time. • BCS shall be capable to draw correct phasor diagram.
3.25	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

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SN	Parameters	Technical Requirements
		if it exceeds predefined limits.

Note: Regarding definition of MD, Power OFF, TOD, Load survey, kVAh, meter output, Phasor diagram for field testing – also refer draft CBIP proposal for meter standardization. Same need to be followed.

4. CONSTRUCTIONAL SPECIFICATIONS

SN	Parameters	Technical Requirements
4.1	Body of Meter	• Top transparent/opaque and base opaque material polycarbonate of LEXAN 143A/943AA or equivalent grade having properties of UV stabilized. • Front cover & base should be ultrasonically welded and should be provided with the brass sealing screws. Alternatively, it is preferred to have a single integrated base and cover. • **Top cover Open** - The meter shall have top cover opening detection mechanism. The top cover opening event shall be indicated display continuously in auto scroll mode with kWh, kVAh or through additional LED/LCD icon and 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 after electronic reading. Alternatively, it is preferred to have a single integrated base and cover so that chances of cover opening are reduced.
4.2	Terminal Block	Made of polycarbonate LEXAN500R or equivalent and having properties of **V0 Inflammability level or equivalent**, Brass/MS current terminals with flat-base screws. • Typical Minimum CSA of BRASS/MS --- 2.5 Amp / Sqmm. • Brass Composition – 62:36:02, Extruded material, Environment protected. • Terminal screw – typically M6, two nos/ per wire (Lower side of screw shall be circular type). The head of screw shall be star type and suitable & non breakable at the time of tightening. Terminal cable entry hole should be suitable for 50 Sqmm PVC cable. Typically brass/MS terminal should start from 6mm (minimum) from front face.
4.3	Terminal cover	• Terminal cover shall be transparent with polycarbonate LEXAN 143R/943A or equivalent. • Transparent terminal cover with provision of sealing through sealing

SN	Parameters	Technical Requirements
		screw. It should be extended type, with two cable entry holes suitable for 4C50 Al armoured cable • The terminal cover shall be provided with separation wall • Preferably with mechanism so as T-Cover should not be lifted once fixed on wall/ base plate. The entry wall should be minimum 80mm away from T block cable entry surface. • Finally T cover should be easy to use and Non removable.
4.4	Diagram of connections	Diagram of external connections to be shown on terminal cover
4.5	Marking on name plates	• Meter should have clearly visible, indelible and distinctly name plate marked in accordance with IS & BRPL specifications. • Prior approval of name plate design to be taken before product supply.
4.6	Meter Sealing	• As per IS 13779 and CEA Metering Regulation 2006, Supplier will fix its seal on meter. In addition, supplier shall affix Buyer seal(s) on side of Meter body as advised by buyer and record should be forwarded to Buyer. • Supplier seal type: Minimum one seal as Hologram type, numbered with hologram transfer on tamper proof paper seal. Seal should not be just Hologram sticker (100% hologram).
4.7	Guarantee	• 66 months from the date of dispatch or 60 months from date of commissioning, whichever is earlier. • Guarantee includes meter with box, i.e. in case of meter is not downloaded from outside of the box with the cord provided by vendor then it will considered as faulty. • 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. • Serial nos. of meters to be replaced shall be as provided by BRPL.
4.8	Insulation	Meter shall withstand an insulation test of 4 kV and impulse test at 8 kV
4.9	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 13779.

5. TAMPER & ANTI-FRAUD DETECTION/ EVIDENCE FEATURES

The meter shall log minimum 200 tamper events (ensuring at least 20 events for critical tamper) compartment wise division of each event and their persistence time shall be indicated in GTP.

The meter shall not be affected by any remote control device & extra high voltage/ field shall continue recording energy under any one or combinations of the following conditions:

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

5.2 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).

5.2.1 Energy computation during missing potential: In case potential is found missing in one/ two phase but current is flowing, in that case energy will be computed assuming V = 240, pf=1.This is true only if current more than 10% of **I**basic.

5.3 Reversal of C.C. (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.

5.4 C.C. Shorting: Meter shall record C.C. terminal shorting with time and date and time of restoration. The threshold of the current should be programmable.

5.5 Power On / Off: Meter shall detect power OFF (minimum power off period 5 mins). This event shall be recorded at the time of each power OFF. At the same time power ON event shall be recorded. This logging shall be available in Tamper details along with cumulative time of failure. Meter should have provision to record last 100 such events minimum.

