NIT No.: TPNODL/OT/2021-22/066

Procedure for Participating in Tender

Tender Enquiry No	Work Description	EMD (Rs. Lacs)	Tender Participation Fee (Rs)	Last date and time for Payment of Tender Participation Fee
TPNODL/OT/2021-22/66	RC for 33KV and 11 KV Feeder Energy meter and HTTV, LTTV ,W/C Meter as per specification	2 Lac	5000	27.09.2021 15:00 hrs

Please note that corresponding details mentioned in this document will supersede any other details mentioned anywhere else in the Tender Document.

Procedure to Participate in Tender.

Following steps to be done before "Last date and time for Payment of Tender Fee" as mentioned above:

1. Eligible and Interested Bidders to submit duly signed and stamped letter on Bidder's letter head indicating

    a. Tender Enquiry number
    b. Name of authorized person
    c. Contact number
    d. E-mail id
    e. Details of submission of Tender Fee
    f. GST Registration No

2. Non-Refundable Tender Fee, as indicated in table above, to be submitted in the form of Direct Deposit in the following bank account and submit the receipt along with a covering letter clearly indicating the Tender Reference/ Enquiry Number –

    Beneficiary Name – TP Northern Odisha Distribution Limited
    Bank Name – Union Bank of India
    Branch Name – Balasore Branch
    Account No – 500601010280332
    IFSC Code – UBIN0550060

E-mail with necessary attachment to be sent to kartikchandra.behera@tpnodl.com before last date and time for payment of Tender Fee.

Interested bidders to submit Tender Fee and Authorization letter before Last date and time as indicated above, after which link from TPNODL E-Tender system (Ariba) will be shared for further communication and bid submission.

Please note all future correspondence regarding the tender, bid submission, bid submission date extension, Pre-bid query etc. will happen only through TPNODL E-Tender system (Ariba). User manual to guide the bidders to submit the bid through E-Tender system (Ariba) is also enclosed.

No e-mail or verbal correspondence will be responded. All communication will be done strictly with the bidders who have done the above step to participate in the Tender.

Also, it may be strictly noted that once date of "Last date and time for Payment of Tender Participation Fee" is lapsed no Bidder will be sent link from TPNODL E-Tender System (Ariba). Without this link BA will not be able to participate in the tender. Any last moment request to participate in tender will not be entertained.

Any payment of Tender Fee / EMD by Bidder who have not done the prerequisite will not be refunded.

Also all future corrigendum to the said tender will be informed on Tender section on website www.tpnodl.com

OPEN TENDER NOTIFICATION

FOR

RC for 6 Months for Supply of 33KV and 11 KV Feeder Energy meter (-/1A, -/110/√3, Cl: 0.2 WH type meters) and HTTV, LTTV, W/C Meter as per specification.

Tender Enquiry No.: TPNODL/OT/2021-22/066
Due Date for Bid Submission: 01.10.2021 15.00 hrs

TP NORTHERN ODISHA DISTRIBUTION LIMITED
(A Tata Power & Odisha Government Joint Venture)
Registered & Corporate Office: Januganj, Remuna Golei, Balasore – 756 019, Odisha, India
Phone: +91 6782 244865, Email: contactus@tpnodl.com, Website: www.tpnodl.com
CIN: U40106OR2021SGC035951

CONTENTS OF THE ENQUIRY

1.0 Event Information

1.1 Scope of work

Open Tender is invited in e-tender bidding process from interested Bidders for entering into a Rate Contract valid for a period of **06 Months** as defined below:

S. No.	Description	EMD Amount (Rs.)	Tender Fee (Rs.)
1	33KV and 11 KV Feeder Energy meter and HTTV,LTTV ,W/C Meter as per specification	2,00,000.00	5000

1.2 Availability of Tender Documents

Please refer "Procedure to participate in the e-tender".

Bidders are requested to visit TPNODL website www.tpnodl.com regularly for any modification / clarification to the bid documents.

1.3 Calendar of Events

(a)	Date of sale/ availability of tender documents from TPNODL Website	From 16.09.2021 onwards
(b)	Date by which interested and eligible vendors to pay tender fee and confirm participation in accordance with "Procedure for participating in tender"	27-09-2021 15:00 hrs
(c)	Date & Time of Pre-Bid Meeting (If any)	Not applicable due to COVID- 19. Queries to be answered through e-mail / TPNODL Tender Website.
(d)	Last Date of receipt of pre-bid queries, if any	23.09.2021: 15:00 Hrs
(e)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	27.09.2021: 15:00 Hrs
(f)	Last date and time of receipt of Bids	01.10.2021: 15:00 Hrs
(g)	Date & Time of opening technical bids & EMD (Envelope-1 & 2)	01.10.2021: 15:30 Hrs
(h)	Date & Time of opening of Price of qualified bids	Will be notified to the successful bidders through our website / e-mail.

Note :- In the event of last date specified for submission of bids and date of opening of bids is declared as a closed holiday for TPNODL, Balasore office the last date of submission of bids and date of opening of bids will be the following working day at appointed times.

1.4 Mandatory documents required along with the Bid

1.4.1 EMD of requisite value and validity
1.4.2 Tender Fee in case the tender is downloaded from website
1.4.3 Requisite Documents for compliance to Qualification Criteria mentioned in Clause 1.7.
1.4.4 Drawing, Type Test details along with a sample of each item as specified at Annexure I (as applicable)
1.4.5 Duly signed and stamped 'Schedule of Deviations' as per Annexure III on bidder's letter head.

1.4.6 Duly signed and stamped 'Schedule of Commercial Specifications' as per Annexure IV on bidder's letter head.

1.4.7 Proper authorization letter / Power of Attorney to sign the tender on the behalf of bidder.

1.4.8 Copy of PAN, GST (In case any of these documents is not available with the bidder, same to be explicitly mentioned in the 'Schedule of Deviations')

1.4.9 **Sample Submission/Demonstration:** TPNODL Reserves the right to seek samples and/or demonstration of offered item during Technical Evaluation. Samples/demonstration will be sought by Technical team doing Technical Evaluation. The same may have to submitted/arranged on urgent basis at TPNODL location at, Odisha. Bidder not able to submit sample/perform demonstration in time, may get technically rejected.

Please note that in absence of any of the above documents, the bid submitted by a bidder shall be liable for rejection.

1.5 Deviation from Tender

Normally, the deviations to tender terms are not admissible and the bids with deviation are liable for rejection. Hence, the bidders are advised to refrain from taking any deviations on this Tender. Still in case of any deviations, all such deviations shall be set out by the Bidders, clause by clause in the 'Annexure III - Schedule of Deviations' and same shall be submitted as a part of the Technical Bid.

1.6 Right of Acceptance/ Rejection

Bids are liable for rejection in absence of following documents:-

1.6.1 EMD of requisite value and validity
1.6.2 Tender fee of requisite value
1.6.3 Price Bid as per the Price Schedule mentioned in Annexure-I
1.6.4 Necessary documents against compliance to Qualification Requirements mentioned at Clause 1.7 of this Tender Document.
1.6.5 Filled in Schedule of Deviations as per Annexure III
1.6.6 Filled in Schedule of Commercial Specifications as per Annexure IV
1.6.7 Receipt of Bid within the due date and time

TPNODL reserves the right to accept / reject any or all the bids without assigning any reason thereof.

1.7 Qualification Criteria

- The bidder should have average annual turnover of Rs. 1 Crore or above in last three FY. Bidders have to submit copy of audited Balance Sheet and P&L Account in this regard.
- The bidder should have supplied 10 Thousand of Poly Phase Hole Current Meters/ Feeder Energy Meters during the last 5 FY years (Purchase order/Customer order/appreciation letters required) .
- The bidder should have own manufacturing facility for manufacturing of meters (Copy of certificate required).
- The bidder should have in-house testing facilities for acceptance test as per TPNODL technical specification. Bidders have to submit Self-undertaking in this regard.

1.8 Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts. Bidders must agree to these rules prior to participating. In addition to other remedies available, TPNODL 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 General Condition of Contracts. A bidder who violates the market place rules or engages in behaviour that disrupts the fair execution of the marketplace, may result in restriction of a bidder from further participation in the marketplace for a 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 terms as published in TENDER / NIT

1.9 Supplier Confidentiality

All information contained in this tender is confidential and shall not be disclosed, published or advertised in any manner without written authorization from TPNODL. This includes all bidding information submitted to TPNODL. All tender documents remain the property of TPNODL and all suppliers are required to return these documents to TPNODL upon request. Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

2.0 Evaluation Criteria

- The bids will be evaluated technically on the compliance to tender terms and conditions.
- The bids of technically qualified BAs will be evaluated commercially on the overall lowest cost LOT-(A) & LOT- (B) [Annexure I]. TPNODL reserves right to split the order line item wise and/or quantity wise into more than one Bidder. Hence all bidders are advised to quote their most competitive rates against each line item.
- ***The bidders have option to quote for LOT- (A) , LOT- (B) or Both in complete terms.***
- Bidder has to **mandatorily** quote against each item of Schedule of Items *[Annexure I]* and strictly as per the defined format. Failing to do so, the bids are liable for rejection.

NOTE: In case of a new bidder new to TPNODL, factory inspection and evaluation shall be carried out to ascertain bidder's manufacturing capability and quality procedures. However TPNODL reserves the right to carry out factory inspection and evaluation for any bidder prior to technical qualification. In case a bidder is found as Disqualified in the factory evaluation, their bid shall not be evaluated any further and shall be summarily rejected. The decision of TPNODL shall be final and binding on the bidder in this regard.

2.1 Price Variation Clause:

The prices shall remain firm during the entire contract period.

3.0 Submission of Bid Documents

3.1 Bid Submission

Bidders are requested to submit their offer in line with this Tender document. TPNODL shall respond to the clarification raised by various bidders and the replies will be sent to all participating bidders through e-mail.

Bids shall be submitted in 3 (Three) parts:

FIRST PART: "EMD" of Rs. **2, 00,000/- (Rupees Two Lacs only)** shall be submitted. The EMD shall be valid for 210 days from the due date of bid submission in the form of BG / Bankers Pay Order favouring "The TP Northern Odisha Distribution Limited". The EMD has to be strictly in the format as mentioned in General Condition of Contract, failing which it shall not be accepted and the bid as submitted shall be liable for rejection. A separate non-refundable tender fee of stipulated amount

also needs to be transferred online through NEFT / RTGS in case the tender document is downloaded from our website.

TP Northern Odisha Distribution Limited Bank Details for transferring Tender Fee and EMD is as below:

Account Name: The TP Northern Odisha Distribution Limited.
Bank Name: Union Bank of India, Balasore
Bank Account No. : 500601010280332
IFSC Code: UBIN0550060

In case of submission of EMD in shape of Bank Guarantee, original hard copy shall be sealed in separate envelope clearly indicating Tender Reference Number, Name of Tender and Name of Business Associate and shall be addressed to:

HOD (Contracts)
The TP Northern Odisha Distribution Limited,
Januganj, Balasore- 756019, Odisha.

SECOND PART: "TECHNICAL BID" shall contain the following documents:

a) Documentary evidence in support of qualifying criteria
b) Technical literature / GTP / Type test report etc. *(if applicable)*
c) Qualified manpower available
d) Testing facilities *(if applicable)*
e) No Deviation Certificate as per the Annexure III – Schedule of Deviations
f) Acceptance to Commercial Terms and Conditions viz Delivery schedule / period, payment terms etc. as per the Annexure IV – Schedule of Commercial Specifications.
g) Quality Assurance Plan / Inspection Test Plan for supply items *(if applicable)*

The technical bid shall be properly indexed and is to be submitted through TPNODL E-tender platform (Ariba) only. Hard copy of Technical Bids need not be submitted.

THIRD PART: "PRICE BID" shall contain only the price details and strictly in format as mentioned in Annexure I along with explicit break up of basic prices, Taxes & duties, Freight etc. In case any discrepancy is observed between the item description stated in Schedule of Items mentioned in the tender and the price bid submitted by the bidder, the item description as mentioned in the tender document (to the extent modified through Corrigendum issued if any) shall prevail. Price Bids have to be mandatorily submitted only through e-procurement portal of TPNODL. Bids submitted through any other form / route shall not be admissible. The interested bidders are requested to obtain user name and password for purpose of bid submission through e-procurement portal of TPNODL, Balasore.

SIGNING OF BID DOCUMENTS:

The bid must contain the name, residence and place of business of the person or persons making the bid and must be signed and sealed by the Bidder with his usual signature. The names of all persons signing should also be typed or printed below the signature.

The Bid being submitted must be signed by a person holding a Power of Attorney authorizing him to do so, certified copies of which shall be enclosed.

The Bid submitted on behalf of companies registered with the Indian Companies Act, for the time being in force, shall be signed by persons duly authorized to submit the Bid on behalf of the Company and shall be accompanied by certified true copies of the resolutions, extracts of Articles of Association, special or general Power of Attorney etc. to show clearly the title, authority and designation of persons signing the Bid on behalf of the Company. Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the bid.

A bid by a person who affixes to his signature the word 'President', 'Managing Director', 'Secretary', 'Agent' or other designation without disclosing his principal will be rejected.

The Bidder's name stated on the Proposal shall be the exact legal name of the firm.

3.2 Contact Information

All the bidders are requested to send their pre-bid queries (if any) against this tender through e-mail within the stipulated timelines. The consolidated reply to all the queries received shall be posted on TPNODL website by the stipulated timelines as detailed in calendar of events.

Communication Details:

Name: Mr. Kartik Chandra Behera

Contact No: 8908972132

E-Mail ID: kartikchandra.behera@tpnodl.com

HOD (Contracts):

Name: Mr. Vipin Chauhan

Contact No.: 9717393121

E-Mail ID: vipin.chauhan@tpnodl.com

3.3 Bid Prices

Bidders shall quote for the entire Scope of Supply / work with a break up of prices for individual items and Taxes & duties. The bidder shall complete the appropriate Price Schedules included herein, stating the Unit Price for each item & total price with taxes, duties & freight up to destination at various sites of TPNODL. The all-inclusive prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during the execution of the supply work, breakup of price constituents.

The quantity break up shown else-where other than Price Schedule is tentative. The bidder shall ascertain himself regarding material required for completeness of the entire work. Any items not indicated in the price schedule but which are required to complete the job as per the Technical Specifications / Scope of Work / SLA mentioned in the tender, shall be deemed to be included in prices quoted.

3.4 Bid Currencies

Prices shall be quoted in Indian Rupees Only.

3.5 Period of Validity of Bids

Bids shall remain valid for 180 days from the due date of submission of the bid.

Notwithstanding clause above, the TPNODL may solicit the Bidder's consent to an extension of the Period of Bid Validity. The request and responses thereto shall be made in writing.

3.6 Alternative 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 regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the bidding documents.

3.7 Modifications and Withdrawal of Bids

The bidder is not allowed to modify or withdraw its bid after the Bid's submission. The EMD as submitted along with the bid shall be liable for forfeiture in such event.

3.8 Earnest Money Deposit (EMD)

The bidder shall furnish, as part of its bid, an EMD amounting as specified in the tender. The EMD is required to protect the TPNODL against the risk of bidder's conduct which would warrant forfeiture. The EMD shall be denominate in any of the following form:

- Online transfer of requisite amount through NEFT / RTGS.
- Bank Guarantee valid for 210 days after due date of submission.

The EMD shall be forfeited in case of:

a) The bidder withdraws its bid during the period of specified bid validity.

Or

b) The case of a successful bidder, if the Bidder does not
i) accept the purchase order, or
ii) furnish the required performance security BG

3.9 Type Tests (if applicable)

The type tests specified in TPNODL specifications should have been carried out within five years prior to the date of opening of technical bids and test reports are to be submitted along with the bids. If type tests carried out are not within the five years prior to the date of bidding, the bidder will arrange to carry out type tests specified, at his cost. The decision to accept / reject such bids rests with TPNODL.

4.0 Bid Opening & Evaluation process

4.1 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 TPNODL's processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

4.2 Technical Bid Opening

Bids shall be opened as per the schedule mentioned in Calendar of Events. In case of limited tenders, the bids shall be opened internally by TPNODL. Owing to COVID Scenario, in case of Open Tenders also, the bids shall be opened internally by TPNODL. Technical bid must not contain any cost information whatsoever.

First the "EMD" will be checked. Bids without EMD/ cost of tender (if applicable) of required amount/ validity in prescribed format, shall be rejected.

Next, the technical bid of the bidders who have furnished the requisite EMD will be opened, one by one. The salient particulars of the techno commercial bid will be read out at the sole discretion of TPNODL.

4.3 Preliminary Examination of Bids/ Responsiveness

TPNODL 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. TPNODL may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

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.

Prior to the detailed evaluation, TPNODL 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.

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

4.4 Techno Commercial Clarifications

Bidders need to ensure that the bids submitted by them are complete in all respects. To assist in the examination, evaluation and comparison of Bids, TPNODL may, at its discretion, ask the Bidder for a clarification on its Bid for any deviations with respect to the TPNODL specifications and attempt will be made to bring all bids on a common footing. 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 owing to any clarifications sought by TPNODL. After all techno commercial issues are clarified, the date of price bid opening will be intimated to the technically accepted bidders and same shall also be notified at TPNODL website.

4.5 Price Bid Opening

Price bids will be opened at the stipulated date and time. The EMD of the bidder withdrawing or substantially altering his offer at any stage after the technical bid opening will be forfeited at the sole discretion of TPNODL without any further correspondence in this regard.

4.6 Reverse Auctions

TPNODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products/ services being asked for in the tender and reserves the rights to conduct the manual negotiation with the BA who is declared L1 after Reverse Auction.. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached as Annexure VI of this document. The bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form attached as Annexure VI as a token of acceptance for the same.

5.0 Award Decision

TPNODL will award the contract to the successful bidder whose bid has been determined to be the lowest-evaluated responsive bid as per the Evaluation Criterion mentioned at Clause 2.0. The Cost for the said calculation shall be taken as the all-inclusive cost quoted by bidder in Annexure I (Schedule of Items) subject to any corrections required in line with Clause 4.3 above. The decision to place purchase order/LOI solely depends on TPNODL on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that TPNODL may deem relevant.

TPNODL reserves all the rights to award the contract to one or more bidders so as to meet the requirement or nullify the award decision without assigning any reason thereof.

In case any service provider is found unsatisfactory during the contract period, the award will be cancelled and TPNODL reserves the right to award other service provide who are found fit.

6.0 Order of Preference/Contradiction:

In case of contradiction in any part of various documents in tender, following shall prevail in order of preference:

1. Schedule of Items (Annexure I)
2. Post Award Contract Administration (Clause 7.0)
3. Submission of Bid Documents (Clause 3.0)
4. Scope of Work and SLA (Annexure VII)
5. Technical Specifications (Annexure II)
6. Inspection Test Plan (Annexure VIII)
7. Acceptance Form for Participation in Reverse Auction (Annexure VI)
8. General Conditions of Contract (Annexure IX)

7.0 Post Award Contract Administration

7.1 Special Conditions of Contract

- After finalization of tender, Rate Contract shall be issued on successful bidder with a validity period of **06 Months**. Prices shall remain firm till validity of issued rate contract. Within the validity of rate contract and as per requirement of material, release order shall be issued time to time.
- Post award of rate contract, Business Associate (BA) shall submit applicable Performance Bank Guarantee as per GCC within 30 days. PBG applicable shall 5% of Rate Contract Value. PBG submitted, shall be released after completion of applicable guarantee period plus one month.
- Guarantee period shall be as per technical specifications.
- **Within 30 days of Rate Contract issuance by TPNODL, it is the responsibility of BA to get manufacturing clearance and CAT-A issued from TPNODL.** In case BA does not get necessary approvals for issuance of CAT-A within mentioned timelines, then TPNODL reserve the right to cancel issued rate contract / release order and also reserve the right to forfeit EMD / PBG.
- **Delivery period shall be 60 days from date of receipt of release order / CAT-A approval whichever is later. Minimum qty. of each RO shall be 150 Nos**.
- TPNODL shall short close the issued Release Order / Rate contract, in case of any quality issues.
- Any change in statutory taxes, duties and levies shall be borne by TPNODL.
- All other terms and conditions of TPNODL GCC shall be applicable.

7.2 Drawing Submission & Approval

The relevant drawings and GTPs need to be submitted as per special condition of contract mentioned in point no. 7.1.