5.5.1 Abnormal Power Off: In case meter micro observes a power off even though AC supply is available, the event is called as "Abnormal power off". Meter shall able to detect and log such event. The logic need to be discussed and agreed beforehand.

5.6 Recording of 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.

5.7 **Snap-on parameters:** Meter shall log all three-phase voltage, current (line, active and reactive), Reading (Active and Apparent), power factor, neutral current etc. at the time of tamper attempt for all such occurrences.

5.8 **External Magnetic tampers:** Meter should log on the events of attempt of tampering by external magnetic field as mentioned in the relevant IS. Manufacturer to explain how MD is computed during magnetic effect.

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.

5.9 **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 should be immune.

5.10 **Influence Quantities:** Meter shall work satisfactorily with guaranteed accuracy limit under the presence of the following influence quantities as per IS 13779, IEC: 1036 and CBIP Technical report no.325 and its latest amendments.
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
   j. D.C. Immunity test

5.11 **Manufacturing detail in memory:** Meter shall have manufacturing month and year in the memory and should come in data downloading.

5.12 **Neutral current measurement:** Meter shall have feature of Neutral current measurement and display along with phase currents.

5.13 **Low voltage event:** Meter shall have feature to log an event in case any of phase voltage is <180 V.

5.14 **Low Power factor recording:**
- The meter shall have feature to record phase wise low power factor as a separate event with date and time of occurrence
- Logic: Load > 10% of rated, pf range --- 0.2 to 0.5, duration 15 minutes.

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5.15 **2 Phase connection:** Meter shall have feature to log an event in case only two phases are connected i.e. remaining one phase & Neutral are absent.

5.16 **Top cover open:** Meter shall have top cover opening detection mechanism. The top cover opening event shall be indicated display continuously in auto scroll mode with kWh. kVAh or through additional LED/LCD and shall be logged in memory. The detection and logging mechanism shall work even when meter is not energized. In case of indication of display, In case of indication of display, meter display shall get reset in 150 days, cumulative tamper count to be maintained.

5.17 **Transactions:** Other than RTC and TOU zone timing, no other parameter should be programmable/ resettable in field. Regarding RTC and TOU, all transactions should be logged.

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 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	Truly semiconductor, Tianma, Haijing Electronics, China, Blaze

3Ph WC Meter Specification-Non Smart

SN	Component Function	Requirement	Makes and Origin
		STN type industrial grade with extended temperature range minimum 70 ºC.	
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 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.	National Semiconductors, 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.

3Ph WC Meter Specification-Non Smart

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.

7.0   DRAWINGS AND DOCUMENTS

Following drawings & Documents shall be submitted with the bid:

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. Component list
h. Display parameter
i. Type Test Certificates from NABL approved laboratories.
j. Tamper details
k. PIN configuration of Optical to DB9 connector
l. Manual and SOP/DWI for operation

8.0 DISPLAY SEQUENCE FOR THE PARAMETERS

8.1 Default Display (Auto Mode)
Display Parameters
  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.   Current Max. demand in kW & kVA
  x.   TOD MD for kWh and kVAh
  xi.   TOD MD occurrence for kWh and kVAh
  xii.   Inst. Avg. Power Factor (3 phase)
  xiii. Inst. Voltage R,Y,B (Phase- Neutral)
  xiv.   Inst. Line current R,Y, B
  xv.   Neutral Current
  xvi.   Temperature

8.2 On-demand Display
  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.   TOD MD for kWh and kVAh
  xi.   TOD MD occurrence for kWh and kVAh
  xii.   Instantaneous Power factor
  xiii.   Instantaneous voltage R phase
  xiv.   Instantaneous voltage Y phase
  xv.   Instantaneous voltage B phase
  xvi.   Instantaneous current R phase
  xvii.   Instantaneous current Y phase
  xviii. Instantaneous current B phase
  xix.   Last month billing Date
  xx.   Last month billing kWh reading
  xxi.   Last month billing kVARh reading

xxii. Last month billing kVAh reading

xxiii. Last month billing Maximum Demand in kW

xxiv. Last month billing Maximum Demand in kW occurrence Date

xxv. Last month billing Maximum Demand in kW occurrence Time

xxvi. Last month billing Maximum Demand in kVA

xxvii. Last month billing Maximum Demand in kVA occurrence Date

xxviii. Last month billing Maximum Demand in kVA occurrence Time

xxix. THD for both Voltage and Current

xxx. Neutral Current

xxxi. Temperature

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

9.0   ADDITIONAL FEATURES

9.1 Net Metering: Meter should be configurable to be used in bi-directional mode.

9.2 Mobile App: App for mobile reading to be supplied by the bidder.

9.3 Bluetooth (Optional): Meter to have Bluetooth communication facility to download meter data through mobile app.

9.4 Terminal cover open detection mechanism (Optional): Meter shall record terminal cover open as an event with date and time stamp. Cumulative count shall be provided.

9.5 Capacitive touch push button (Optional)- Meter shall have capacitive touch instead of physical push button to avoid water/fluid injection inside the meter.

Additional features mentioned above will be preferred. The Supplier shall detail out additional features while submitting the technical bid.

10.0   GENERAL REQUIREMENTS

10.1   On the meter name-plate:

a. Manufacturer name and place of manufacturing

b. Meter rating and Class

c. Meter serial number should be of 8 digits.

d. Size of the digit of the meter serial number should be approx. 5mm X 3mm. (Laser printing shall be preferred)

e. Bar code of fine quality should be printed below the meter serial number

f. BIS registration mark (ISI mark)

g. Property of 'BRPL'

h. Manufacturing date (mm/yy)

i. Guaranty period

j. Meter constant (imp/kWh)

k. PO no. and date

10.2 Meter Sr. Nos. to be printed in black on the name plate, instead of embossing. (Good quality of printing)

10.3 The supplier should seal (double lock approved seal) meters on both sides. The Buyer shall approve the method of sealing.

10.4 The internal potential links should be in closed position or link less meters will be preferred and there shall not be any external link.

10.5 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

    iii. Report of seal & initial reading record. (soft copy as per BRPL format)

10.6 Box number, meter serial number, type, rating should be mentioned on cases / cartons.

10.7 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. Vendor shall replace all meters and boxes if any breakage is found during transit.

10.8 In case battery removal/ total discharge same should not affect the energy total cumulative working & memory of the meter.

10.9 The supplier shall give 15 day advanced intimation to enable BRPL to depute representative for lot inspection.

10.10 Delivery of software for reading through HHU/CMRI before meter delivery is required.

10.11 Vendor shall ensure that future software 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.

10.12 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.

11.0   PRE-FIT METER BOX

11.1 General Requirements

a. The prefit meter box shall be IP54 rating and bidder shall provide compliance certificate for IP54 rating of prefit meter box. The box shall be fully transparent.

b. The prefit meter box shall have danger symbol, manufacturer details/symbol, meter serial no. and Property of BRPL printed on it.

c. Meter box shall be push-fit type and have earth nut and no unidirectional screws to be used to fix the meter in the meter box.

d. The box will have metal plate around optical portion so that optical cord can easily fix on it without support while reading.

e. The thickness of the prefit meter box should be min 3 mm mm (Base and cover) and will have two cable glands and design should be such that there is no space to insert any illegal material after inserting armored cable.

f. The material of box shall be virgin polycarbonate and grade of the prefit box should be such that it is fire retardant and self extinguishing.

g. In case of prefit meter box found broken the vendor replace the box with meter.

h. The box should have four numbers of back pillar (Two eye holes and two holes types) with their screw and guttys.

i. Supplier shall provide prefit meter box drawing and box mounting arrangement.

j. Push fit box shall allow the push button/capacitive touch without opening the box.

11.2 Tests for Pre-fitted meter box

SN	Name of test	Standard
A	Visual examination	As per GTP/approved drawing
B	Verification of dimensions & marking	As per GTP/approved drawing
C	Protection against electric shock	IS:14772
D	Resistance to ingress of solid object & to harmful ingress of water (IP-55)	IS:14772
E	Test of mechanical strength/impact resistance test	IS:14772
F	Resistance to heat	IS:14772
G	Resistance to rusting	IS:14772
H	Glow wire test at 950 degree centigrade	IS:14772/IEC 695-2-1
I	Verification of dielectric properties at 5kV	IS:8623
J	Heat deflection at 125 degree centigrade at 0.45 Mpa	As per standard
K	Test for self extinguishing properties	IS:4249
L	Flammability Test	IS:11731 II
m	UV resistance Test	Din 53387

11.3 Service Condition

The insulated meter box to be supplied against this specification shall be suitable for satisfactory continuous operation under outdoor environment. Following are the climatic condition:

SN	Parameters	Requirements
a.	Peak ambient temp.	55°C
b.	Min ambient temp. in shade	45°C
c.	Max. average ambient temp in 24 hours period in shade	40°C
d.	Min ambient temp.	(-)5°C
e.	Max. temp. attainable by an object exposed to sun	70°C

3Ph WC Meter Specification-Non Smart

f.	Max. relative humidity	95%
g.	Avarage number of thunder storm days per annum	40
h.	Avarage number of rainy storm days per annum	120
i.	Avarage annual rainfall	1250mm
j.	No of months of tropical monsoon condition	4 months
k.	Max. wind pressure	150kg/m2
l.	Altitudes	Not exceeding 1000mtrs

ANNEXURE

GUARANTEED TECHNICAL PARTICULARS OF PREFITTED METER BOX FOR HOUSING THREE PHASE ENERGY METER

S.NO.	PARTICULARS	REQUIRMENT	OFFERED BY THE FIRM
1	Name of the firm and place of manufacturer.	As per the firm	
2	Type of box/model	Three Phase meter box	
3	Material used for cover	U V resistant fire retardant Transparent Polycarbonate	
4	Material used for base	U V resistant fire retardant Transparent Polycarbonate	
5	Dimension of box a. Length b. Width c. Depth	As per meter	
6	Thickness of Base minimum	3mm±0.1mm	
7	Thickness of Cover (Transparent) minimum	3mm±0.1mm	
8	Pad locking arrangement provided	Required	
9	Two Nos. sealing arrangement at diagonal Opposite corner	Required	
10	Meter mounting arrangement	Screws shall not be unidirectional type	
11	Superior Nylon 66 Glands	2 Nos. glands are Required	
12	Rubber 'O' ring	1 Set	
13	Eye holes for fixing at base with pillar	2 Nos.	
14	Round holes for fixing at base with pillar	2 Nos.	
15	Earthing connections	1 Set	
16	Meter box mounting accessories	Four numbers Gutty and screw shall be provided. Screw size shall be suitable for Box with pillar	
17	Same serial no. should be embossed on base and cover of box as well as meter	Required	
18	Provision to make the meter immune to 35 KV spark device and high frequency electromagnetic pulse device upto 10 Ghz. (loop type) shield.	Required	

--End of Doc--

![BSES Rajdhani Power Limited logo]

Volume - II

FORMATS

Tender Notification for

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

CMC/BR/20-21/SV/RS/SN/875

Date :25.02.2021

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.

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<u>**Annexure -I**</u>

<u>**BID FORM**</u>

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 <u>AS PER PRICE BID ENCLOSED</u> 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 is issued, 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

PRICE FORMAT

ENQUIRY NO & DATE: CMC/BR/20-21/SV/RS/SN/875 DT : 25.02.2021

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	15718										
2			3PH Meter Small with Box	NOS	1000										
3			LT CT Meter (3P-4W, 240Volts, CL- 0.5s)	NOS	1000										
4			HT Meter (3P-4W, 63.5V, 5A, CL-0.5s)	NOS	100										
5			HT Meter (3P-4W, 63.5V, 1A, CL-0.2s)	NOS	5										
6			HT Meter 63.5V, 3PH, 4.0 0.5s; HVDS	NOS	300										
7			DT METER	NOS	1000										
8			Grid Meter /1A,3P 4W	NOS	250										
9			Grid Meter /5A,3P 4W	NOS	250										
10			MTR,ENERGY,ABT GRID MTR,0.2S (ABT Meter 1 AMP & 5 Amp)	NOS	30										
11			MTR,ENERGY,LTCT,INBUILD MODM, BOX CT	NOS	200										

Pls attach the covering letter head alongwith the price format.

NAME OF THE BIDDER WITH STAMP

Annexure - IV

COMMERCIAL TERMS AND CONDITIONS

ENQUIRY NO & DATE : CMC/BR/20-21/SV/RS/SN/875, DT:25.02.2021

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/20-21/SV/RS/SN/875 DT: 25.02.2021

NO DEVIATION SHEET

SL NO	SL NO OF TECHNICAL SPECIFICATION	DEVIATIONS,IF ANY

SIGNATURE & SEAL OF BIDDER

NAME OF BIDDER

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. 2017-18,18-19 & 19-20) . 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.		

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| 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
		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