7.3 Delivery Terms

The delivery of material shall be made as per special condition of contract mentioned in point 7.1.

7.4 Warranty Period

Guarantee/Warranty Period of the supplied material shall be as per technical specification attached separately with this tender.

7.5 Payment Terms

On delivery of the materials in good condition and certification of acceptance by certified official, Associate shall submit the Bills/ Invoices in original in the name of TP Northern Odisha Distribution Ltd. to Invoice Desk. The payment shall be released **within 30 days** from the date of submission of certified bills/ invoices.

7.6 Climate Change

Significant quantities of waste are generated during the execution of project and an integrated approach for effective handling, storage, transportation and disposal of the same shall be adopted. This would ensure the minimization of environmental and social impact in order to combat the climate change.

7.7 Ethics

- TPNODL is an ethical organization and as a policy TPNODL lays emphasis on ethical practices across its entire domain. Bidder should ensure that they should abide by all the ethical norms and in no form either directly or indirectly be involved in unethical practice.
- TPNODL work practices are governed by the Tata Code of Conduct which emphasizes on the following:
- We shall select our suppliers and service providers fairly and transparently.
- We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.
- Our suppliers and service providers shall represent our company only with duly authorized written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
- We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
- We respect our obligations on the use of third party intellectual property and data.

Bidder is advised to refer GCC attached at Annexure IX for more information.

Any ethical concerns with respect to this tender can be reported to the following e-mail ID: sunil.bhattar@tpnodl.com

8.0 Specification and standards

Attached separately with tender.

9.0 General Condition of Contract

Any condition not mentioned above shall be applicable as per GCC for Supply attached along with this tender at Annexure IX.

10.0 Safety

Safety related requirements as mentioned in our safety Manual put in the Company's website which can be accessed by:

http://www.tpnodl.com

All Associates shall strictly abide by the guidelines provided in the safety manual at all relevant stages during the contract period.

ANNEXURE I
Schedule for Items

LOT-A

S. No	Item Description	Qty.	UoM	Unit Price (Rs.)	GST (Rs.)	Unit Price with GST (Rs.)	Amount (Rs.)
1	33KV and 11 KV Feeder Energy meter (-/1A, -/110/√3, Cl: 0.2 WH type meters.) as per tech specification	300	Each				
HSN Code:				**Total Value Of LOT-A All Incl. Taxes.**			

LOT-B

S. No	Item Description	Qty.	UoM	Unit Price (Rs.)	GST (Rs.)	Unit Price with GST (Rs.)	Amount (Rs.)
1	3-ph,4-wire HTTV Meter-/5A,0.2 class without BOX(KWH Meter)	150	No				
2	3-ph,4-wire HTTV Meter-/1A,0.2 class without BOX(WH Meter)	30	No				
3	3-ph,4-wire HTTV Meter-/5A,0.5 class without BOX(KWH Meter)	500	No				
4	3-ph,4-wire HTTV Meter-/5A,0.2 class with BOX(KWH Meter)	30	No				
5	3-ph,4-wire HTTV Meter-/5A,0.5 class with BOX(KWH Meter)	100	No				
6	3-ph,4-wire HTTV Meter-/1A,0.2 class with BOX(WH Meter)	10	No				
7	3-ph,4-wire HTTV Meter-/5A,0.5 class with BOX(KWH Meter)	50	No				
8	3-ph,4-wire LTTV Meter,100/5A,0.5 class with BOX(KWH Meter)	30	No				
9	3-ph,4-wire LTTV Meter,150/5A,0.5 class with BOX(KWH Meter)	30	No				
10	3-ph,4-wire ,20-100Amp, Whole current meter with BOX	100	No				
HSN Code:				**Total Value Of LOT-B All Incl. Taxes.**			

NOTE:

- The quantity mentioned above is for evaluation purpose only and may vary during the execution.
- The unit price with GST in column no. 7, is landed price FOR TPNODL Odisha Locations. Exact delivery location shall be specified in the Order.
- The bidders are advised to quote prices strictly in the above format. Failing to do so, bids are liable for rejection.
- The bidder must fill each and every column of the above format. **Mentioning "extra/inclusive" in any of the column may lead for rejection of the price bid.**
- No cutting/ overwriting in the prices is permissible.
- The prices shall inclusive of packaging/F&I/loading/unloading and FOR TPNODL Locations.

Annexure II

Technical Specifications attached separately with the tender.

ANNEXURE III

Schedule of Deviations

Bidders are advised to refrain from taking any deviations on this TENDER. Still in case of any deviations, all such deviations from this tender document shall be set out by the Bidders, Clause by Clause in this schedule and submit the same as a part of the ***Technical Bid.***

Unless specifically mentioned in this schedule, the tender shall be deemed to confirm the* TPNODL'S *specifications:

Technical Deviations:-

S. No.	Clause No.	Tender Clause Details	Details of deviation with justifications

Commercial Deviations:-

S. No.	Clause No.	Tender Clause Details	Details of deviation with justifications

By signing this document we hereby withdraw all the deviations whatsoever taken anywhere in this bid document and comply to all the terms and conditions, technical specifications, scope of work etc. as mentioned in the standard document except those as mentioned above.

Seal of the Bidder:

Signature:

Name:

ANNEXURE IV

Schedule of Commercial Specifications

(The bidders shall mandatorily fill in this schedule and enclose it with the offer Part I: Technical Bid. In the absence of all these details, the offer may not be acceptable.)

S. No.	Particulars	Remarks
1.	Prices firm or subject to variation (If variable indicate the price variation clause with the ceiling if applicable)	Firm / Variable
1a.	If variable price variation on clause given	Yes / No
1b.	Ceiling	--------- %
1f.	Inclusive of transit insurance	Yes / No
2.	Delivery	Weeks / months
3.	Guarantee clause acceptable	Yes / No
4.	Terms of payment acceptable	Yes / No
5.	Performance Bank Guarantee acceptable	Yes / No
6.	Liquidated damages clause acceptable	Yes / No
7.	Validity (180 days) (From the date of opening of technical bid)	Yes / No
8.	Inspection during stage of manufacture	Yes / No
9.	Rebate for increased quantity	Yes / No (If Yes, indicate value)
10.	Change in price for reduced quantity	Yes / No (If Yes, indicate value)
11.	Covered under Small Scale and Ancillary Industrial Undertaking Act 1992	Yes / No (If Yes, indicate, SSI Reg'n No.)

ANNEXURE V

Checklist of all the documents to be submitted with the Bid

Bidder has to mandatorily fill in the checklist mentioned below:-

S. No.	Documents attached	Yes / No / Not Applicable
1	EMD of required value	
2	Tender Fee as mentioned in this RFQ	
3	Company profile/organ gram	
4	Signed copy of this RFQ as an unconditional acceptance	
5	Duly filled schedule of commercial specifications (Annexure IV)	
6	Sheet of commercial/technical deviation if any (Annexure III)	
7	Balance sheet for the last completed three financial years; mandatorily enclosing Profit & loss account statement	
8	Acknowledgement for Testing facilities if available (duly mentioned on bidder letter head)	
9	List of Machine/tools with updated calibration certificates if applicable	
10	Details of order copy (duly mentioned on bidder letter head)	
11	Order copies as a proof of quantity executed	
12	Details of Type Tests if applicable (duly mentioned on bidder letter head)	
13	All the relevant Type test certificates as per relevant IS/IEC (CPRI/ERDA/other certified agency) if applicable	
14	Project/supply Completion certificates	
15	Performance certificates	
16	Client Testimonial/Performance Certificates	
17	Credit rating/solvency certificate	
18	Undertaking regarding non blacklisting (On company letter head)	
19	List of trained/untrained Manpower	

Annexure VI

Acceptance Form for Participation In Reverse Auction Event

(To be signed and stamped by the bidder)

In a bid to make our entire procurement process more fair and transparent, TPNODL intends to use the reverse auctions through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

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

1. TPNODL shall provide the user id and password to the authorized representative of the bidder. *(Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).*
2. TPNODL will make every effort to make the bid process transparent. However, the award decision by TPNODL would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPNODL, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of TPNODL.
6. In case of intranet medium, TPNODL shall provide the infrastructure to bidders. Further, TPNODL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case of an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out-rightly rejected by TPNODL.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at TPNODL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by TPNODL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

CONTENTS

1 SCOPE

This specification covers the technical requirements of design, manufacturing, testing at meter manufacturer's works ,packing, forwarding, supply and unloading at store/site of three phase four Wire, HT (CT and VT operated) operated AC static meters of accuracy **class 0.2 , WH** (here after referred as meters) complete with all accessories for efficientand trouble free operation.

It is not the intent to specify completely herein all the details of tech design and construction of material. However, the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in manner acceptable to the TPNODL, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.

2 APPLICABLE STANDARDS

The equipment covered by this specification shall conform to the requirements stated in latest editions & amendments of relevant Indian/ IEC Standards and shall conform to the regulations of local statutory authorities.

a.	IS 14697	A.C. Static Transformer operated watt hour and VAR-hour meters, class 0.2s, 0.5s & 1.0s
b.	IS 15959 (Part 1) : 2011	Data exchange for electricity meter reading, tariff and load control
c.	IS 9000	Basic Environmental testing procedure for electrical and electronic items.
d.	IS 12346: 1999	Testing Equipment For Ac Electrical Energy Meters
e.	IS 11000	Fire Hazard Testing
f.	IEC 62052: 2003 Part 11	Electricity metering equipment (AC) - General requirements , tests and test conditions – metering equipment
g.	IEC 62053 Part 22: 2003	Electricity metering equipment (a.c.) - Particular Requirements - Part 22: Static meters for active energy (classes 0.2s and 0.5s)
h.	IS 15707: 2006	Testing Evaluation installation and maintenance of AC Electricity Meters- Code of practice.
i.	IEC 60068	Environmental testing.
j.	CBIP–TR No.325	Specification for A.C. Static Electrical Energy Meters (latest amendment)
k.	CEA Regulation (2019)	Installation and operation of meters
l.	IS 60529	Degree of protection provided by enclosure
m.	IEC 62056-61	Electricity metering- Object Identification system (OBIS)
n.	ASTM D648	Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
o.	IS 11731-1	Methods of test for determination of the flammability of solid electrical insulating materials when exposed to an igniting source, Part 1: Horizontal specimen method

p.	IS 11731-2	Methods of Test for Determination of Flammability of Solid Electrical Insulating Materials When Exposed to An Igniting Source, Part 2: Vertical Specimen Method
q.	ISO 75 Part 1&2	Determination of temperature of deflection under load

3 CLIMATE CONDITIONS OF THE INSTALLATION

a) Max. Ambient Temperature : 50 deg.C
b) Max. Daily average ambient temp. : 40 deg.C
c) Min Ambient Temp : 0 deg C
d) Maximum Humidity : 100%
e) Minimum Humidity : 10%
f) Average No. of thunderstorm days per annum : 70
g) Maximum Annual Rainfall : 1500 mm
h) Average No. of rainy days per annum : 120
i) Altitude above MSL not exceeding : 1000 meters
j) Wind Pressure : 150 kg/sq m up to an elevation at 10 m.

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g

4 GENERAL TECHNICAL REQUIREMNTS

S.No	DESCRIPTION	REQUIREMENT
4.01	Type of the meter	Three Phase Four Wire, AC Static Current Transformer (CT) and Voltage Transformer (VT) operated **Watthour and Var-hour Energy Meter**. It consists of measuring elements(s), time of use of register(s) and display and plug in type bi-directional communication module all integral within the meter housing. The meter design shall be such that only CT MF is required energy calculation.
4.02	Accuracy Class of the meter	1. Active Energy Measurement, a. For 11kV - 0.2s b. For 33kV, 66kV and 220kV - 0.2s 2. Reactive Energy Measurement, a. For 11kV - 1 or better b. For 33kV, 66kV and 220kV - 0.5s or better
4.03	Basic Current (Ib) & rated Maximum current (Imax)	a. **For 11kV – Ib = 1A**; Imax= 10 Amps(Balanced and Unbalanced Load) **b. For 33/66kV/220kV – Ib shall be 1A** (shall be defined in tender) When Ib= 1A; Imax= 2 Amps (Balanced and Unbalanced Load)
4.04	Reference Conditions for testing the performance of the meter	Vref = 110 V ± 1 % (phase to phase) **63.5 V ± 1 % (phase to neutral)** Frequency = **50Hz ± 3%** Temperature= 27^0C ± 2^0C
4.05	Operating Voltage	Meter shall be operational with required accuracy from 0.6 Vref to 1.2 Vref. However meter shall withstand the maximum system Voltage of 110V between phase and neutral (for minimum 5 min).

		4.06	Operating Frequency	**50 Hz± 3%.**
		4.07	Power Consumption	Voltage circuit: Maximum 5W and 15 VA Current Circuit :Maximum 4VA
		4.08	Starting Current	0.1% of Ib – (5mA for Ib 5A)
		4.09	Short time over Current	20 Imax for 0.5sec (200 A for Ib-5A)
		4.10	Influence of heating	Temperature rise at any point of the external surface of the meter shall not exceed by more than 20K with an ambient temperature at 45^0 C.
		4.11	Rated Impulse Withstand Voltage	6 kV (shall be applied ten times with one polarity and then repeated with the other polarity and minimum time between each impulse to be 3 sec)
		4.12	AC withstand Voltage for 1 min	4 Kv
		4.13	Minimum Insulation resistance at test voltage 500+/- 50 V DC a)Between frame & current ,voltage circuits as well as auxiliary circuits connected together: b)Between each current (or voltage circuit) & each and every other circuit:	a) 5 M ohm b) 50 M ohm.
		4.14	Mechanical requirements	Meter shall be in compliance with clause 12.3 of IS 14697
		4.15	Resistance to heat and fire	The terminal block and Meter case shall ensure safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per clause 6.8 of IS 14697 fire retardant material shall be used.
		4.16	Protection against penetration of dust and water.	Degree of protection: IP 51 as per IS 12063/60529, but Without suction in the meter. Meter shall comply with clause 6.9 and 12.5 of IS 14697
		4.17	Resistance against Climatic influence.	Meter shall be in compliance with clause 12.6 of IS 14697.
		4.18	Electromagnetic Compatibility (EMC)	Meter shall be in compliance with clause CBIP report 325 and IS
		4.19	Accuracy requirements	Meter shall be in compliance with clause 11 of IS 14697

		4.20	Power factor range	Zero lag to Zero lead. Meter shall be programed at default 'lag only configuration i.e. Lead to be treated as unity for kVA & KVAh calculations'
		4.21	Energy measurement	Fundamental energy +Energy due to Harmonics
		4.22	Connection Diagram	The connection diagram for the system shall be provided on terminal cover.
		4.23	Self-Diagnostic feature	The meter shall have logging with date and time in memory for un satisfactory / non-functioning of 1. Real Time Clock 2. RTC battery 3. Non Volatile Memory
		4.24	Initial start-up of meter	Meter shall be fully functional within 5 sec after reference voltage is applied to the meter terminals (as per clause 11.4.1 of IS 14697).
		4.25	Alternate mode of supply to the meters	In case of meter power failure, reading/data should be retrieved with the help of battery or other power source.
		4.26	Internal diameter of the terminal holes Depth of the terminal holes	5 mm (minimum) 20 mm (minimum)
		4.27	Clearance between adjacent terminals	10 mm (minimum)
		4.28	Display	Backlit LCD, Scrolling, 10 seconds for each parameter minimum 8 digits for reading LCD display
		4.29	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication etc.
		4.30	Software and communication compatibility	The bidder shall supply software required for communication through MRI and BCS software including required training to use the software free of cost. The meter shall be compatible to communicate with GSM/GPRS/RF modems in DLMS protocol.
		4.31	Calibration	Meters shall be software calibrated at factory and modifications in calibration shall not be possible at site by any means. However parameters like RTC, TOD slots, DIP (billing & load survey), billing date, display parameters etc. shall be reconfigure through MRI with proper security level. Any software/keys required to reprogram the meter or/and any other support will be provided without any additional cost to TPNODL till the useful life of the meters.
		4.32	Usage Application	**Outdoor**

		4.33	Ultrasonic welding	Meter cover and body should be continuous and seamless ultrasonically welded with an overlapping of 5 mm (min.).
		4.34	Harmonics recording	The meter should record the current and voltage THD. The meter should record harmonics up to 20th harmonic Average THD of all phase for voltage THD and current THD. THD values shall have 30/15 minutes (as applicable) integration period in load survey. Accuracy of harmonics recording shall be as per meter accuracy class. The meter shall generate a flag whenever the threshold (user configurable) of the 5% THD of the load current and voltage is breached.
		4.35	Terminal arrangement	The terminal pin shall be 10 terminal arrangement with phase voltage terminal in between current terminals as mentioned in clause no. 5.2.11
4.1	**COMMUNICATION CAPABILITIES AND SOFTWARE FEASIBILITIES**	4.1.1 The meter shall have facilities for data transfer locally through MRI (Using optical port/RJ11/RF modems) and remotely using optical port/RJ11 port via GSM/GPRS/RF modems with proper security through optically isolated ports through serial communication. 4.1.2 Meter should have additional RJ11/ RJ45 port to communicate with GSM/GPRS/RF modems. 4.1.3 Optical Communication port shall be available for communication. Communication ports shall not be affected by any type of injection /unauthenticated signals and having proper sealing arrangement. 4.1.4 The XML files of downloaded data of the meters will be as per MIOS standards. 4.1.5 The bidder shall supply software required for local (MRI/Laptop) & remote (AMI) connectivity including required training to use the software free of cost. Bidder shall provide the communication protocol / APIs as per MIOS standards for communication with meter through local (MRI) / BCS as and when required by TPNODL free of cost during life time of meter. The bidder should provide DLMS compliance for Communication with the meter through Optical port. Bidder should also provide protocol / API for hosting in smart modem using GPRS / RF technology for capturing full data / partial data from the meter and sending it to server / HES OTA. 4.1.6 Bidder should also provide software for changing firmware of meters in mass. Any software / keys required to reprogram the meter and any other support for enabling TPNODL to execute this option will be provided without any additional cost to TPNODL. 4.1.7 Bidder should also provide base computer software (BCS) for viewing the data downloaded through MRI/laptop/HHU in separate PC/laptop. Android based or windows based HHU shall be preferred. API required for converting raw file to XML (DLMS) should also be provided if applicable. 4.1.8 Communication of the meter at optical port should be as per IS 15959 (Part-1): 2011.			

		4.1.9 Bidders to supply protocol to read the meters supplied against this tender using intelligent RF / GPRS / GSM modem with store and forward feature without any additional cost implication. Bidders to provide API on MIOS standard to convert the meter data in to XML and read API for hosting in Server and Modem RF / GSM / GPRS based for reading meters from any third party manufactured modems. Bidder to provide necessary support if required during integration of the RF modem with supplied meters against this tender.
4.2	**Immunity against external influencing signals**	**4.2.1 Magnetic Field:** Meter shall record accurate energy in case of any external influencing signals in line with IS 14697:1999 Cl.11.2 and variation in limits of error (upto 100% Imax) shall be as per the table 13 of IS 14697. Meter shall be immune to any magnetic field such that it shall not affect the normal overall functionality However, in case of abnormal magnetic field as defined below meter shall perform as per the following actions: a. Meter shall log the event in its memory as" Magnet" with date and time stamp along with snapshot and the event logging threshold values as per table no. 1 in 4.4 b. The energy recording to shift on I max, Vref. with UPF. **Abnormal Magnetic field is defined as below:** a. Continuous DC magnetic induction: **>**0.20 Tesla ± 5% (Value of the magneto motive force to be applied shall be generally >10000 AT. b. AC magnetic induction: **>**10 milli Tesla (if produced with circular metal core with square cross section as specified in CBIP latest report with 2800 AT) c. Permanent Magnet: Immune up to 0.5T and Event logging **>**0.5T. **4.2.2 Electrostatic Discharge (ESD)** Meter shall be immune up to 50 kV and shall record accurate energy as per IS-14697:1999/CBIP-325. Meter shall log the event into memory as 'ESD' with date & time stamp for any ESD greater than 50 kV with snap shot, the event logging threshold values as per table no. 1 in 4.4. 4.2.3 The shielding around the meter shall be such that it does not get affected by high Voltage and high energy or low energy impulse when comes in contact with meter from any side. 4.2.4 Meter should immune to high/low frequency jammer devices. Meter shall log the event in its memory as" JAMMER" with date and time stamp along with snapshot, the threshold values as per table no. 1 in 4.4. 4.2.5 The meter should be immune or log the tamper on application of any other higher magnetic field of any frequency waves, micro waves like magnetron etc. the threshold values as per table no. 1 in 4.4.
4.3	**Neutral Disturbance & other tampers**	4.3.1 The meter shall log the event in memory on thresholds defined in table 1 in 4.4 4.3.2 The meter shall not saturate on passage of direct current, which can cause the meter either to stop recording/ record inaccurately. DC injection shall be tested both in phase and neutral. Measurement by meter shall not get influenced by injection of Chopped signal/ DC signal/ DC pulse upto 330V (both + & - DC) and for any value beyond this, of any low frequency and harmonics. Meter shall log the event into memory as 'Neutral Disturbance' with date & time stamp the thresholds are as per table no. 1 in clause 4.4 below.

4.4 Abnormal Tamper conditions

4.4.1 The meter shall record forward energy under all abnormal tampering conditions and shall be capable of recording occurrence and restoration of abnormal events listed below along with date & time and snap shots of individual voltages, currents, power factors, active energy and apparent energy at the time of occurrence of abnormal event and restoration of normal supply.

4.4.2 For all tamper events the time stamp and snapshot parameters shall be recorded at the start time of event for occurrence (T1) and for restoration the time stamp and snapshot parameters shall be recorded at the end time of the event (T3).

4.4.3 During abnormal & tamper conditions, the current shall be recorded as active current and line current. Each such event shall be provided with minimum count of as per table no.1 to avoid missing of data amidst usual events (like power failure) due to the limitation of FIFO. Persistence time for occurrence and restoration for the events along with their threshold values shall be as per table no. 1 given below.

4.4.4 Multiple occurrences of same event, with different time stamps should not be logged without restoration of first occurrence, except for the case of Top Cover Open.

4.4.5 All tamper/event logging thresholds values shall be configurable.

Table No.1

Persistence Time for Occurrences	Persistence Time for Restoration	Threshold Value for Occurrence of Events	Threshold Value for Restoration of Events	Compartment Size
ESD/JAMMER= immediate (record only 1 event on first application & only one event for next 1min) (ESD)	ESD/JAMMER = 0 Hr 01 Min 0 sec (ESD) (should restore after 1 min. of last application)	Immunity up to 50 KV and logging of event >50 KV	Removal of ESD/JAMMER signal	25
Magnet = 0 Hr 2 Min 0 sec (MAG)	Magnet = 0 Hr 2 Min 0 sec (MAG)	> 0.5 Tesla for permanent magnet OR DC magnetic induction > 0.2T OR AC magnetic induction > 10 mT (of any frequency)	< 0.5 Tesla for permanent magnet OR DC magnetic induction < 0.2T or AC magnetic induction <10 mT	25

			Meter Top Cover Open (TC Open) immediate	Meter Top Cover Open (TC Open) Immediate	If meter top cover is opened	NA	05 (Stay put Type)
			Potential Missing = 0 Hr 10 Min 0 sec (PM)	Potential Missing = 0 Hr 2 Min 0 sec	Voltage < 70% of Vref AND current > 2% Ibasic	Voltage > 80% of Vref AND current > 2% Ibasic	25
			Voltage Unbalance = 0 Hr 30 Min 0 sec (VU)	Voltage Unbalance = 0 Hr 2 Min 0 sec	20% or more between the phases and current > 2% Ibasic	Shall be less than 10 % between the phases and current > 2% Ibasic	25
			CT Open (phase wise) = 0 Hr 10 Min 0 sec	CT Open (phase wise) = 0 Hr 2 Min 0 sec	Phase Current < 1% of Ibasic AND Current on other phases > 10% of Ibasic with all current positive	Phase Current > 10% of Ibasic with all current positive	25
			Invalid Phase Association	Invalid Phase Association (Immediate)	Incorrect Phase connections	Correct Phase Connections	5
			CT Reversal = 0 Hr 30 Min 0 sec (CTR)	CT Reversal = 0 Hr 2 Min 0 sec	Active current negative	Active current positive AND > 2 % Ibasic	25
			Current Unbalance = 0 Hr 30 Min 0 sec (CU)	Current Unbalance = 0 Hr 2 Min 0 sec	Current difference > 10% between phases and I min 10% of Ibasic	Current difference < 5% between the phases and I min>5% of Ib	25
			Low Power Factor = 0 Hr 30 Min 0 sec (LPF)	Low Power Factor = 0 Hr 2 Min 0 sec	I >1% of Ib and Power Factor ≤ 0.5 in any phase	I >1% of Ib and Power Factor ≤ 0.7 in respective phase	25
			Neutral Disturbance = 0 Hr 01 Min 0 sec (ND)	Neutral Disturbance = 0 Hr 2 Min 0 sec (ND)	Voltage >145% of Vref & Current >10% Ib OR Frequency < 47 Hz OR Frequency > 53 Hz OR DC voltage / signal/ pulse/ chopped signal injection	Voltage <115% of Vref & Current > 10% Ib AND Frequency > 47 Hz OR Frequency < 53 Hz	25

			Power On Off = 0 Hr 02 Min 0 Sec	Power On Off = immediate	Actual Voltage off	Actual Voltage On	25
			Over Voltage = 0 Hr 30 Min 0 sec	Over Voltage = 0 Hr 2 Min 0 sec	Voltage > 130% of Vref	Voltage <110% of Vref	25
			Over current = 0hr 30min 0sec (OL)	Over Current = 0hr 2min 0sec	>Preset value (default value set at 120%Ib)	I<100%Ib	25
			Microwave immediate (record only 1 event on first application & only one event for next 1min)	Microwave 0 Hr 01 Min 0 sec (should restore after 1 min. of last application)	Any higher frequency magnetic waves, micro waves > 10 mT (or mutually decided)	Removal of device	25

4.4.6 Meter shall latch & store cumulative counts of all the tampers events which have logged /occurred/stored in memory of meter from the date of energization till life of meter. Total tamper storage should be as per table 1 above.

4.4.7 The meters are to be used for registration of energy consumed by the consumer, as such the meters shall be programmed for import mode and in case of reversal of energy direction (reversal of all CT terminals) meter shall register energy separately in export mode i.e. in case of CT reversal, meter shall record scalar (not vector sum) sum of energy. The meter shall accurately distinguish between actual CT reversal and condition due to faulty reactive power compensation devices/ capacitor banks. Appropriate logics for the same shall be provided in meter.

4.4.6 The meter shall register correctly if supply neutral is not available at the meter neutral terminal. The meter shall work in absence of any two incoming wires. It shall keep recording correctly in case of unbalance system voltage also as defined above.

4.4.7 The meter shall keep working accurately irrespective of the phase sequence of the supply. The meter shall be functional even if somehow change in the phase sequence takes place.

4.4.8 The Meter shall be able to differentiate between actual CT reversal and condition arising out of unbalanced / unhealthy capacitor bank. Appropriate logics for the same shall be provided meter.

4.4.9 The Cover Open tamper detection should be through heavy duty, sturdy micro switches with OR gate logic such that it should not log false event on vibration or impact during handling or testing.

4.5	**Event compartments**	4.5.1 The event compartments shall be as IS 15959 Part-1 table 9. 4.5.2 The size of the event compartments should be such that all above events (in table no.1 and other required events defined in various clauses of this documents) are accommodated in the assigned event category compartment. i.e. if in case of voltage compartment assigned to 4 number of events then the minimum size of this compartment should be such that it should accommodate sum of all maximum number of events as marked above table 1. 4.5.3 Transaction events compartment size shall be minimum 20 events.
5	**GENERAL CONSTRUCTIONS**	The 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 shock, safety against effect of excessive temperature, protection against spread of fire, protection against penetration of solid objects, dust and water. 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. The meters shall be designed and manufactured using SMT (Surface Mount Technology) components. All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy as given below or any other equivalent make with the strict approval of TPNODL :

SNo	Component Function	Requirement	Makes and Origin
1	Measurement/ computing chips	The Measurement/ computing chips used in the meter should be with the Surface mount type along with the ASICs	
2	Memory chips/NVM	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges. The life of NVM shall be 15 years.	
3	Display modules	The display modules should be well Protected from the external UV radiations. The display visibility should be sufficient to read the meter mounted between height of 0.5m and 2m. The construction of the modules should be such that the displayed quantity should not	

				disturbed with the life of display. Should be with Green LED background. It should be trans-reflective STN type industrial grade with extended temperature range.	
			4	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. It should be magnetic locking type	
			5	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	A class consumer
			6	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.	
			7	Battery	Lithium-ion battery with guaranteed life of 15 years	
			8	Microcontroller and RTC having separate battery	The accuracy of RTC shall be as per relevant IEC / IS standards and RTC shall be provided with separate battery in its circuit. The micro controller shall be of superior quality from reputed make with long life.	
5.1	**Meter Body**	5.1.1	Meter body shall be made of unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II) with FV0 Fire Retardant, self - extinguishing, UV stabilize, recyclable and Anti oxidation properties.			
		5.1.2	The minimum thickness of the meter enclosure shall be 2mm.			
		5.1.3	Meter base shall be opaque with virgin polycarbonate LEXAN 500R or equivalent (i.e. chart of Lexan 500R compared with the alternative material) on prior approval from the TPNODL. (If different material offered the bidders should submit material data sheet in technical bid)			
		5.1.4	Meter cover shall be transparent with polycarbonate LEXAN 143R/943A or equivalent (i.e. chart of Lexan 500R compared with the alternative material) on prior approval from the TPNODL. (If different material offered the bidders should submit material data sheet in technical bid)			

		5.1.5	Meter cover & base shall be provided with continuous and seamless Ultrasonic welding such that it cannot be opened without breaking the enclosure. Front cover & base shall be such that it is not possible to cut & open the meter without certainly damaging the meter body and by no means shall an attempt to reassemble would not leave physical evidence. The damage evidences should be visible externally& should be traceable in such a way that attempts can be proved in court of law.
		5.1.6	The meter body shall be sealed in such a way that opening of meter base and cover is possible only after breaking the seal(s).
		5.1.7	During meter manufacturing the meter seal fixing should be tightened such that the seal body should be close to meter body.
		5.1.8	Unidirectional screws to be used on meter covers where ever required.
		5.1.9	The Meter body shall be such that the liquid or chemical shall not reach the electronic parts (in installed condition), if liquid is injected from any side of meter body such as meter terminals, push button, display etc. Necessary protection and water tight sealing to be provided at terminals and Push buttons etc.
5.2	**Terminals, Terminal Block**	5.2.1	Even after any attempts the terminal block should get disengaged, opened or loosen from any side. Any attempt to disengage the terminal block should certainly damage the meter body with physical evidences. The damage evidences should be visible externally& should be traceable in such a way that attempts can be proved in court of law.
		5.2.2	Terminals may be grouped in terminal block having adequate insulating properties and mechanical strength. In order to satisfy such requirements when choosing insulating materials for the terminal block adequate testing of materials shall be taken into account.
		5.2.3	Terminal block and terminal cover shall be of a material which complies with the requirements of IS11731 (part 1) method FH1. The material of which the terminal block is made shall be capable of passing the Heat Deflection temperature test given in ISO 75 for temperature of 135°C and pressure of 1.8 MPa as mentioned in IS 14697. Tested as per ISO 75-2/A or ASTM D648.
		5.2.4	The terminal block shall be of opaque with virgin polycarbonate LEXAN500R or equivalent (complying to above requirement) on prior approval from the TPNODL. (The bidders should submit material data sheet in technical bid)
		5.2.5	The terminal block, the terminal cover and the meter case shall ensure reasonable safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them. The material and plating details of terminals screw shall be submitted by the bidder.
		5.2.6	The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there is no risk of loosening or undue heating. Terminal & screw should not be damaged during regular opening and tightening.

		5.2.7	**Temperature sensor** to be for sensing the temperature and meter should be programmed in such way that on reaching the threshold value set (as per tamper table no. 1) the event must get logged.
		5.2.8	Internal diameter of the terminal holes shall be minimum 5 mm; minimum clearance between adjacent terminals shall be 10 mm. Minimum Depth of the terminal holes shall be of 20 mm.
		5.2.9	Minimum two number of terminal screws to be provided per terminal wire.
		5.2.10	Terminal block 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 is not transmitted through insulating material.
		5.2.11	Meter terminal should have 10 terminals arrangement. The terminals should have center to center distance of min. 11.5mm. Terminal configuration shall be R-Cin, R volt, R-Cout, Y-Cin, Y volt, Y-Cout, B-Cin, B-volt, B-Cout, Neutral.
5.3	**Terminal Cover**	5.3.1	Terminal cover shall be short type and transparent with virgin polycarbonate LEXAN 143R/943A or equivalent on prior approval from the TPNODL (the bidders should submit the relevant material data sheet in technical bid).
		5.3.2	Appropriate space shall be available for incoming /out-going cables without damaging/stressing terminal cover (terminal cover design shall be as per the TPNODL approval). After sealing the cover, terminals shall not be accessiblewithout breaking the seals. Terminal cover should be of short type 20-25 mm length. The system connection diagram shall be provided on the terminal cover.
		5.3.3	The terminal cover design should be such that the sealing screw locking provision on cover should have min dimension of 3mmx3mm. (Excluding seal lock hole)
		5.3.4	The terminal cover should open on the top side, during connection of the cables. The side opening of terminal cover is not acceptable due to additional opening space requirement.
5.4	**Sealing of meter and its terminal cover**	5.4.1	The system connection diagram shall be provided on the terminal cover. Reliable sealing arrangement shall be provided to make the meter tamper evident and to avoid fiddling or tampering by unauthorized persons.
		5.4.2	For this, one no. Polycarbonate seal and three no. Hologram seal with unique serial numbers (on Left, Right & Top side) shall be provided by the bidder. One no polycarbonate seal shall be provided by the TPNODL. This seal shall be fix on right hand side of meter.
		5.4.3	All the seals with unique serial numbers shall be fixed on meter body by the bidder at his works before calling for inspection.
		5.4.4	Two sealing provision shall be provided at meter terminal cover, such that terminal shall not be accessible without breaking the seals. All the seals shall be provided on front side only and as per the TPNODL specification. Rear side sealing arrangement shall not be accepted. Bidder shall provide seals be as per CEA regulation (2006). Only patented seals to be used as per CEA requirements.

		5.4.5 The bidder shall provide TPNODL (MMG store and MTL) the soft record of polycarbonate seal and hologram seal serial number used against each meter serial number along with its position (RHS/LHS/Top/TB Cover) in tabular form for every lot of meter
5.5	**TOD Feature**	The meter shall be capable of measuring Cumulative Energy **(Wh & VAh)**, and MD (kW & kVA) with time of day (TOD) registers having 8 zones & 02 seasons (no. of zones & timeslot shall be programmable by MRI/ Over the air with adequate security level and in one toone /broadcast mode over the air). Current TOD (during tender) to be given is as below: **Slots** / **Time Slot** / **Jan-Dec** Normal / 0000-0300 / Register 2 Off-Peak / 0300-0900 / Register 1 Normal / 0900-1300 / Register 2 Peak / 1300-1700 / Register 3 Normal / 1700-2100 / Register 2 Peak / 2100-2400 / Register 3 **# The bidder to ask TPNODL for latest TOD timing slots before manufacturing of every lot.**
5.6	**MD Integration**	The MD integration period shall be 30/15 minutes, as applicable (integration period-programmable by MRI at site and also thru AMR with adequate security level). The MD resetting shall be automatic at the 1st of the month i.e. 0000 hours of 1st day of the month. Manual MD reset button shall not be available. Last 12 MD values shall be stored in the memory and one to be displayed in the Auto scroll mode. MD shall be recorded and displayed with minimum three digits before decimal and minimum three digits after decimal points. MD integration shall be of sliding Type at an interval of 10 min.
5.7	**Parameters in BCS**	All these parameters shall be downloaded locally or remotely and interpreted in PC/Laptop. All the parameters shall be recorded and memorized in its Non Volatile Memory (NVM). The corresponding Non Volatile Memory shall have a minimum retention time of 15 years. 'Fail' to be log in memory in the following conditions only in BCS: a) RTC fail b) NVM memory fail c) Battery fail
5.7.1	**Load survey (for pre-paid & post-paid meter mode)**	Meter serial number shall be recorded and communicated for all profiles of data. The meter shall be capable of recording 30 minutes average of the following parameters for at least last 90 days a) Voltage for each phase b) Current of each phase c) Average PF d) Average kWh e) Average kVAh (lag only) f) kVArh(Lagging) g) kVArh(Leading) h) Temperature near terminal block (˚C) i) THD Voltage phase wise j) THD Current phase wise **Meter shall be capable of recording daily Energy and Demand 00:00 to 24:00 Hrs Wh/VAh, kW/kVA in BCS for 90 days. Midnight energy value of cumulative Wh, VAh along with H1 KW and KVA along with daily consumption kWh should be available in metermemory for last 90 days.**

5.7.2 Instantaneous Parameters

Meter serial number shall be recorded and communicated for all profiles of data. Meter shall be capable for following Instantaneous Parameters in Memory and should be available in BCS.

Meter Sr.No.	
Meter Type	3P HT
Meter date & Time MRI/PC date & Time Dump date & Time	DD MM YYYY HH MM SS DD MM YYYY HH MM SS DD MM YYYY HH MM SS
Voltage –R	000.000V
Voltage –Y	000.000V
Voltage –B	000.000V
Line Current –R	00.000A
Line Current –Y	00.000A
Line Current –B	00.000A
Active Current –R	00.000A
Active Current –Y	00.000A
Active Current –B	00.000A
Reactive Current-R	00.000A
Reactive Current-Y	00.000A
Reactive Current-B	00.000A
Power factor-R	0.000
Power factor-Y	0.000
Power factor-B	0.000
Average Power factor	0.000
Instantaneous Frequency	00.000Hz
Instantaneous Load	Active ,Reactive Lag/Lead, Apparent
Present Cumulative Energy	Active ,Reactive Lag/Lead, Apparent
Cumulative Power Off Duration	00000
Cumulative Power ON Duration	00000
Cumulative Tamper count	00000
Terminal Block Temperature (˚C)	
Cumulative Billing Count	00000
Last Billing date	dd:mm:yy
No of Power failure	00000
Vector/phasor diagram In case one of the voltage is missing, vector should be made with 2 voltage and all currents.	

5.7.3 General Information

Meter shall be capable for providing below mentioned general parameters in memory

Meter Serial number
Firmware Version
Manufacture Name
Manufacture month (MM/YYYY)
Meter Type
Meter Class

		Meter Constant Meter Voltage Rating Meter Current Rating TOD profile showing timing and seasons # # if any additional key is required to see this value, it should be provided without any additional cost to TPNODL .
5.7.4	**Billing Parameters**	1) Meter serial number shall be recorded and communicated for all profiles of data 2) Cumulative Wh, VAh (lag only), VArh lead, lag and TOD1 Wh,TOD2 Wh,TOD3 Wh,TOD1 VAh (lag only),TOD2 VAh (lag only),,TOD3 VAh (lag only), For present and last 12 Resets (reset date for all resets/history, time zone register wise) 3) Maximum Demand Absolute Active Load and Absolute Apparent load and TOD1 kW,TOD2 kW,TOD3 kW,TOD1 kVA (lag only),TOD2 kVA (lag only),TOD3 kVA (lag only), for present and last 12 Resets (reset date for all resets/history, time zone register wise) along with date and time stamp. 4) Consumption (Reading date, Current Month & 12 History, time zone register wise) Wh and VAh 5) Billing Dates (12 History) 6) Cumulative Billing count 7) TOD details with day time and season wise. Cumulative energy parameters Wh, VAh (lag only), VArh lead, lag and TOD1 Wh,TOD2 Wh, TOD3 Wh, TOD1 VAh (lag only), TOD2 VAh (lag only) and TOD3 VAh (lag only). The meter shall be capable of measuring Cumulative Energy (Wh & VAh).
5.7.5	**Transactions**	All the changes in software of meter to be logged along with date & time stamp and readings indicating the particular parameter which has been programmed. Meter should do billing if any transaction is done.
5.7.6	**Tamper Events**	All events should be logged as per table no-1.The meter should not have any other event logging or any logic other than desired in specs. If any other logic is present then bidder has to disclose during tender and offering of lot and get approval for same. All other logics not mentioned in specs should be removed or disabled in meter firmware if not approved by TPNODL.
5.8	**Display units**	The display unit shall be Pin type built-in liquid crystal display (Permanently backlit type LCD). The LCD shall be of STN (Super Twisted Nematic) construction suitable for maximum temperature withstands 65˚C and minimum temperature withstands 0 ˚C during normal operating condition. The LCD display shall have a wide viewing angle of 120 degree. When the meter is not energized the electronic display need not be visible. The display shall not be affected by electrical, magnetic disturbances and ESD. The display should be readablein direct sunlight. **The back lit must be green in color for good visibility of digits in sunlight.**

		The Wh & VAh register shall have minimum 8 digits LCD display and size of the digits shall be minimum 10mmx5mm. Cumulative energy (Wh & VAh) shall be displayed withoutdecimal in auto scroll mode. (However decimal shall be available in push button mode for high resolution display for testing).
5.8.1	**Auto Scroll mode & Push-button mode**	Persistence time for each parameter shall be 10 second. Values followed by header shall be avoided. (I.e. if MD1 is displayed in Auto scroll mode, Header (MD1) and value (say 025.238 kW) shall be shown simultaneously; it shall not be shown in successive displays. Off time shall not be available in auto scroll mode between each cycle. Auto scroll mode is restored after 10 sec, if push button is not operated. Display should not be stuck for any tamper events. Following shall be continuously displayed in auto scroll and push button mode in the given order.

Display	Display 1	Display 2
Scroll Process	**Auto**	**Push**
LCD Check	1	1
Meter Sr. No	2	2
Date	3	3
Time	4	4
Cum. Wh	5	5
Cum. VAh	6	6
Cum. VARh (Lag)	7	7
Cum. VARh (Lead)	8	8
TOD Cum. Wh (T1,T2,T3)	9,10,11	9,10,11
TOD Cum. VAh (T1,T2,T3)	12,13,14	12,13,14
Current Month MD kW	15	15
Current Month MD kVA	16	16
Last Month (history 1) Wh	17	17
Last Month (history 1) VAh	18	18
Last Month (history 1) TOD Cum. Wh (T1,T2,T3)	19,20,21	19,20,21
Last Month (history 1) TOD Cum. VAh (T1,T2,T3)	22,23,24	22,23,24
Last Month (history 1) MD kW	25	25
Last Month (history 1) MD kVA	26	26
Last Month (history 1) Power Factor	27	27
Phase Voltages (Vr, Vy, Vb)	28,29,30	28,29,30
Phase Currents (Ir, Iy, Ib)	31,32,33	31,32,33
Inst. Active Power (kW)	34	34
Inst. Apparent Power (kVA)	35	35
Inst.Power Factor	36	36
Voltage Sequence (R-Y-B)	37	37

		Current Sequence (R-Y-B)	38	38	
		High Resolution Wh	-	39	
		High Resolution VAh	-	40	
		High Resolution VARh (Lag)	-	41	
		High Resolution VARh (Lead)	-	42	
		Magnetic Tamper count	-	43	
		Latest Magnetic tamper occurrence date	-	44	
		Latest Magnetic tamper occurrence Time	-	45	
		ESD Tamper count	-	46	
		Latest ESD tamper occurrence date	-	47	
		Latest ESD tamper occurrence time	-	48	
		TC Open tamper count	-	49	
		TC Open occurrence date of very first event	-	50	
		TC Open occurrence time of very first event	-	51	

5.9 Output Device

5.9.1 **Pulse Rate:** The meters shall have a suitable test output device. 2 nos of Red color blinking LED (marked as imp/Wh and imp/VArh) shall be provided in the front. This device shall be suitable for using with sensing probe used with test benches or reference standard meters. Meter constant shall be indelibly printed on the name plate as imp / Wh & imp/VArh. Meter constant shall be as per actual without multiplying factor.

5.9.2 Phase indication : Individual phases should be displayed on LCD display of meter and shall glow with minimum operating voltage (as defined in 4.05 of GTR)

6.0 NAME PLATE AND MARKING

Meters shall have a name plate clearly visible and effectively secured against removal. The name plate data should be laser printed. The base color of Name plate shall be blue (Pantone 2727C) indelibly and distinctly marked with all essential particulars as per relevant standards along with the following:

i. Manufacturer's name
ii. Type designation
iii. Number of phases and wires
iv. Serial number (Meter serial number shall be laser printed on name plate instead on sticker).
v. Month and Year of manufacture (MM/YYYY)
vi. Unit of measurement
vii. Reference voltage ,frequency
viii. Ref. temperature if different from 27 deg. C
ix. Rated basic and maximum Current
x. Meter constant (imp/Wh, imp/VArh)
xi. 'BIS' Mark
xii. Class index of meter
xiii. "Property of TPNODL, Balasore "
xiv. Purchase Order No. & date
xv. Guarantee period.
xvi. Rated frequency
xvii. Sign of double square

		xviii. Country of manufacture. xix. Firmware version for meter xx. Category However the following shall be printed in bar code on the meter nameplate (shall be laser printed on name plate instead of any sticker). All data shall be laser printed on meter along with Sr.NO and date of manufacturing. No sticker to be used to avoid loss of data in event of fire. Content Format for bar code: **TPNODL MMYY XXXXXXXX** (8-digit Serial no.). The PCB Serial number should be printed on the PCB instead of sticker.
7.0	**TESTS**	All routine, acceptance & type tests shall be carried out on the meter and meter body separately in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the TPNODL /his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted in addition to the tests specified in IS/IEC from CPRI/ERDA.
7.1	**TYPE TEST**	1) All type-tests defined in IS 14697 and IS 15959 (Part-1):2011 2) Test against abnormal magnetic influence as per CBIP TR 325. 3) Test for Material used for Terminal Block and meter body as per relevant standards. 4) IP test for IP 51 as per IS 60529 5) Bidder/BA must submit valid BIS license for manufacturing energy meters as per IS 14697 and IS 15959 (Part-1) with all requisite inclusions.
7.2	**ROUTINE TEST**	1) AC High Voltage test (Clause no. 12.7.6.3 of IS 14697) 2) Insulation test (Table 18 of Clause no. 12.7.6 of IS 14697) 3) Test on limits of error (Clause no. 11 of IS 14697) 4) Test of starting current (Clause no. 12.13 of IS 14697) 5) Test of no load condition (Clause no. 12.12 of IS 14697)
7.3	**ACCEPTANCE TEST**	1) AC High Voltage test (Clause no. 12.7.6.3 of IS 14697) 2) Insulation test (Table 18 of Clause no. 12.7.6 of IS 14697) 3) Test on limits of error (Clause no. 11 of IS 14697) with following loads:

120% Imax	Imax (10A)	Ib (5A)	0.1 Ib	0.02 Ib	0.05Ib	0.01Ib
UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF	UPF

4) Test of meter constant (Clause no. 12.14 of IS 14697)
5) Test of starting current (Clause no. 12.13 of IS 14697)
6) Test of no load condition (Clause no. 12.12 of IS 14697)
7) Test of repeatability of error (Clause no. 12.16 of IS 14697)
8) Test of power consumption (Clause no. 12.7.1 of IS 14697)
9) Test for Immunity against external influencing signal as per the TPNODL specification
10) Test for Immunity against DC Immunity as per the TPNODL specification
11) Test for Immunity against Tamper conditions as per the TPNODL specification
12) Error measurements with all abnormal condition along with ESD, magnet, jammer as per the TPNODL specification
13) Test to Influence of Harmonics (Table 13 of IS 14697)
14) Supply voltage and frequency variation test (Clause 11.2 & 12.10 of IS 14697)
15) Testing of self-diagnostic features (as per this technical specification)

		16) Tamper count increment and logging with date and time in meter database (as per this technical specification) 17) All tests as defined in IS 15959(Part-1):2011
7.4	**Special Test**	The bidder shall demonstrate the communication capability of the meter through communication modes as defined in the specification before conducting acceptance tests.
8.0	**TYPE TEST CERTIFICATE**	The bidder shall furnish the type test certificates of the meter for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ ERDA as per IS 14697 & IS 15959 (Part-1). For communication testing any national approved laboratory or international acclaimed lab or equivalent will also suffice at the discretion of TPNODL. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPNODL.
9.0	**PRE-DESPATCH INSPECTION**	Inspection may be made at any stage of manufacture at the discretion of the TPNODL of the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Equipment shall be subject to inspection by a duly authorized representative of the TPNODL. Bidder shall grant free access to the places of manufacture to TPNODL's representatives at all times when the work is in progress. Inspection by the TPNODL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPNODL. Following documents shall be sent along with material a) Test reports b) MDCC issued by TPNODL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warrantee card g) Delivery Challan h) Other Documents (as applicable) i) One no. leaflet with each meter Note-Photographs of packed lot clearly showing s.no of meters whose inspection call has been requested should be sent along with letter for inspection call. Two meters from the offered lot, if deemed necessary, shall be tested for all tampers at TPNODL laboratory for compliance to anti tamper feature before MDCC. The inspectors shall free to take any two meters from offered lot for testing at our Lab. Bidder should check and ensureeach meter and reset each meter for any event logged for any tamper.
10.0	**INSPECTION AFTER RECEIPT AT STORE**	The material received at TPNODL's store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection.

11.0	**GUARANTEE**	Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the TPNODL up to a period of at least 48 months from the date of commissioningor 60 months from the date of last supplies made under the contract whichever is earlier, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Company, failing which theTPNODL will be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the bidder or from the " Security cum Performance Deposit" as the case maybe. Bidder shall own responsibility for all internal component with an end to end agreement with individual component manufacturer.
12.0	**PACKING**	1. Bidder shall ensure that all material covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The material used for packing shall be environmentally friendly. Packing and transportation shall be as per IS 15707:206 clauses 9.1 and 9.2. 2. Individual meter should be packed in separate box. Routine test report (with manufacturing company logo) of the individual meter shall be kept inside each card board carton of the meter. 3. On back side of routine test certificate (RTC) the bidder shall print a picture of the meter with its small details like for consumer to know about meter or display parameters sheet. 4. The softcopy of the routine test certificate of each meter to be provided with each lot to TPNODL store. 5. The routine test certificate shall contain results & all tests of clause no. 7.2. 6. Bar code containing information of meter Sr. No should be pasted on the outer most box in which single / group of meters are transported.
13.0	**SAMPLE**	**Tendering stage:** Bidders are required to manufacture 03 numbers of sample meters as per the TPNODL specification (sealed, unsealed and open able base and cover to view/test theinner circuits) and submit the samples (non-returnable) along with bid for approval. These samples should be submitted at TPNODL store. **Pre-manufacturing approvals:** The successful bidder shall submit two prototype samples of 11kV HT Consumer meters at TPNODL store, for further testing and compliance as per specificationsand shall get approval before mass manufacturing. Further, for 33kV, 66kV & 220kV HT Consumer Meters, one sample may be asked for demonstration and compliance as per specifications, prior to the manufacturing approval. **Following accessories to be submitted along with sample at both the tendering stage & pre-manufacturing approvals stages:** 1) Detailed manual 2) Communication cords 3) Tamper logic sheet 4) Display parameter annunciator 5) BCS 6) Internal connection diagram.

14.0	**TRAINING**	Suitable training to be arranged for TPNODL representatives, for operationand handling of every software and hardware regarding communication between meter & MRI, without any cost implications towards TPNODL.
15.0	**QUALITY CONTROL**	The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. Quality should be ensured at the following stages: • At PCB manufacturing stage, each board shall be subjected to computerized bare board testing. • At insertion stage, all components should undergo computerized testing for conforming to design parameter and orientation. • Complete assembled and soldered PCB should undergo functional testing using Automatic Test Equipment (ATEs). • Prior to final testing and calibration, sample meters shall be subjected to aging test (i.e. meters will be kept in ovens for 24 hours at 55 Deg. C temperature and atmospheric humidity under real-life condition at its full load current. After 24 hours meter should work satisfactorily. TPNODL's engineer or its nominated representative shall have free access tothe bidder's/manufacturer's works to carry out inspections.
16.0	**MINIMUM TESTING FACILITIES**	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards. The bidder shall have duly calibrated Reference Standard meter of Class 0.1 accuracy or better.
17.0	**MANUFACTURING ACTIVITIES**	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer.
18.0	**SPARES, ACCESSORIES AND TOOLS**	1. Bidder to be provide free of cost 02 nos. of jig for retrieving data from memory of meter with every new design of meter in which previous jig supplied cannot be used. Jig should be such that NVM can be push fit on this jig and data can be retrieve from this NVM. 2. Five (5) nos. of optical cord against each 100 meter lot on pro-rata basis for retrieving the data of meter through optical port should be provided, if design of optical port is changed from those of previously supplied meters.
19.0	**DRAWINGS AND DOCUMENTS**	Following drawings & Documents shall be prepared based on TPNODL specifications and statutory requirements and shall be submitted with the bid: a) Completely filled-in Technical Parameters.b)General arrangement drawing of the meter c) Terminal Block dimensional drawing d) Mounting arrangement drawings. e) General description of the equipment and all components with makes and technical requirement f) Type Test Certificates g)Experience List

		After the award of the contract, soft copies of following drawings, documents, describing the equipment in detail shall be forwarded for approval: S. No. / Description / For Approval / For Review Information / Final Submission 1 / Technical Parameters / √ / / √ 2 / General Arrangement drawings / √ / / √ 3 / Terminal block Dimensional drawings / √ / / √ 4 / Mounting arrangement drawing. / √ / / √ 5 / Manual/Catalogues / / √ / 6 / Transport/ Shipping dimension drawing / / √ / √ 7 / QA &QC Plan / √ / √ / √ 8 / Routine, Acceptance and Type Test Certificates / √ / √ / √ **Bidder shall subsequently provide soft copy of all the drawings, GTP, data-sheet of dis-connector switch, data-sheet/ comparative analysis (of material of terminal block, terminal cover, terminal screw, meter body, meter base) and Test certificates for the final approval of TPNODL, before mass manufacturing. All the documents & drawings shall be in English language.**
20.0	**GUARANTEED TECHNICAL PARTICULARS**	Clause-wise compliance to this specification.
21.0	**SCHEDULE OF DEVIATIONS**	**(TO BE ENCLOSED WITH THE BID)** All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the TPNODL 's specifications: **S. No. / Clause No. / Details of deviation with justifications** We confirm that there are no deviations apart from those detailed above. Seal of the Company: Signature: Designation:

TATA POWER NORTHEN ODISHA DISTRIBUTION LIMITED				
ANNEXURE I: INSPECTION TEST PLAN FOR 3-PH HT CONSUMER ENERGY METER				
No extra test to be performed without approval and standard process of testing declared from QAG/PE				
Sr. No.	**Item Requirement**	**Characteristics**	**Acceptance Criteria**	
RAW MATERIAL INSPECTION				
1	Material for Meter Body	Physical Appearance	Smooth, Clean , free from welding marks on the body	
		Grade of Material	Unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II) withFV0 Fire Retardant, self - extinguishing, UV stabilize, recyclable and Anti oxidation properties	
		Flammability requirement	FV0	
		Materials		
		a) Base:	Opaque with polycarbonate LEXAN 500R or equivalent	
		b) Cover:	Transparent with polycarbonate LEXAN 143R/943A or equivalent	
		Thickness, Min.	2.0 mm	
2	Material for Terminals and Terminal Block, Terminal Cover	Physical Appearance	Smooth, Clean, free from grease.	
		Grade of Material	Terminal block and terminal cover shall be of a material which complies with the requirements of IS11731 (part 1) method FH1. The material of which the terminal block is made shall be capable of passing the Heat Deflection temperature test given in ISO 75 for temperature of 135°C and pressure of 1.8 MPa as mentioned in IS 14697. Tested as per ISO 75-2/A or ASTM D648	
		Materials		
		a) Terminal Block:	Opaque with polycarbonate LEXAN500R or equivalent	
		Depth of Terminal Hole (min.)	20 mm	
		Internal Diameter of Terminal Hole (min.)	5 mm	
		Clearance between adjacent terminals (min.)	10 mm	

		Arrangement	Meter terminal should have 10 terminals arrangement consisting of neutral and neutral S2 shorted inside the meter. All terminals should be in one row only. The terminals should have center to center distance of min. 11.5mm, 5.2.13 Pin configuration shall be R-Cin, R volt, R-Cout, Y-Cin, Y volt, Y-Cout, B-Cin, B-volt, B-Cout, Neutral	
		a) Terminal Cover:	Short type and Transparent with polycarbonate LEXAN 143R/943A or equivalent	
		Material withstand temperature for terminal block	135 Deg C	
		Material pressure withstand for terminal block	1.8 M Pa	
3	PCB	Glass epoxy, fire resistance grade, with minimum thickness 1.6 mm(The PCB Serial number should be printed on PCB instead of sticker).	-	
4	Battery	Lithium with guaranteed life of 15 years	-	
5	Microcontroller and RTC having separate battery	Accuracy shall be as per relevant IEC/IS standards, RTC shall be provided with separate battery in its ckt. The microcontroller should be of superior quality from reputed make with long life.	-	
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. It should be magnetic locking type.	-	
7	Memory chip/NVM	Chip should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges. Life of NVM shall be 15 years.	-	

8	Display modules	The display modules should be well protected from the external UV radiations. The display visibility should be sufficient to read the meter mounted between height of 0.5m and 2m. The construction of the modules should be such that the displayed quantity should not disturbed with the life of display. Should be with Green LED background. It should be trans-reflective STN type industrial grade with extended temperature range. Chip should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.Life of NVM shall be 15 years.	-	
9	Electronic components	The active and passive components should be of the surface mount type and are to handled and soldered by the state of art assembly processes.	-	
10	Mesurement/ computing chips	The Measurement/ computing chips used in the meter should be with the Surface mount type along with the ASICs.	-	
Acceptance Tests				
1	AC High Voltage test	The ac voltage test shall be carried out in accordance with Table 17 for acceptance test of new meters. For any subsequent test, the voltage applied shall be 80 percent of the test voltage indicated in Table 21	Clause no. 12.7.6.3 of IS 14697	IS 14697
2	Insulation test	The meter shall withstand the impulse voltage test and the ac voltage test as specified in Clause 12.7.6.4 of IS 14697 (Table 18).	Table 18 of Clause no. 12.7.6 of IS 14697	IS 14697
3	Test on limits of error as per Purchaser specification	The test shall be conducted as per Table 11 for Class 0.5.	Clause no. 11 of IS 14697	IS 14697
4	Test of meter constant	Relation between the test output and the indication in the display shall comply with the marking on the name plate.The requirement of Clause 11.5 shall be verified at one test point preferably at Imax UPF.	Clause no. 12.14 of IS 14697	IS 14697
5	Test of starting current	0.1% of Ib as per Table 15 of IS 14697	Clause no. 12.13 of IS 14697	IS 14697
6	Test of no load condition	For this test the current circuit must be open circuit and a voltage of 115 percent of the reference voltage shall be applied to the voltage circuits. The minimum test period shall be 20 times the actual test period of starting current, the maximum test period shall be limited to 200 min. During this test the test output of the meter shall not produce more than one output pulse/count.	Clause no. 12.12 of IS 14697	IS 14697

7	Test of Repeatability of error.	Repeatability of error at 5 percent Ib, and UPF load shall not exceed 0.25 for class 0.5S as measured by ht dispersion method.	Clause no. 12.16 of IS 14697	IS 14697
8	Test of power consumption.	The active and apparent power consumption in each voltage circuit of a meter at reference voltage reference temperature and reference frequency shall not exceed 1.5 W and 10 VA.	Clause no. 12.7.1 of IS 14697	IS 14697
9	Test for Immunity against external influencing signals as per TPNODL specification	-	-	
10	Test for Immunity against DC Immunity as per TPNODL specification	-	-	
11	Test for Immunity against Tamper conditions as per TPNODL specification	-	-	
12	Error measurements with all abnormal conditions along with ESD, Magnet, Jammer	-	-	
13	Test to Influence of Harmonics	Wave form: 10 percent of third harmonic in the current, at unity power factor, limit of variiation in percentage error shall be 0.1. The distortion factor of the voltage shall be less than lpercent. The variation in percentage error shall be measured under two conditions. The peak of third harmonic in the first measurement in phase and in the second easurement in antiphase of the peaks of the fundamental current. For polyphase meters, the voltage circuit shall be energized in parallel and the current circuit in series.	Table 13 of IS 14697	IS 14697
14	Supply voltage and frequency variation test	Voltage variation of ±10 percent, limit of variation in percentage error for meter at unity and 0.5 lagging shall be 0.7 and 1 respectively. For the voltage ranges-from -20 percent to -10 percent and +10 percent to + 20 percent the limits of variation in percentage error are three times the values. Frequency variation of ±5 percent, limit of variation in percentage error for meter at unity and 0.5 lagging shall be 0.2 respectively.	Clause 11.2 & 12.10 of IS 14697	IS 14697
15	Testing of self diagnostic features and tamper count increment and logging with date and time	The meter shall have logging with date and time in memory for un satisfactory / non-functioning of 1. Real Time Clock2. RTC battery 3. Non Volatile Memory	-	
16	Tamper Count Increment and logging with Time and Date in Meter	As per Approved GTP	-	

	Database, as per TPNODL specification			
17	All tests as defined in IS 15959 (Part-1):2011	All tests as defined in IS 15959(Part-1):2011	-	IS 15959 (Part-2):2016
18	Communication between Meter and MRI; MRI & BCS Software	The meter shall be compatible to communicate with GSM/GPRS/RF modems in DLMS protocol.	As per approved Cat-A GTP	IS16444 Part2
19	Meter Dimensions	HxWxT shall be specified in Cat A GTP, Drawing.. Height is from the base of the terminal block. Should conform with Cat-A GTP and Drawing.	Approved Cat-A GTP	Approved Cat-A GTP
20	Parameters in Meter, BCS	Any data which is pushed or pulled from meter must have Meter Serial number as one of the parameter, time sync with RTC and overwrites on drift threshhold. Clarity on event logged in memory and server time-stamps matching. Should conform to Clause 5.7 of Specification. Auto Scroll mode & Push-button mode to be checked as per Clause 5.8.1	-	
21	Marking	Following shall be printed in bar code on the meter nameplate. (Shall be laser printed on name plate instead of any sticker). Name plate and marking to be ensured as per Specifications	-	

TECHNICAL SPECIFICATION COVER SHEET

Document No: ENG-HV-78

Document Title: Specification for 3 Phase 4 wire HT NET Meter

Rev No	Remarks	Date	Prepared By		Reviewed By		Approved By		issued By	
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	TECHNICAL SPECIFICATION		
Document Title	Specification for 3P 4W HT NET Meter		
Document No.	ENG-HV-78		Eff. Date: 04.06.2015
Revision No.			
Prepared By Iqbal Alam	Reviewed By Manish Jain	Approved By D R Dharmadhikari	Issued By HC Sharma

1	Scope	The specification covers design, engineering, manufacture, assembly, inspection, testing at manufacturers' works before dispatch, supply of 3 phase 4 wire, Class 0.5 accuracy, and 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
2	Applicable Standards	IS 14697: 1999 for Class 0.5 and IS :13779:1999 for class 1.0 , IS 9000, IEC 687 for Class 0.5, IEC 62053-22, IEC 62056 and IEC 61036 for Class 1.0 with latest amendments and CBIP Technical Report No. 88 with latest amendments, draft CBIP Manual 2014 – No. 304.
3		Technical Specification
Parameters		Description
3.1	Voltage	63.5 V (P-N) with +20% to -40% Vref. and Vref =110V±1%
3.2	Basic current (Ib) and rated maximum current Imax	When Ib= 1A; Imax= 2A When Ib= 5A; Imax= 10A
3.3	Display	LCD, scrolling, **10 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 shall 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 Class 0. 5 and 0.2 % Ib for Class 1.0
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 (import and export), cumulative KVAH and KVARH (import and export), MD in KW and KVA (import and export), PF, V, I. b) Display order shall be as per Annexure-1
3.11	MD Registration	a) Meter shall store MD in every 30 min. period along with date & time with sliding window of 5 min. during 30 min interval). 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). c) MD reset button should be disabled.
3.12	Auto Reset of MD	Default auto reset date should be 00:00Hrs 1st day of month. 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 6 time zones (programmable on site through CMRI)- for both import and export mode Following are the default TODs:-

Initiator		HOG (Plant Engineering)	

		<table><tr><th>Register</th><th>TOD</th><th>April-Sep</th><th>Oct-Mar</th></tr><tr><td>1</td><td>Off peak</td><td>0000-0600</td><td>2300-0600</td></tr><tr><td>2</td><td>Normal</td><td>0600-1500</td><td>0600-1700</td></tr><tr><td>3</td><td>Peak</td><td>1500-2400</td><td>1700-2300</td></tr></table>
3.14	Load survey	15 parameters with 30 days, 30 IP Load survey parameters: 3 phase voltage (R,Y,B) 3 phase currents (R,Y,B) Active import Active export Active net Apparent import Apparent export Reactive import while active import Reactive import while active export Reactive export while active import Reactive export while active export
3.15	Time required for data reading from meter and downloading on desktop PC	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). 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 outside the terminal cover 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) Bidder 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 (with the updated versions). Reading can be done through scheduling in BCS or trough 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. e) Offered meter shall have open protocol. F) Bidder shall provide read and convert API on MIOS standard and also integrate

		communication with the TPDDL system.
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 - 60°C and humidity up to 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	**KVA shall be computed as Modulus of Active and reactive energy. However incase of capacitive Reactive energy, the KVA shall 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	**Constructional Feature**	
	Parameters	**Technical Requirements**
4.1	Body of Meter	a) Top transparent and base opaque material polycarbonate of LEXAN 143A 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 grade and shall form Integral part of the meter base, brass terminal inserts & MS screws. Internal diameter of terminal holes-5.5 mm (minimum), depth of terminal hole- 25 mm and clearance between adjacent terminal shall be 10 mm(minimum)
4.3	Terminal cover	Transparent terminal cover with provision of sealing through sealing screw. Terminal cover shall be of short type and shall be transparent with polycarbonate LEXAN 143R/943A or equivalent on prior approval from the Purchaser. Appropriate space shall be available for incoming /outgoing cables without damaging/stressing terminal cover (terminal cover design shall be as per the Purchaser approval). After sealing the cover, terminals shall not be accessible without breaking the seals.
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 & as specified by purchaser.
4.6	Meter Sealing	Reliable sealing arrangement shall be provided to make the meter tamper evident and to avoid fiddling or tampering by unauthorized persons. For this, one no. Polycarbonate seal and one no. Hologram seal shall be provided by the Purchaser. One no polycarbonate seal and two no. hologram seal shall be provided by the bidder. All the seals shall be fixed on meter body by the bidder at his works before dispatch. Two sealing provision shall be provided at meter terminal cover, such that terminal shall not be accessible without breaking the seals. Length of the seal wire should not be loose, that meter top cover should not be opened without cutting/breaking the seal wire. All the seals shall be provided on front side only and as per the Purchaser specification. Rear

		side sealing arrangement shall not be accepted. Bidder shall provide seals be as per CEA regulation (2006). Only patented seals to be used as per CEA requirements
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.
4.10	Protection against penetration of dust and water.	Degree of Protection: IP 51 as per IS 12063, but without suction in the meter.
5	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 indicated in tamper logic sheet. 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 programmable
5.3	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.
5.4	Snap shots	Meter shall log all three phase voltage, current, power factor at the time of tamper attempt for all such occurrences
5.5	External Magnetic tamper	Meter should log on the events of attempt of tampering by external magnetic field & should f unction as mentioned in the CBIP Technical report no. 88 with latest amendments.
5.6	Over Load	Meter shall record Over Load as an event, in terms of defined % threshold value of load (Programmable at factory)
5.7	Voltage High/Voltage Low	Meter shall record case of High Voltage/Low Voltage in terms of defined value Voltage Threshold (Vref.)
5.8	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
5.9	RTC Drift	For TOD tariff the proper RTC functioning shall be of prime importance. Software to adjust the RTC drifts to be provided along with BCS.
5.10	Protection against HV spark	Meter shall continue to record energy if it is disturbed using spark gun/ignition coil of strength upto 35 KV. Beyond which either meter should be immune or it should record an event (Occurrence and restoration) with date & time stamping as HV ESD. Reversal of reading is not accepted in any condition"
5.11	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.
5.12	Power off	Meter shall be capable to record On/Off event logging in case all the three phase are not available.
5.13	Abnormal voltage/ load	Meter shall record invalid voltage and if either the angle between two phases is beyond 120 +/- 10deg.
5.14	Top cover open	Tamper indication for top cover open shall not get reset on downloading the meter. Time of logging of cover open shall be the actual time of logging cover open (event snap shot shall be taken when meter is powered up again).
5.15	Wiring connection Display	Meter shall have connection check display parameter for this requirement and also meter shall have phase enunciators to indicate the availability of phases on display. However meter shall have phase association event to capture phase association error.
5.16	Abnormal and Temper Condition	Meter shall be capable of recording occurrence and restoration of abnormal events listed below along with date & time and snap shots of individual voltages, currents, power factors, active energy and apparent energy for export & import mode at the time of occurrence of abnormal event and restoration of normal supply. During abnormal and Tamper conditions, the current shall be recorded as active current and line current. Each such event shall be provided compartment wise as mentioned below due to the limitation of FIFO. Persistence time for occurrence and restoration for the events along with their threshold values shall be as per table given below.

Compartment No.	Description of event type	No. of Event Logged	Snapshot parameters : Phase Voltages, Currents (both phase and neutral), power factor phase wise, Frequency, Active & Apparent Energy for both export & Import mode.
1	PT Missing ,	50 50	Yes

	Voltage Unbalance, High Voltage,	25	
2	CT Open, CT Bypass, Over Current , Current Imbalance	50 50 25 25	Yes
3	Neutral Disturbance, Magnet , Low Power Factor HV ESD	25 25 25 25	Yes
4	Power on off	25	No
5	Cover Open	5	YES

Abnormal tampering conditions

S.No	Persistence time for occurrences	Persistence time for restoration	Threshold value for occurrence event.	Threshold value for restoration event.
1	PT Missing= 0 Hr 5 Min 0 sec	PT Missing= 0 Hr 5 Min 0 sec	Voltage <70% of Vref: and current > 2% Ib.	Voltage >80% of Vref: and current > 2% Ib.
2	Voltage Unbalance= 0 Hr 5 Min 0 sec	Voltage Unbalance= 0 Hr 5 Min 0 sec	20% or more between the phases and current > 2% Ib.	Shall be less than 10 % between the phases and current > 2% Ib.
3	CT Open= 0 Hr 5 Min 0 sec	CT Open= 0 Hr 5 Min 0 sec	Ir + Iy + Ib + In ≥ 10 % of Ibasic (vector	Ir + Iy + Ib + In <5 % of Ibasic. (vector

				Sum). AND Phase current < 1% of Ibasic with All current +ve.	Sum) AND Phase current > 10% of Ibasic with All current +ve.
		4	CT Bypass= 0 Hr 5 Min 0 sec	CT Bypass= 0 Hr 5 Min 0 sec	Ir + Iy + Ib + In ≥ 10 % of Ibasic. (vector Sum) AND Phase current > 10% of Ibasic with All current +ve.	(I1+I2+I3+IN) < 5% Ib (vector Sum) AND Phase current > 10% of Ibasic with All current +ve.
		5	Current unbalance= 0 Hr 15 Min 0 sec	Current unbalance= 0 Hr 15 Min 0 sec	> 30% difference between the phase	< 20% difference between the phase
		6	Overload current = 0 Hr 5 Min 0 sec	Overload current= 0 Hr 5 Min 0 sec	>125% of I-Max	<110% of I-Max
		7	Neutral Disturbance = 0 Hr 2 Min 00 sec	Neutral Disturbance= 0 Hr 2 Min 00 sec	Voltage >145% of Vref ,Current >2% Ib OR freq <47 Hz OR Freq>52 OR DC Voltage/signal injection	Voltage < 110% of Vref ,Current >2% Ib AND Freq>47 Hz OR Freq<52
		8	Magnet= 0 Hr 2Min 00 sec	Magnet= 0 Hr 2Min 00 sec	> 0.5 Tesla (permanent magnet) Or DC magnetic induction:>0.27 Tesla or AC Magnetic induction >0.2	< 0.5 Tesla (permanent magnet) DC magnetic induction: <0.20 Tesla AC Magnetic induction <0.15 Tesla

					Tesla	
		9	Power On Off= 0 Hr 5 Min 0 sec	Power On Off= 0 Hr 5 Min 0 sec		

6 COMPONENT SPECIFICATIONS

Function	Component	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 clauses under 5.2.h	The current transformer should withstand for the clauses under 5.2.h
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: Analog 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 Ever light Korea: Advantech China: Success 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	USA: National Semiconductors, HP, Optonica,ST, Holland / Korea: Phillips Ever light Japan: Hitachi

		communicate with various modems for AMR)	Taiwan: Ligitek 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 Ever light Japan: Hitachi, Taiwan: Ligitek
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, Tekcell
6.11	RTC & Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Philips, Dallas Atmel, Motorola, Microchip Built into microcontroller Japan: NEC or Oki
6.12	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	
7	GENERAL REQUIREMENTS		
7.1	On the meter nameplate	Meter name plate parameters should be laser print and inside the top cover. Meters shall have a name plate clearly visible and effectively secured against removal. Indelibly and distinctly marked with all essential particulars as per relevant standards along with the following. i. Manufacturer's name ii. Type designation iii. Number of phases and wires iv. Meter Serial number v. Month and Year of manufacture vi. Unit of measurement vii. Reference voltage , viii. Frequency	

		ix. Ref. temperature if different from 27 deg. C x. Rated basic and maximum Current xi. Meter constant (imp/kWh) xii. 'BIS' Mark xiii. Class index of meter xiv. "Property of TPDDL" xv. Purchase Order No. & date xvi. Guarantee period. xvii. Sign of double square xviii. Country of manufacture. However the following shall be printed in bar code on the meter nameplate.(shall be printed on name plate instead on sticker). i. Manufacturer's code No.(given by TPDDL) ii. Meter Sr. No (printed inside the meter Top cover) iii. TPDDL Property iv. Month/Year of manufacture.
7.2		Bidder shall supply software suitable for energy measurement & energy spot billing through CMRI. Meter Sr. Nos. should be printed in black on the name plate. (printed inside the meter Top cover) Meter shall be sealed as per CEA guideline. Terminal cover should be fixed on Meter before dispatch. Box number, Meter serial number, type, rating should be mentioned on cases / cartons. Meters shall be suitably packed with environmental friendly material in order to avoid damage or disturbance during transit or handling and to prevent in grace of moisture and dust. Identification for different types of meters shall be provided on the name plate. For eg. NET METERING
8	ANNEXURE 1: DISPLAY SEQUENCE FOR THE PARAMETERS	
8.1	**Default Display**: Auto scroll mode, Scroll time 10 Sec. i. All Segment on display ii. Date iii. Real Time iv. Mete Serial No v. Cumulative Active import energy vi. Cumulative Active export energy vii. Cumulative Active net energy viii. Cumulative Apparent import Energy	

	ix. Cumulative Apparent export Energy x. Maximum demand in Active import xi. Maximum demand in Active export xii. Cumulative Reactive import while active import energy xiii. Cumulative Reactive import while active export energy xiv. Cumulative Reactive export while active import energy xv. Cumulative Reactive export while active export energy xvi. Instantaneous Average Power Factor xvii. Maximum Demand in Apparent import while Active import xviii. Maximum Demand in Apparent import while Active export xix. TOD Active energy import (Reg.1 to Reg.3) xx. TOD Active energy export (Reg.1 to Reg.3) xxi. TOD Apparent energy while Active import (Reg.1 to Reg.3) xxii. TOD Apparent energy while Active export (Reg.1 to Reg.3) xxiii. TOD Reactive import while active import energy (Reg.1 to Reg.3) xxiv. TOD Reactive import while active export energy (Reg.1 to Reg.3) xxv. TOD Reactive export while active import energy (Reg.1 to Reg.3) xxvi. TOD Reactive export while active export energy (Reg.1 to Reg.3) xxvii. Phase To Neutral Voltage R xxviii. Phase To Neutral Voltage Y xxix. Phase To Neutral Voltage B xxx. R Phase Line Current xxxi. Y Phase Line Current xxxii. B Phase Line Current xxxiii. Neutral Current xxxiv. History 1 Active import energy xxxv. History 1 Active export energy xxxvi. History 1 Reactive import while active import energy xxxvii. History 1 Reactive import while active export energy xxxviii. History 1 Reactive export while active import energy xxxix. History 1 Reactive export while active export energy xl. History 1 Apparent import Energy xli. History 1 Apparent export Energy xlii. History 1 Maximum demand in Active import xliii. History 1 Maximum demand in Active import Occurrence Time and Date xliv. History 1 Maximum demand in Active export xlv. History 1 Maximum demand in Active export Occurrence Time and Date xlvi. History 1 Maximum Demand in Apparent while Active import xlvii. History 1 Maximum demand in Apparent while Active import Occurrence Time and Date xlviii. History 1 Maximum Demand in Apparent while Active export xlix. History 1 Maximum demand in Apparent while Active export Occurrence Time and Date **History 1 TOD register reading of active, apparent and reactive of import and export mode shall be displayed in auto display.**
8.2	**<u>On-demand Display:</u>** (pushbutton the following parameters should be displayed) a. All Segment on display b. Date c. Real Time

d. Meter serial no.
e. Cumulative Active import energy
f. Cumulative Active export energy
g. Cumulative Active net energy
h. Cumulative Apparent import Energy
i. Cumulative Apparent export Energy
j. Maximum demand in Active import
k. Maximum demand in Active export
l. Cumulative Reactive import while active import energy
m. Cumulative Reactive import while active export energy
n. Cumulative Reactive export while active import energy
o. Cumulative Reactive export while active export energy
p. Instantaneous Average Power Factor
q. Maximum Demand in Apparent while Active import
r. Maximum Demand in Apparent while Active export
s. TOD Active energy import (Reg.1 to Reg.3)
t. TOD Active energy export (Reg.1 to Reg.3)
u. TOD Apparent energy while Active import (Reg.1 to Reg.3)
v. TOD Apparent energy while Active export (Reg.1 to Reg.3)
w. TOD Reactive import while active import energy (Reg.1 to Reg.3)
x. TOD Reactive import while active export energy (Reg.1 to Reg.3)
y. TOD Reactive export while active import energy (Reg.1 to Reg.3)
z. TOD Reactive export while active export energy (Reg.1 to Reg.3)
aa. Phase To Neutral Voltage R
bb. Phase To Neutral Voltage Y
cc. Phase To Neutral Voltage B
dd. R Phase Line Current
ee. Y Phase Line Current
ff. B Phase Line Current
gg. Neutral Current
hh. History 1 Active import energy
ii. History 1 Active export energy
a. History 1 Reactive import while active import energy
b. History 1 Reactive import while active export energy
c. History 1 Reactive export while active import energy
d. History 1 Reactive export while active export energy
jj. History 1 Apparent import Energy
kk. History 1 Apparent export Energy
ll. History 1 Maximum demand in Active import
mm. History 1 Maximum demand in Active import Occurrence Time and Date
nn. History 1 Maximum demand in Active export
oo. History 1 Maximum demand in Active export Occurrence Time and Date
pp. History 1 Maximum Demand in Apparent while Active import
qq. History 1 Maximum demand in Apparent while Active import Occurrence Time and Date
rr. History 1 Maximum Demand in Apparent while Active export
ss. History 1 Maximum demand in Apparent while Active export Occurrence Time and Date
tt. Cumulative Tamper Count
uu. Present PT Status

	vv. Present CT Status ww. Present Others Status xx. Last Occurrence Tamper ID yy. Date of Last Tamper Occurrence zz. Time of Last Tamper Occurrence aaa. Last Restoration Tamper ID bbb. Date of Last Tamper Restoration ccc. Time of Last Tamper Restoration ddd. Front Cover Open Count eee. Last Cover open date fff. Last Cover open time ggg. Meter Serial Number BIS hhh. Program Name iii. SML Tariff Name jjj. Supply Frequency kkk. R Phase Power Factor Q1 lll. Y Phase Power Factor Q2 mmm. B Phase Power Factor Q3 nnn. Instantaneous Load Active ooo. Instantaneous Load Reactive ppp. Instantaneous Load Apparent qqq. MD Reset Time and Date rrr. MD Reset Or Bill Count sss. Cumulative power off duration ttt. Number of Power-Failures uuu. High Resolution Cumulative Active import energy vvv. High Resolution Cumulative Active export energy www. High Resolution Cumulative Active net energy xxx. High Resolution Cumulative Reactive import while active import energy yyy. High Resolution Cumulative Reactive import while active export energy zzz. High Resolution Cumulative Reactive export while active import energy aaaa. High Resolution Cumulative Reactive export while active export energy bbbb. High Resolution Cumulative Apparent import Energy cccc. High Resolution Cumulative Apparent export Energy dddd. Phase Sequence eeee. Battery Status ffff. Self Diagnostic Flags gggg. Connection Check Note: The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated approx. more than 10 seconds. Provision for scroll lock by pressing for approx 5 sec and sent to normal after by same action or after mid night cross over.
9	Test	All routine, acceptance & type tests shall be carried out on the meter and meter body separately in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily

conducted in addition to the tests specified in IS/IEC

1. **Routine Test**
   - i. AC High Voltage test
   - ii. Insulation test
   - iii. Test on limits of error
   - iv. Test of starting current
   - v. Test of no load condition

2. **Acceptance test:**
   - i. AC High Voltage test
   - ii. Insulation test
   - iii. Test on limits of error with following loads

120% I max(120A)	I max (100A)	Ib(20A)	0.5 Ib (10A)	0.1Ib (2A)	0.05Ib (1A)
UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 Lead and 0.5 lag	UPF

   - i. Test of meter constant
   - ii. Test of starting current
   - iii. Test of no load condition
   - iv. Test of repeatability of error.

Test of power consumption

3. **Type test:**
   - i. All tests as defined in IS 13779:1999.
   - ii. Test against abnormal magnetic influence as per CBIP TR 88.
   - iii. DC immunity test (injection both on phase and neutral terminal)
   - iv. Test for Material used for Terminal Block and meter body as per relevant standards.

4. **Special test:**

The bidder shall demonstrate the communication capability of the meter through communication modes as defined in the specification before conducting acceptance tests. The bidder shall ensure that API (Application protocol interface) is compatible with TPDDL CFW. Special test are as below:

- i. Test for Immunity against external influencing signal as per the Purchaser specification
- ii. Test for Immunity against DC Immunity as per the Purchaser specification
- iii. Test for Immunity against Tamper conditions as per the Purchaser specification.
- iv. Error measurements with all abnormal conditions
- v. Test to Influence of Harmonics
- vi. Supply voltage and frequency variation test
- vii. Testing of self-diagnostic features and tamper count increment and logging

		with date and time.
10	Type Test Certificate	The bidder shall furnish the type test certificates of the meter for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA as per the relevant standards. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPDDL
11	**PRE-DISPATCH INSPECTION**	The successful bidder shall submit two prototype samples for further testing and compliance as per specifications and getting approval before mass manufacturing. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection Equipment shall be subject to inspection by a duly authorized representative of the Purchaser. Bidder shall grant free access to the places of manufacture to TPDDL representatives at all times when the work is in progress. Inspection by the TPDDL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPDDL. Following documents shall be sent along with material a) Test reports b) MDCC issued by TPDDL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warrantee card g) Delivery Challan Other Documents (as applicable)
12	Inspection After Receipt at Store	The material received at Purchaser's store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department. The successful bidder shall submit two extra boxes (unpaid) per lot delivered, with serial nos. in continuation to the lot (lot size shall be 2,000 numbers or as defined in the order) to the Purchaser for further testing and confirmation in line with the specifications and the material shall be liable for rejection, if test results are found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department.
13	Guarantee	Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the purchaser up to a period of at least 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract whichever is earlier, Bidder shall be liable to undertake to replace/rectify such defects

		at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Company, failing which the purchaser will be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the bidder or from the " Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement at site' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the purchaser.
14	Packing	Bidder shall ensure that all material covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The material used for packing shall be environmentally friendly. Packing and transportation shall be as per IS 15707:206 clauses 9.1 and 9.2. Routine test report of the individual meter shall be kept inside each card board carton of the meter
15	Tender Sample	Bidders are required to manufacture 3 sample meters as per NDPL specification (sealed, unsealed and openable base and cover to view/test the inner circuits) and submit the sample along with bid to Purchaser for approval.
16	Quality Control	The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. Quality should be ensured at the following stages: • At PCB manufacturing stage, each board shall be subjected to computerized bare board testing. • At insertion stage, all components should under go computerized testing for conforming to design parameter and orientation. • Complete assembled and soldered PCB should under go functional testing using Automatic Test Equipment (ATEs). • Prior to final testing and calibration, sample meters shall be subjected to ageing test (i.e. meters are kept in ovens for 24 hours at 55 Deg.C temperature and atmospheric humidity under real-life condition at its full load current. After 24 hours meter should work satisfactorily) The Purchaser's engineer or its nominated representative shall have free access to the bidder's/manufacturer's works to carry out inspections.
17	Minimum Testing Facility	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards. The bidder shall have duly calibrated Reference Standard meter of Class 0.05 accuracy.
18	Manufacturing Activities	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line

		with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.
19	Drawing	Following drawings & Documents shall be prepared based on TPDDL specifications and statutory requirements and shall be submitted with the bid: a) Completely filled-in Technical Parameters. b) General arrangement drawing of the meter c) Terminal Block dimensional drawing d) Mounting arrangement drawings. e) General description of the equipment and all components with makes and technical requirement f) Type Test Certificates g) Experience List h) Manufacturing schedule and test schedule After the award of the contract, four (4) copies of following drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings	√		√
3	Terminal block Dimensional drawings	√		√
4	Mounting arrangement drawing.	√		√
5	Manual/Catalogues		√	
6	Transport/ Shipping dimension drawing		√	√
7	QA &QC Plan	√	√	√
8	Routine, Acceptance and Type Test Certificates	√	√	√

Bidder shall subsequently provide Four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, Test certificates shall be submitted final approval of the same to purchaser.

		All the documents & drawings shall be in English language.Instruction Manuals: Bidder shall furnish two softcopies (CD) and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices

20	GUARANTEED TECHNICAL PARTICULARS		
	Description	**Units**	**As Furnished by Bidder**
1	Type of meter		
2	Accuracy Class of the meter		
3	Ib & Imax	A	
4	Operating Voltage	V	
5	Operating Frequency	*Hz*	
6	Power Consumption and Burden		
7	Starting Current	mA	
8	Short time over current	A	
9	Influence of heating		
10	Rated impulse withstand voltage	KV	
11	AC withstand Voltage for 1 min	KV	
12	Insulation resistance a) Between frame & Current, voltage circuits connected together: b) Between each current (or voltage circuit) & each and every other circuit.	M ohm	
13	Mechanical requirement as per IS 13779		
14	Resistance to heat and fire (As per specification)		
15	Degree of protection		
16	Resistance against climatic influence (as per IS 13779)		
17	Electromagnetic Compatibility (EMC) as per CBIP Technical report no 88(latest amendment		
18	Accuracy requirements (As per IS 13779		

19	Power factor range		
20	Energy measurement		
21	Connection Diagram for system on terminal cover	Yes/No	
22	Self diagnostic feature		
23	Initial start up of meter (meter shall be fully functional within 5 sec after reference voltage is applied to the meter terminals)		
24	Terminal block		
	a) Depth of the Terminal holes	Mm	
	b) Internal diameter of terminal holes	Mm	
	c) Clearance between adjacent terminals	Mm	
25	Communication capabilities As per specs		
26	Immunity against abnormal Magnetic influence, as defined in specifications		
27	Immunity against HV ESD as defined in specs		
28	DC Immunity as defined in Specifications		
29	Grade of material for a) Meter base b) Meter cover c) Terminal block d) Terminal cover		
30	Tamper counts		
31	Recording energy in all conditions as per given in specifications	Yes/No	
32	Makes of all components used in the meter.	Yes/No	
33	Non Volatile memory (Retention period)		
34	Measuring elements used in the meter		
35	Power supply to circuit in case		

	of supply failure		
36	Display of measured values (As per specification)	Yes/No	
37	LCD display (Type and viewing angle)		
38	Pulse rate	Imp/kWh, Imp/kVArh	
39	Name plate marking	Yes/No	
40	Routine test certificates	Yes/No	
41	Acceptance test certificates	Yes/No	
42	Type test certificates	Yes/No	
43	Guarantee certificates	Yes/No	
21	SCHEDULES OF DEVIATIONS	The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless **specifically** mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.	

(TO BE ENCLOSED WITH THE BID)

All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications

S.No.	Clause No.	Details of deviation with justifications

TATAPOWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Specification for 3P 4W HT NET Meter**		
Document No.	**ENG-HV-78**		**Eff. Date: 04.06.2015**
Revision No.			
Prepared By Iqbal Alam	Reviewed By Manish Jain	Approved By D R Dharmadhikari	Issued By HC Sharma

Initiator		HOG (Plant Engineering)	

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
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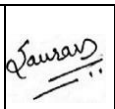
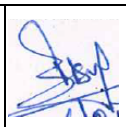
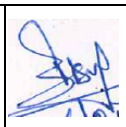
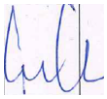
TECHNICAL SPECIFICATION COVER SHEET

Document No: ENG-HV-2014

Document Title: TECHNICAL SPECIFICATION FOR HT CONSUMER ENERGY METER

00	As per periodic revision ENG-HV-2104	01-05-2020	2021ED 5545	SC		BND		BND		PV	
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00	Issued for tender purpose PEC-GEN-72	16-08-2008	-	ARK/ SPN	-sd-	----------	----------	HoG (PE&C)	-sd-	HoD (TS&P)	-sd-
Rev No.	**Remarks**	**Date**	**ERM No.**	**Initials**	**Sign**	**Initials**	**Sign**	**Initials**	**Sign**	**Initials**	**Sign**
				Prepared By		**Reviewed By**		**Approved By**		**Issued By**	

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TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 1 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

CONTENTS

TATA POWER-DDL	**TATA POWER DELHI DISTRIBUTION LIMITED, DELHI**		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 2 of 24**
Prepared By: Saurav Chandel	**Reviewed By:** Brajanath Dey	**Approved By:** Brajanath Dey	**Issued By:** Parveen Verma

1 SCOPE

This specification covers the technical requirements of design, manufacturing, testing at meter manufacturer's works ,packing, forwarding, supply and unloading at store/site of three phase four Wire, HT (CT and VT operated) operated AC static meters of accuracy class 0.5s & 0.2s (here after referred as meters) complete with all accessories for efficient and trouble free operation.

It is not the intent to specify completely herein all the details of tech design and construction of material. However, the material shall conform in all respects to high standards of engineering, design and workmanship and shall be capable of performing in continuous commercial operation in manner acceptable to the TATA POWER - DDL, who will interpret the meanings of drawings and specification and shall have the power to reject any work or material which, in his judgment is not in accordance therewith. The offered material shall be complete with all components necessary for their effective and trouble free operation. Such components shall be deemed to be within the scope of Bidder's supply irrespective of whether those are specifically brought out in this specification and/or the commercial order or not.

2 APPLICABLE STANDARDS

The equipment covered by this specification shall conform to the requirements stated in latest editions & amendments of relevant Indian/ IEC Standards and shall conform to the regulations of local statutory authorities.

a.	IS 14697	A.C. Static Transformer operated watt hour and VAR-hour meters, class 0.2s, 0.5s & 1.0s
b.	IS 15959 (Part 1) : 2011	Data exchange for electricity meter reading, tariff and load control
c.	IS 9000	Basic Environmental testing procedure for electrical and electronic items.
d.	IS 12346: 1999	Testing Equipment For Ac Electrical Energy Meters
e.	IS 11000	Fire Hazard Testing
f.	IEC 62052: 2003 Part 11	Electricity metering equipment (AC) - General requirements , tests and test conditions – metering equipment
g.	IEC 62053 Part 22: 2003	Electricity metering equipment (a.c.) - Particular Requirements - Part 22: Static meters for active energy (classes 0.2s and 0.5s)
h.	IS 15707: 2006	Testing Evaluation installation and maintenance of AC Electricity Meters- Code of practice.
i.	IEC 60068	Environmental testing.
j.	CBIP–TR No.325	Specification for A.C. Static Electrical Energy Meters (latest amendment)
k.	CEA Regulation (2019)	Installation and operation of meters
l.	IS 60529	Degree of protection provided by enclosure
m.	IEC 62056-61	Electricity metering- Object Identification system (OBIS)
n.	ASTM D648	Standard Test Method for Deflection Temperature of Plastics Under Flexural Load in the Edgewise Position
o.	IS 11731-1	Methods of test for determination of the flammability of solid electrical insulating materials when exposed to an igniting source, Part 1: Horizontal specimen method

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
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Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 3 of 24**
Prepared By: Saurav Chandel	**Reviewed By:** Brajanath Dey	**Approved By:** Brajanath Dey	**Issued By:** Parveen Verma

		p.	IS 11731-2	Methods of Test for Determination of Flammability of Solid Electrical Insulating Materials When Exposed to An Igniting Source, Part 2: Vertical Specimen Method
		q.	ISO 75 Part 1&2	Determination of temperature of deflection under load

3 CLIMATE CONDITIONS OF THE INSTALLATION

a) Max. Ambient Temperature : 50 deg.C
b) Max. Daily average ambient temp. : 40 deg.C
c) Min Ambient Temp : 0 deg C
d) Maximum Humidity : 95%
e) Minimum Humidity : 10%
f) Average No. of thunderstorm days per annum : 50
g) Maximum Annual Rainfall : 750 mm
h) Average No. of rainy days per annum : 60
i) Rainy months : June to Oct.
j) Altitude above MSL not exceeding : 300 meters
k) Wind Pressure : 126 kg/sq m up to an elevation at 10 m.

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1 g

4 GENERAL TECHNICAL REQUIREMNTS

S.No	DESCRIPTION	REQUIREMENT
4.01	Type of the meter	Three Phase Four Wire, AC Static Current Transformer (CT) and Voltage Transformer (VT) operated Watthour and Var-hour Energy Meter. It consists of measuring elements(s), time of use of register(s) and display and plug in type bi-directional communication module all integral within the meter housing. The meter design shall be such that only CT MF is required energy calculation.
4.02	Accuracy Class of the meter	1. Active Energy Measurement, a. For 11kV - 0.5s b. For 33kV, 66kV and 220kV - 0.2s 2. Reactive Energy Measurement, a. For 11kV - 1 or better b. For 33kV, 66kV and 220kV - 0.5s or better
4.03	Basic Current (Ib) & rated Maximum current (Imax)	a. For 11kV – Ib = 5A; Imax= 10 Amps (Balanced and Unbalanced Load) b. For 33/66kV/220kV – Ib shall be either 5A or 1A (shall be defined in tender) When Ib= 1A; Imax= 2 Amps (Balanced and Unbalanced Load)
4.04	Reference Conditions for testing the performance of the meter	Vref = 110 V ± 1 % (phase to phase) = 63.5 V ± 1 % (phase to neutral) Frequency = 50Hz ± 0.3% Temperature= 27^0C ± 2^0C
4.05	Operating Voltage	Meter shall be operational with required accuracy from 0.6 Vref to 1.2 Vref. However meter shall withstand the maximum system Voltage of 110V between phase and neutral (for minimum 5 min).

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		4.06	Operating Frequency	50 Hz± 5%.
		4.07	Power Consumption	Voltage circuit: Maximum 5W and 15 VA Current Circuit :Maximum 4VA
		4.08	Starting Current	0.1% of Ib – (5mA for Ib 5A)
		4.09	Short time over Current	20 Imax for 0.5sec (200 A for Ib-5A)
		4.10	Influence of heating	Temperature rise at any point of the external surface of the meter shall not exceed by more than 20K with an ambient temperature at 45^0 C.
		4.11	Rated Impulse Withstand Voltage	6 kV (shall be applied ten times with one polarity and then repeated with the other polarity and minimum time between each impulse to be 3 sec)
		4.12	AC withstand Voltage for 1 min	4 kV
		4.13	Minimum Insulation resistance at test voltage 500+/- 50 V DC a)Between frame & current ,voltage circuits as well as auxiliary circuits connected together: b)Between each current (or voltage circuit) & each and every other circuit:	a) 5 M ohm b) 50 M ohm.
		4.14	Mechanical requirements	Meter shall be in compliance with clause 12.3 of IS 14697
		4.15	Resistance to heat and fire	The terminal block and Meter case shall ensure safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them as per clause 6.8 of IS 14697 fire retardant material shall be used.
		4.16	Protection against penetration of dust and water.	Degree of protection: IP 51 as per IS 12063/60529, but Without suction in the meter. Meter shall comply with clause 6.9 and 12.5 of IS 14697
		4.17	Resistance against Climatic influence.	Meter shall be in compliance with clause 12.6 of IS 14697.
		4.18	Electromagnetic Compatibility (EMC)	Meter shall be in compliance with clause CBIP report 325 and IS
		4.19	Accuracy requirements	Meter shall be in compliance with clause 11 of IS 14697

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 5 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

		4.20	Power factor range	Zero lag to Zero lead. Meter shall be programed at default 'lag only configuration i.e. Lead to be treated as unity for kVA & KVAh calculations'
		4.21	Energy measurement	Fundamental energy +Energy due to Harmonics
		4.22	Connection Diagram	The connection diagram for the system shall be provided on terminal cover.
		4.23	Self-Diagnostic feature	The meter shall have logging with date and time in memory for un satisfactory / non-functioning of 1. Real Time Clock 2. RTC battery 3. Non Volatile Memory
		4.24	Initial start-up of meter	Meter shall be fully functional within 5 sec after reference voltage is applied to the meter terminals (as per clause 11.4.1 of IS 14697).
		4.25	Alternate mode of supply to the meters	In case of meter power failure, reading/data should be retrieved with the help of battery or other power source.
		4.26	Internal diameter of the terminal holes Depth of the terminal holes	5 mm (minimum) 20 mm (minimum)
		4.27	Clearance between adjacent terminals	10 mm (minimum)
		4.28	Display	Backlit LCD, Scrolling, 10 seconds for each parameter minimum 8 digits for reading LCD display
		4.29	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication etc.
		4.30	Software and communication compatibility	The bidder shall supply software required for communication through MRI and BCS software including required training to use the software free of cost. The meter shall be compatible to communicate with GSM/GPRS/RF modems in DLMS protocol.
		4.31	Calibration	Meters shall be software calibrated at factory and modifications in calibration shall not be possible at site by any means. However parameters like RTC, TOD slots, DIP (billing & load survey), billing date, display parameters etc. shall be reconfigure through MRI with proper security level. Any software/keys required to reprogram the meter or/and any other support will be provided without any additional cost to TATA POWER - DDL till the useful life of the meters.
		4.32	Usage Application	Indoor

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 6 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

		4.33	Ultrasonic welding	Meter cover and body should be continuous and seamless ultrasonically welded with an overlapping of 5 mm (min.).
		4.34	Harmonics recording	The meter should record the current and voltage THD. The meter should record harmonics up to 20th harmonic Average THD of all phase for voltage THD and current THD. THD values shall have 30/15 minutes (as applicable) integration period in load survey. Accuracy of harmonics recording shall be as per meter accuracy class. The meter shall generate a flag whenever the threshold (user configurable) of the 5% THD of the load current and voltage is breached.
		4.35	Terminal arrangement	The terminal pin shall be 10 terminal arrangement with phase voltage terminal in between current terminals as mentioned in clause no. 5.2.11
4.1	**COMMUNICATION CAPABILITIES AND SOFTWARE FEASIBILITIES**	4.1.1	The meter shall have facilities for data transfer locally through MRI (Using optical port/RJ11/RF modems) and remotely using optical port/RJ11 port via GSM/GPRS/RF modems with proper security through optically isolated ports through serial communication.	
		4.1.2	Meter should have additional RJ11/ RJ45 port to communicate with GSM/GPRS/RF modems.	
		4.1.3	Optical Communication port shall be available for communication. Communication ports shall not be affected by any type of injection /unauthenticated signals and having proper sealing arrangement.	
		4.1.4	The XML files of downloaded data of the meters will be as per MIOS standards.	
		4.1.5	The bidder shall supply software required for local (MRI/Laptop) & remote (AMI) connectivity including required training to use the software free of cost. Bidder shall provide the communication protocol / APIs as per MIOS standards for communication with meter through local (MRI) / BCS as and when required by TATA POWER-DDL free of cost during life time of meter. The bidder should provide DLMS compliance for Communication with the meter through Optical port. Bidder should also provide protocol / API for hosting in smart modem using GPRS / RF technology for capturing full data / partial data from the meter and sending it to server / HES OTA.	
		4.1.6	Bidder should also provide software for changing firmware of meters in mass. Any software / keys required to reprogram the meter and any other support for enabling TATA POWER-DDL to execute this option will be provided without any additional cost to TATA POWER-DDL.	
		4.1.7	Bidder should also provide base computer software (BCS) for viewing the data downloaded through MRI/laptop/HHU in separate PC/laptop. Android based or windows based HHU shall be preferred. API required for converting raw file to XML (DLMS) should also be provided if applicable.	
		4.1.8	Communication of the meter at optical port should be as per IS 15959 (Part-1): 2011.	

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 7 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

		4.1.9	Bidders to supply protocol to read the meters supplied against this tender using intelligent RF / GPRS / GSM modem with store and forward feature without any additional cost implication. Bidders to provide API on MIOS standard to convert the meter data in to XML and read API for hosting in Server and Modem RF / GSM / GPRS based for reading meters from any third party manufactured modems. Bidder to provide necessary support if required during integration of the RF modem with supplied meters against this tender.
4.2	**Immunity against external influencing signals**	**4.2.1 Magnetic Field:**	Meter shall record accurate energy in case of any external influencing signals in line with IS 14697:1999 Cl.11.2 and variation in limits of error (upto 100% Imax) shall be as per the table 13 of IS 14697. Meter shall be immune to any magnetic field such that it shall not affect the normal overall functionality However, in case of abnormal magnetic field as defined below meter shall perform as per the following actions: a. Meter shall log the event in its memory as" Magnet" with date and time stamp along with snapshot and the event logging threshold values as per table no. 1 in 4.4 b. The energy recording to shift on I max, Vref. with UPF. **Abnormal Magnetic field is defined as below:** a. Continuous DC magnetic induction: **>**0.20 Tesla ± 5% (Value of the magneto motive force to be applied shall be generally >10000 AT. b. AC magnetic induction: **>**10 milli Tesla (if produced with circular metal core with square cross section as specified in CBIP latest report with 2800 AT) **c.** Permanent Magnet: Immune up to 0.5T and Event logging **>**0.5T.
		4.2.2	**Electrostatic Discharge (ESD)** Meter shall be immune up to 50 kV and shall record accurate energy as per IS-14697:1999/CBIP-325. Meter shall log the event into memory as 'ESD' with date & time stamp for any ESD greater than 50 kV with snap shot, the event logging threshold values as per table no. 1 in 4.4.
		4.2.3	The shielding around the meter shall be such that it does not get affected by high Voltage and high energy or low energy impulse when comes in contact with meter from any side.
		4.2.4	Meter should immune to high/low frequency jammer devices. Meter shall log the event in its memory as" JAMMER" with date and time stamp along with snapshot, the threshold values as per table no. 1 in 4.4.
		4.2.5	The meter should be immune or log the tamper on application of any other higher magnetic field of any frequency waves, micro waves like magnetron etc. the threshold values as per table no. 1 in 4.4.
4.3	**Neutral Disturbance & other tampers**	4.3.1	The meter shall log the event in memory on thresholds defined in table 1 in 4.4
		4.3.2	The meter shall not saturate on passage of direct current, which can cause the meter either to stop recording/ record inaccurately. DC injection shall be tested both in phase and neutral. Measurement by meter shall not get influenced by injection of Chopped signal/ DC signal/ DC pulse upto 330V (both + & - DC) and for any value beyond this, of any low frequency and harmonics. Meter shall log the event into memory as 'Neutral Disturbance' with date & time stamp the thresholds are as per table no. 1 in clause 4.4 below.

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 8 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

4.4 Abnormal Tamper conditions

4.4.1 The meter shall record forward energy under all abnormal tampering conditions and shall be capable of recording occurrence and restoration of abnormal events listed below along with date & time and snap shots of individual voltages, currents, power factors, active energy and apparent energy at the time of occurrence of abnormal event and restoration of normal supply.

4.4.2 For all tamper events the time stamp and snapshot parameters shall be recorded at the start time of event for occurrence (T1) and for restoration the time stamp and snapshot parameters shall be recorded at the end time of the event (T3).

4.4.3 During abnormal & tamper conditions, the current shall be recorded as active current and line current. Each such event shall be provided with minimum count of as per table no.1 to avoid missing of data amidst usual events (like power failure) due to the limitation of FIFO. Persistence time for occurrence and restoration for the events along with their threshold values shall be as per table no. 1 given below.

4.4.4 Multiple occurrences of same event, with different time stamps should not be logged without restoration of first occurrence, except for the case of Top Cover Open.

4.4.5 All tamper/event logging thresholds values shall be configurable.

Table No.1

Persistence Time for Occurrences	Persistence Time for Restoration	Threshold Value for Occurrence of Events	Threshold Value for Restoration of Events	Compartment Size
ESD/JAMMER= immediate (record only 1 event on first application & only one event for next 1min) (ESD)	ESD/JAMMER = 0 Hr 01 Min 0 sec (ESD) (should restore after 1 min. of last application)	Immunity up to 50 KV and logging of event >50 KV	Removal of ESD/JAMMER signal	25
Magnet = 0 Hr 2 Min 0 sec (MAG)	Magnet = 0 Hr 2 Min 0 sec (MAG)	> 0.5 Tesla for permanent magnet OR DC magnetic induction > 0.2T OR AC magnetic induction > 10 mT (of any frequency)	< 0.5 Tesla for permanent magnet OR DC magnetic induction < 0.2T or AC magnetic induction <10 mT	25

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 9 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

			Meter Top Cover Open (TC Open) immediate	Meter Top Cover Open (TC Open) Immediate	If meter top cover is opened	NA	05 (Stay put Type)
			Potential Missing = 0 Hr 10 Min 0 sec (PM)	Potential Missing = 0 Hr 2 Min 0 sec	Voltage < 70% of Vref AND current > 2% Ibasic	Voltage > 80% of Vref AND current > 2% Ibasic	25
			Voltage Unbalance = 0 Hr 30 Min 0 sec (VU)	Voltage Unbalance = 0 Hr 2 Min 0 sec	20% or more between the phases and current > 2% Ibasic	Shall be less than 10 % between the phases and current > 2% Ibasic	25
			CT Open (phase wise) = 0 Hr 10 Min 0 sec	CT Open (phase wise) = 0 Hr 2 Min 0 sec	Phase Current < 1% of Ibasic AND Current on other phases > 10% of Ibasic with all current positive	Phase Current > 10% of Ibasic with all current positive	25
			Invalid Phase Association	Invalid Phase Association (Immediate)	Incorrect Phase connections	Correct Phase Connections	5
			CT Reversal = 0 Hr 30 Min 0 sec (CTR)	CT Reversal = 0 Hr 2 Min 0 sec	Active current negative	Active current positive AND > 2 % Ibasic	25
			Current Unbalance = 0 Hr 30 Min 0 sec (CU)	Current Unbalance = 0 Hr 2 Min 0 sec	Current difference > 10% between phases and I min 10% of Ibasic	Current difference < 5% between the phases and I min>5% of Ib	25
			Low Power Factor = 0 Hr 30 Min 0 sec (LPF)	Low Power Factor = 0 Hr 2 Min 0 sec	I >1% of Ib and Power Factor ≤ 0.5 in any phase	I >1% of Ib and Power Factor ≤ 0.7 in respective phase	25
			Neutral Disturbance = 0 Hr 01 Min 0 sec (ND)	Neutral Disturbance = 0 Hr 2 Min 0 sec (ND)	Voltage >145% of Vref & Current >10% Ib OR Frequency < 47 Hz OR Frequency > 53 Hz OR DC voltage / signal/ pulse/ chopped signal injection	Voltage <115% of Vref & Current > 10% Ib AND Frequency > 47 Hz OR Frequency < 53 Hz	25

Initiator		HoG (Plant Engineering)	

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 10 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

Power On Off = 0 Hr 02 Min 0 sec	Power On Off = immediate	Actual Voltage off	Actual Voltage On	25
Over Voltage = 0 Hr 30 Min 0 sec	Over Voltage = 0 Hr 2 Min 0 sec	Voltage > 130% of Vref	Voltage <110% of Vref	25
Over current = 0hr 30min 0sec (OL)	Over Current = 0hr 2min 0sec	>Preset value (default value set at 120%Ib)	I<100%Ib	25
Microwave immediate (record only 1 event on first application & only one event for next 1min)	Microwave 0 Hr 01 Min 0 sec (should restore after 1 min. of last application)	Any higher frequency magnetic waves, micro waves > 10 mT (or mutually decided)	Removal of device	25

4.4.6 Meter shall latch & store cumulative counts of all the tampers events which have logged /occurred/stored in memory of meter from the date of energization till life of meter. Total tamper storage should be as per table 1 above.

4.4.7 The meters are to be used for registration of energy consumed by the consumer, as such the meters shall be programmed for import mode and in case of reversal of energy direction (reversal of all CT terminals) meter shall register energy separately in export mode i.e. in case of CT reversal, meter shall record scalar (not vector sum) sum of energy. The meter shall accurately distinguish between actual CT reversal and condition due to faulty reactive power compensation devices/ capacitor banks. Appropriate logics for the same shall be provided in meter.

4.4.6 The meter shall register correctly if supply neutral is not available at the meter neutral terminal. The meter shall work in absence of any two incoming wires. It shall keep recording correctly in case of unbalance system voltage also as defined above.

4.4.7 The meter shall keep working accurately irrespective of the phase sequence of the supply. The meter shall be functional even if somehow change in the phase sequence takes place.

4.4.8 The Meter shall be able to differentiate between actual CT reversal and condition arising out of unbalanced / unhealthy capacitor bank. Appropriate logics for the same shall be provided meter.

4.4.9 The Cover Open tamper detection should be through heavy duty, sturdy micro switches with OR gate logic such that it should not log false event on vibration or impact during handling or testing.

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 11 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

4.5 Event compartments

4.5.1 The event compartments shall be as IS 15959 Part-1 table 9.

4.5.2 The size of the event compartments should be such that all above events (in table no.1 and other required events defined in various clauses of this documents) are accommodated in the assigned event category compartment. i.e. if in case of voltage compartment assigned to 4 number of events then the minimum size of this compartment should be such that it should accommodate sum of all maximum number of events as marked above table 1 .

4.5.3 Transaction events compartment size shall be minimum 20 events.

5 GENERAL CONSTRUCTIONS

The 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 shock, safety against effect of excessive temperature, protection against spread of fire, protection against penetration of solid objects, dust and water.

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.
The meters shall be designed and manufactured using SMT (Surface Mount Technology) components. All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy as given below or any other equivalent make with the strict approval of TATA POWER - DDL :

SNo	Component Function	Requirement	Makes and Origin
1	Measurement/computing chips	The Measurement/ computing chips used in the meter should be with the Surface mount type along with the ASICs	USA: Analog Devices, Cyrus Logic, Atmel, Phillips, Free scale semiconductor, Texas Instruments, South Africa: SAMES, Japan: NEC
2	Memory chips/NVM	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges. The life of NVM shall be 15 years.	USA: Atmel, National, Semiconductors, Texas Instruments, Phillips, Microchip, Japan: Hitachi or Oki, Swiss: STMicro
3	Display modules	The display modules should be well protected from the external UV radiations. The display visibility should be sufficient to read the meter mounted between height of 0.5m and 2m. The construction of the modules should be such that the displayed quantity should not	Taiwan: Holtek, Singapore: Bonafied, Technologies, Korea: Advantek, China: Xiamen, Truly semiconductor

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 12 of 24**
Prepared By: Saurav Chandel	**Reviewed By:** Brajanath Dey	**Approved By:** Brajanath Dey	**Issued By:** Parveen Verma

				disturbed with the life of display. Should be with Green LED background. It should be trans-reflective STN type industrial grade with extended temperature range.	
			4	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. It should be magnetic locking type	USA: National, Semiconductors, Holland / Korea: Phillips, Taiwan: MAXIM, Everlight, Japan: Hitachi
			5	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	A class consumer
			6	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, Vishay, Japan: Hitachi, Oki, AVX or Ricoh, Korea: Samsung,
			7	Battery	Lithium-ion battery with guaranteed life of 15 years	Varta / Tedirun / Vitzrocell / Sanyo or equivalent.
			8	Microcontroller and RTC having separate battery	The accuracy of RTC shall be as per relevant IEC / IS standards and RTC shall be provided with separate battery in its circuit. The micro controller shall be of superior quality from reputed make with long life.	USA: Philips , Dallas, Atmel, Motorola, Texas Instruments, Japan: Renesas, NEC or Oki

5.1	**Meter Body**	5.1.1	Meter body shall be made of unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II) with FV0 Fire Retardant, self - extinguishing, UV stabilize, recyclable and Anti oxidation properties.
		5.1.2	The minimum thickness of the meter enclosure shall be 2mm.
		5.1.3	Meter base shall be opaque with virgin polycarbonate LEXAN 500R or equivalent (i.e. chart of Lexan 500R compared with the alternative material) on prior approval from the TATA POWER - DDL. (If different material offered the bidders should submit material data sheet in technical bid)
		5.1.4	Meter cover shall be transparent with polycarbonate LEXAN 143R/943A or equivalent (i.e. chart of Lexan 500R compared with the alternative material) on prior approval from the TATA POWER - DDL. (If different material offered the bidders should submit material data sheet in technical bid)

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 13 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

		5.1.5	Meter cover & base shall be provided with continuous and seamless Ultrasonic welding such that it cannot be opened without breaking the enclosure. Front cover & base shall be such that it is not possible to cut & open the meter without certainly damaging the meter body and by no means shall an attempt to reassemble would not leave physical evidence. The damage evidences should be visible externally& should be traceable in such a way that attempts can be proved in court of law.
		5.1.6	The meter body shall be sealed in such a way that opening of meter base and cover is possible only after breaking the seal(s).
		5.1.7	During meter manufacturing the meter seal fixing should be tightened such that the seal body should be close to meter body.
		5.1.8	Unidirectional screws to be used on meter covers where ever required.
		5.1.9	The Meter body shall be such that the liquid or chemical shall not reach the electronic parts (in installed condition), if liquid is injected from any side of meter body such as meter terminals, push button, display etc. Necessary protection and water tight sealing to be provided at terminals and Push buttons etc.
5.2	**Terminals, Terminal Block**	5.2.1	Even after any attempts the terminal block should get disengaged, opened or loosen from any side. Any attempt to disengage the terminal block should certainly damage the meter body with physical evidences. The damage evidences should be visible externally& should be traceable in such a way that attempts can be proved in court of law.
		5.2.2	Terminals may be grouped in terminal block having adequate insulating properties and mechanical strength. In order to satisfy such requirements when choosing insulating materials for the terminal block adequate testing of materials shall be taken into account.
		5.2.3	Terminal block and terminal cover shall be of a material which complies with the requirements of IS11731 (part 1) method FH1. The material of which the terminal block is made shall be capable of passing the Heat Deflection temperature test given in ISO 75 for temperature of 135°C and pressure of 1.8 MPa as mentioned in IS 14697. Tested as per ISO 75-2/A or ASTM D648.
		5.2.4	The terminal block shall be of opaque with virgin polycarbonate LEXAN500R or equivalent (complying to above requirement) on prior approval from the TATA POWER - DDL. (The bidders should submit material data sheet in technical bid)
		5.2.5	The terminal block, the terminal cover and the meter case shall ensure reasonable safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them. The material and plating details of terminals screw shall be submitted by the bidder.
		5.2.6	The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there is no risk of loosening or undue heating. Terminal & screw should not be damaged during regular opening and tightening.

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 14 of 24**
Prepared By: Saurav Chandel	**Reviewed By:** Brajanath Dey	**Approved By:** Brajanath Dey	**Issued By:** Parveen Verma

		5.2.7	**Temperature sensor** to be for sensing the temperature and meter should be programmed in such way that on reaching the threshold value set (as per tamper table no. 1) the event must get logged.
		5.2.8	Internal diameter of the terminal holes shall be minimum 5 mm; minimum clearance between adjacent terminals shall be 10 mm. Minimum Depth of the terminal holes shall be of 20 mm.
		5.2.9	Minimum two number of terminal screws to be provided per terminal wire.
		5.2.10	Terminal block 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 is not transmitted through insulating material.
		5.2.11	Meter terminal should have 10 terminals arrangement. The terminals should have center to center distance of min. 11.5mm. Terminal configuration shall be R-Cin, R volt, R-Cout, Y-Cin, Y volt, Y-Cout, B-Cin, B-volt, B-Cout, Neutral.
5.3	**Terminal Cover**	5.3.1	Terminal cover shall be short type and transparent with virgin polycarbonate LEXAN 143R/943A or equivalent on prior approval from the TATA POWER – DDL (the bidders should submit the relevant material data sheet in technical bid).
		5.3.2	Appropriate space shall be available for incoming /out-going cables without damaging/stressing terminal cover (terminal cover design shall be as per the TATA POWER - DDL approval). After sealing the cover, terminals shall not be accessible without breaking the seals. Terminal cover should be of short type 20-25 mm length. The system connection diagram shall be provided on the terminal cover.
		5.3.3	The terminal cover design should be such that the sealing screw locking provision on cover should have min dimension of 3mmx3mm. (Excluding seal lock hole)
		5.3.4	The terminal cover should open on the top side, during connection of the cables. The side opening of terminal cover is not acceptable due to additional opening space requirement.
5.4	**Sealing of meter and its terminal cover**	5.4.1	The system connection diagram shall be provided on the terminal cover. Reliable sealing arrangement shall be provided to make the meter tamper evident and to avoid fiddling or tampering by unauthorized persons.
		5.4.2	For this, one no. Polycarbonate seal and three no. Hologram seal with unique serial numbers (on Left, Right & Top side) shall be provided by the bidder. One no polycarbonate seal shall be provided by the TATA POWER - DDL. This seal shall be fix on right hand side of meter.
		5.4.3	All the seals with unique serial numbers shall be fixed on meter body by the bidder at his works before calling for inspection.
		5.4.4	Two sealing provision shall be provided at meter terminal cover, such that terminal shall not be accessible without breaking the seals. All the seals shall be provided on front side only and as per the TATA POWER - DDL specification. Rear side sealing arrangement shall not be accepted. Bidder shall provide seals be as per CEA regulation (2006). Only patented seals to be used as per CEA requirements.

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 15 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

		5.4.5 The bidder shall provide TATA POWER - DDL (MMG store and MTL) the soft record of polycarbonate seal and hologram seal serial number used against each meter serial number along with its position (RHS/LHS/Top/TB Cover) in tabular form for every lot of meter
5.5	**TOD Feature**	The meter shall be capable of measuring Cumulative Energy (kWh & kVAh), and MD (kW & kVA) with time of day (TOD) registers having 8 zones & 02 seasons (no. of zones & time slot shall be programmable by MRI/ Over the air with adequate security level and in one to one /broadcast mode over the air). Current TOD (during tender) to be given is as below: **Slots** / **Time Slot** / **Jan-Dec** Normal / 0000-0300 / Register 2 Off-Peak / 0300-0900 / Register 1 Normal / 0900-1300 / Register 2 Peak / 1300-1700 / Register 3 Normal / 1700-2100 / Register 2 Peak / 2100-2400 / Register 3 **# The bidder to ask TATA POWER - DDL for latest TOD timing slots before manufacturing of every lot.**
5.6	**MD Integration**	The MD integration period shall be 30/15 minutes, as applicable (integration period-programmable by MRI at site and also thru AMR with adequate security level). The MD resetting shall be automatic at the 1st of the month i.e. 0000 hours of 1st day of the month. Manual MD reset button shall not be available. Last 12 MD values shall be stored in the memory and one to be displayed in the Auto scroll mode. MD shall be recorded and displayed with minimum three digits before decimal and minimum three digits after decimal points. MD integration shall be of sliding Type at an interval of 10 min.
5.7	**Parameters in BCS**	All these parameters shall be downloaded locally or remotely and interpreted in PC/Laptop. All the parameters shall be recorded and memorized in its Non Volatile Memory (NVM). The corresponding Non Volatile Memory shall have a minimum retention time of 15 years. 'Fail' to be log in memory in the following conditions only in BCS: a) RTC fail b) NVM memory fail c) Battery fail
5.7.1	**Load survey (for pre-paid & post-paid meter mode)**	Meter serial number shall be recorded and communicated for all profiles of data. The meter shall be capable of recording 30 minutes average of the following parameters for at least last 90 days a) Voltage for each phase b) Current of each phase c) Average PF d) Average kWh e) Average kVAh (lag only) f) kVArh(Lagging) g) kVArh(Leading) h) Temperature near terminal block (˚C) i) THD Voltage phase wise j) THD Current phase wise Meter shall be capable of recording daily Energy and Demand 00:00 to 24:00 Hrs kWh/kVAh, kW/kVA in BCS for 90 days. Midnight energy value of cumulative KWh, KVAh along with H1 KW and KVA along with daily consumption kWh should be available in meter memory for last 90 days.

Initiator		HoG (Plant Engineering)	

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 16 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

5.7.2 Instantaneous Parameters

Meter serial number shall be recorded and communicated for all profiles of data. Meter shall be capable for following Instantaneous Parameters in Memory and should be available in BCS.

Meter Sr.No.	
Meter Type	3P HT
Meter date & Time MRI/PC date & Time Dump date & Time	DD MM YYYY HH MM SS DD MM YYYY HH MM SS DD MM YYYY HH MM SS
Voltage –R	000.000V
Voltage –Y	000.000V
Voltage –B	000.000V
Line Current –R	00.000A
Line Current –Y	00.000A
Line Current –B	00.000A
Active Current –R	00.000A
Active Current –Y	00.000A
Active Current –B	00.000A
Reactive Current-R	00.000A
Reactive Current-Y	00.000A
Reactive Current-B	00.000A
Power factor-R	0.000
Power factor-Y	0.000
Power factor-B	0.000
Average Power factor	0.000
Instantaneous Frequency	00.000Hz
Instantaneous Load	Active ,Reactive Lag/Lead, Apparent
Present Cumulative Energy	Active ,Reactive Lag/Lead, Apparent
Cumulative Power Off Duration	00000
Cumulative Power ON Duration	00000
Cumulative Tamper count	00000
Terminal Block Temperature (˚C)	
Cumulative Billing Count	00000
Last Billing date	dd:mm:yy
No of Power failure	00000
Vector/phasor diagram In case one of the voltage is missing, vector should be made with 2 voltage and all currents.	

5.7.3 General Information

Meter shall be capable for providing below mentioned general parameters in memory

Meter Serial number
Firmware Version
Manufacture Name
Manufacture month (MM/YYYY)
Meter Type
Meter Class

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TATA POWER-DDL	**TATA POWER DELHI DISTRIBUTION LIMITED, DELHI**		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 17 of 24**
Prepared By: Saurav Chandel	**Reviewed By:** Brajanath Dey	**Approved By:** Brajanath Dey	**Issued By:** Parveen Verma

		Meter Constant Meter Voltage Rating Meter Current Rating TOD profile showing timing and seasons # # if any additional key is required to see this value, it should be provided without any additional cost to TATA POWER - DDL .
5.7.4	**Billing Parameters**	1) Meter serial number shall be recorded and communicated for all profiles of data 2) Cumulative kWh, kVAh (lag only), kVArh lead, lag and TOD1 kWh,TOD2 kWh,TOD3 kWh,TOD1 kVAh (lag only),TOD2 kVAh (lag only),,TOD3 kVAh (lag only), For present and last 12 Resets (reset date for all resets/history, time zone register wise) 3) Maximum Demand Absolute Active Load and Absolute Apparent load and TOD1 kW,TOD2 kW,TOD3 kW,TOD1 kVA (lag only),TOD2 kVA (lag only),TOD3 kVA (lag only), for present and last 12 Resets (reset date for all resets/history, time zone register wise) along with date and time stamp. 4) Consumption (Reading date, Current Month & 12 History, time zone register wise) kWh and kVAh 5) Billing Dates (12 History) 6) Cumulative Billing count 7) TOD details with day time and season wise. Cumulative energy parameters kWh, kVAh (lag only), kVArh lead, lag and TOD1 kWh, TOD2 kWh, TOD3 kWh, TOD1 kVAh (lag only), TOD2 kVAh (lag only) and TOD3 kVAh (lag only). The meter shall be capable of measuring Cumulative Energy (kWh & kVAh).
5.7.5	**Transactions**	All the changes in software of meter to be logged along with date & time stamp and readings indicating the particular parameter which has been programmed. Meter should do billing if any transaction is done.
5.7.6	**Tamper Events**	All events should be logged as per table no-1.The meter should not have any other event logging or any logic other than desired in specs. If any other logic is present then bidder has to disclose during tender and offering of lot and get approval for same. All other logics not mentioned in specs should be removed or disabled in meter firmware if not approved by TATA POWER – DDL.
5.8	**Display units**	The display unit shall be Pin type built-in liquid crystal display (Permanently backlit type LCD). The LCD shall be of STN (Super Twisted Nematic) construction suitable for maximum temperature withstands 65˚C and minimum temperature withstands 0 ˚C during normal operating condition. The LCD display shall have a wide viewing angle of 120 degree. When the meter is not energized the electronic display need not be visible. The display shall not be affected by electrical, magnetic disturbances and ESD. The display should be readable in direct sunlight. **The back lit must be green in color for good visibility of digits in sunlight.**

TATA POWER-DDL	**TATA POWER DELHI DISTRIBUTION LIMITED, DELHI**		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 18 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

		The kWh & kVAh register shall have minimum 8 digits LCD display and size of the digits shall be minimum 10mmx5mm. Cumulative energy (kWh & kVAh) shall be displayed without decimal in auto scroll mode. (However decimal shall be available in push button mode for high resolution display for testing).
5.8.1	**Auto Scroll mode & Push-button mode**	Persistence time for each parameter shall be 10 second. Values followed by header shall be avoided. (I.e. if MD1 is displayed in Auto scroll mode, Header (MD1) and value (say 025.238 kW) shall be shown simultaneously; it shall not be shown in successive displays. Off time shall not be available in auto scroll mode between each cycle. Auto scroll mode is restored after 10 sec, if push button is not operated. Display should not be stuck for any tamper events. Following shall be continuously displayed in auto scroll and push button mode in the given order.

Display	**Display 1**	**Display 2**
Scroll Process	**Auto**	**Push**
LCD Check	1	1
Meter Sr. No	2	2
Date	3	3
Time	4	4
Cum. kWh	5	5
Cum. kVAh	6	6
Cum. kVARh (Lag)	7	7
Cum. kVARh (Lead)	8	8
TOD Cum. kWh (T1,T2,T3)	9,10,11	9,10,11
TOD Cum. kVAh (T1,T2,T3)	12,13,14	12,13,14
Current Month MD kW	15	15
Current Month MD kVA	16	16
Last Month (history 1) kWh	17	17
Last Month (history 1) kVAh	18	18
Last Month (history 1) TOD Cum. kWh (T1,T2,T3)	19,20,21	19,20,21
Last Month (history 1) TOD Cum. kVAh (T1,T2,T3)	22,23,24	22,23,24
Last Month (history 1) MD kW	25	25
Last Month (history 1) MD kVA	26	26
Last Month (history 1) Power Factor	27	27
Phase Voltages (Vr, Vy, Vb)	28,29,30	28,29,30
Phase Currents (Ir, Iy, Ib)	31,32,33	31,32,33
Inst. Active Power (kW)	34	34
Inst. Apparent Power (kVA)	35	35
Inst.Power Factor	36	36
Voltage Sequence (R-Y-B)	37	37

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 19 of 24**
Prepared By: Saurav Chandel	**Reviewed By:** Brajanath Dey	**Approved By:** Brajanath Dey	**Issued By:** Parveen Verma

		Current Sequence (R-Y-B)	38	38
		High Resolution kWh	-	39
		High Resolution kVAh	-	40
		High Resolution kVARh (Lag)	-	41
		High Resolution kVARh (Lead)	-	42
		Magnetic Tamper count	-	43
		Latest Magnetic tamper occurrence date	-	44
		Latest Magnetic tamper occurrence Time	-	45
		ESD Tamper count	-	46
		Latest ESD tamper occurrence date	-	47
		Latest ESD tamper occurrence time	-	48
		TC Open tamper count	-	49
		TC Open occurrence date of very first event	-	50
		TC Open occurrence time of very first event	-	51

5.9 Output Device

5.9.1 **Pulse Rate:** The meters shall have a suitable test output device. 2 nos of Red color blinking LED (marked as imp/kWh and imp/kVArh) shall be provided in the front. This device shall be suitable for using with sensing probe used with test benches or reference standard meters. Meter constant shall be indelibly printed on the name plate as imp / KWh & imp/kVArh. Meter constant shall be as per actual without multiplying factor.

5.9.2 Phase indication : Individual phases should be displayed on LCD display of meter and shall glow with minimum operating voltage (as defined in 4.05 of GTR)

6.0 NAME PLATE AND MARKING

Meters shall have a name plate clearly visible and effectively secured against removal. The name plate data should be laser printed. The base color of Name plate shall be blue (Pantone 2727C) indelibly and distinctly marked with all essential particulars as per relevant standards along with the following:

i. Manufacturer's name
ii. Type designation
iii. Number of phases and wires
iv. Serial number (Meter serial number shall be laser printed on name plate instead on sticker).
v. Month and Year of manufacture (MM/YYYY)
vi. Unit of measurement
vii. Reference voltage ,frequency
viii. Ref. temperature if different from 27 deg. C
ix. Rated basic and maximum Current
x. Meter constant (imp/kWh, imp/kVArh)
xi. 'BIS' Mark
xii. Class index of meter
xiii. "Property of TATA POWER - DDL "
xiv. Purchase Order No. & date
xv. Guarantee period.
xvi. Rated frequency
xvii. Sign of double square

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 20 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

<table>
<tr><td></td><td></td><td>xviii. Country of manufacture.
xix. Firmware version for meter
xx. Category
However the following shall be printed in bar code on the meter nameplate (shall be laser printed on name plate instead of any sticker). All data shall be laser printed on meter along with Sr.NO and date of manufacturing. No sticker to be used to avoid loss of data in event of fire. Content Format for bar code: TATA POWER-DDL MMYY XXXXXXXX (8-digit Serial no.). The PCB Serial number should be printed on the PCB instead of sticker.</td></tr>
<tr><td>7.0</td><td>TESTS</td><td>All routine, acceptance & type tests shall be carried out on the meter and meter body separately in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the TATA POWER - DDL /his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted in addition to the tests specified in IS/IEC from CPRI/ERDA.</td></tr>
<tr><td>7.1</td><td>TYPE TEST</td><td>1) All type-tests defined in IS 14697 and IS 15959 (Part-1):2011
2) Test against abnormal magnetic influence as per CBIP TR 325.
3) Test for Material used for Terminal Block and meter body as per relevant standards.
4) IP test for IP 51 as per IS 60529
5) Bidder/BA must submit valid BIS license for manufacturing energy meters as per IS 14697 and IS 15959 (Part-1) with all requisite inclusions.</td></tr>
<tr><td>7.2</td><td>ROUTINE TEST</td><td>1) AC High Voltage test (Clause no. 12.7.6.3 of IS 14697)
2) Insulation test (Table 18 of Clause no. 12.7.6 of IS 14697)
3) Test on limits of error (Clause no. 11 of IS 14697)
4) Test of starting current (Clause no. 12.13 of IS 14697)
5) Test of no load condition (Clause no. 12.12 of IS 14697)</td></tr>
<tr><td>7.3</td><td>ACCEPTANCE TEST</td><td>1) AC High Voltage test (Clause no. 12.7.6.3 of IS 14697)
2) Insulation test (Table 18 of Clause no. 12.7.6 of IS 14697)
3) Test on limits of error (Clause no. 11 of IS 14697) with following loads:
<table>
<tr><td>120% Imax</td><td>Imax (10A)</td><td>Ib (5A)</td><td>0.1 Ib</td><td>0.02 Ib</td><td>0.05Ib</td><td>0.01Ib</td></tr>
<tr><td>UPF, 0.8 lead and 0.5 lag</td><td>UPF, 0.8 lead and 0.5 lag</td><td>UPF, 0.8 lead and 0.5 lag</td><td>UPF, 0.8 lead and 0.5 lag</td><td>UPF, 0.8 lead and 0.5 lag</td><td>UPF</td><td>UPF</td></tr>
</table>
4) Test of meter constant (Clause no. 12.14 of IS 14697)
5) Test of starting current (Clause no. 12.13 of IS 14697)
6) Test of no load condition (Clause no. 12.12 of IS 14697)
7) Test of repeatability of error (Clause no. 12.16 of IS 14697)
8) Test of power consumption (Clause no. 12.7.1 of IS 14697)
9) Test for Immunity against external influencing signal as per the TATA POWER - DDL specification
10) Test for Immunity against DC Immunity as per the TATA POWER - DDL specification
11) Test for Immunity against Tamper conditions as per the TATA POWER - DDL specification
12) Error measurements with all abnormal condition along with ESD, magnet, jammer as per the TATA POWER - DDL specification
13) Test to Influence of Harmonics (Table 13 of IS 14697)
14) Supply voltage and frequency variation test (Clause 11.2 & 12.10 of IS 14697)
15) Testing of self-diagnostic features (as per this technical specification)</td></tr>
</table>

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 21 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

		16) Tamper count increment and logging with date and time in meter database (as per this technical specification) 17) All tests as defined in IS 15959(Part-1):2011 (as per clause no. 3.23 and Annex. K)
7.4	**Special Test**	The bidder shall demonstrate the communication capability of the meter through communication modes as defined in the specification before conducting acceptance tests.
8.0	**TYPE TEST CERTIFICATE**	The bidder shall furnish the type test certificates of the meter for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI/ ERDA as per IS 14697 & IS 15959 (Part-1). For communication testing any national approved laboratory or international acclaimed lab or equivalent will also suffice at the discretion of TATA POWER - DDL. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TATA POWER - DDL.
9.0	**PRE-DESPATCH INSPECTION**	Inspection may be made at any stage of manufacture at the discretion of the TATA POWER - DDL of the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection. Equipment shall be subject to inspection by a duly authorized representative of the TATA POWER - DDL. Bidder shall grant free access to the places of manufacture to TATA POWER - DDL's representatives at all times when the work is in progress. Inspection by the TATA POWER - DDL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TATA POWER - DDL. Following documents shall be sent along with material a)Test reports b)MDCC issued by TATA POWER - DDL c)Invoice in duplicate d)Packing list e)Drawings & catalogue f) Guarantee / Warrantee card g)Delivery Challan h)Other Documents (as applicable) i) One no. leaflet with each meter Note-Photographs of packed lot clearly showing s.no of meters whose inspection call has been requested should be sent along with letter for inspection call. Two meters from the offered lot, if deemed necessary, shall be tested for all tampers at Tata Power-DDL laboratory for compliance to anti tamper feature before MDCC. The inspectors shall free to take any two meters from offered lot for testing at our Lab. Bidder should check and ensure each meter and reset each meter for any event logged for any tamper.
10.0	**INSPECTION AFTER RECEIPT AT STORE**	The material received at TATA POWER - DDL's store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection.

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 22 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

11.0	**GUARANTEE**	Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the TATA POWER-DDL up to a period of at least 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract whichever is earlier, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Company, failing which the TATA POWER-DDL will be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the bidder or from the " Security cum Performance Deposit" as the case may be. Bidder shall own responsibility for all internal component with an end to end agreement with individual component manufacturer.
12.0	**PACKING**	1. Bidder shall ensure that all material covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The material used for packing shall be environmentally friendly. Packing and transportation shall be as per IS 15707:206 clauses 9.1 and 9.2. 2. Individual meter should be packed in separate box. Routine test report (with manufacturing company logo) of the individual meter shall be kept inside each card board carton of the meter. 3. On back side of routine test certificate (RTC) the bidder shall print a picture of the meter with its small details like for consumer to know about meter or display parameters sheet. 4. The softcopy of the routine test certificate of each meter to be provided with each lot to TATA POWER - DDL, MMG stores at Keshav Puram. 5. The routine test certificate shall contain results & all tests of clause no. 7.2. 6. Bar code containing information of meter Sr. No should be pasted on the outer most box in which single / group of meters are transported.
13.0	**SAMPLE**	**Tendering stage:** Bidders are required to manufacture 03 numbers of sample meters as per the TATA POWER-DDL specification (sealed, unsealed and open able base and cover to view/test the inner circuits) and submit the samples (non-returnable) along with bid for approval. These samples should be submitted at Meter Testing Lab, Rohini Sector 13. **Pre-manufacturing approvals:** The successful bidder shall submit two prototype samples of 11kV HT Consumer meters at Meter Testing Lab, Rohini Sector 13, for further testing and compliance as per specifications and shall get approval before mass manufacturing. Further, for 33kV, 66kV & 220kV HT Consumer Meters, one sample may be asked for demonstration and compliance as per specifications, prior to the manufacturing approval. **Following accessories to be submitted along with sample at both the tendering stage & pre-manufacturing approvals stages:** 1) Detailed manual 2) Communication cords 3) Tamper logic sheet 4) Display parameter annunciator 5) BCS 6) Internal connection diagram.

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Technical Specification of HT Consumer Energy Meter		
Document No.	ENG-HV-2014		Eff. Date: 01-05-2020
Revision No.	00		Page 23 of 24
Prepared By: Saurav Chandel	Reviewed By: Brajanath Dey	Approved By: Brajanath Dey	Issued By: Parveen Verma

14.0	**TRAINING**	Suitable training to be arranged for TATA POWER – DDL representatives, for operation and handling of every software and hardware regarding communication between meter & MRI, without any cost implications towards TATA POWER – DDL.
15.0	**QUALITY CONTROL**	The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. Quality should be ensured at the following stages: • At PCB manufacturing stage, each board shall be subjected to computerized bare board testing. • At insertion stage, all components should undergo computerized testing for conforming to design parameter and orientation. • Complete assembled and soldered PCB should undergo functional testing using Automatic Test Equipment (ATEs). • Prior to final testing and calibration, sample meters shall be subjected to aging test (i.e. meters will be kept in ovens for 24 hours at 55 Deg. C temperature and atmospheric humidity under real-life condition at its full load current. After 24 hours meter should work satisfactorily. TATA POWER - DDL's engineer or its nominated representative shall have free access to the bidder's/manufacturer's works to carry out inspections.
16.0	**MINIMUM TESTING FACILITIES**	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards. The bidder shall have duly calibrated Reference Standard meter of Class 0.1 accuracy or better.
17.0	**MANUFACTURING ACTIVITIES**	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer.
18.0	**SPARES, ACCESSORIES AND TOOLS**	1. Bidder to be provide free of cost 02 nos. of jig for retrieving data from memory of meter with every new design of meter in which previous jig supplied cannot be used. Jig should be such that NVM can be push fit on this jig and data can be retrieve from this NVM. 2. Five (5) nos. of optical cord against each 100 meter lot on pro-rata basis for retrieving the data of meter through optical port should be provided, if design of optical port is changed from those of previously supplied meters.
19.0	**DRAWINGS AND DOCUMENTS**	Following drawings & Documents shall be prepared based on TATA POWER-DDL specifications and statutory requirements and shall be submitted with the bid: a)Completely filled-in Technical Parameters. b)General arrangement drawing of the meter c)Terminal Block dimensional drawing d)Mounting arrangement drawings. e)General description of the equipment and all components with makes and technical requirement f) Type Test Certificates g)Experience List

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TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Technical Specification of HT Consumer Energy Meter**		
Document No.	**ENG-HV-2014**		**Eff. Date: 01-05-2020**
Revision No.	**00**		**Page 24 of 24**
Prepared By: **Saurav Chandel**	**Reviewed By:** **Brajanath Dey**	**Approved By:** **Brajanath Dey**	**Issued By:** **Parveen Verma**

After the award of the contract, soft copies of following drawings, documents, describing the equipment in detail shall be forwarded for approval:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings	√		√
3	Terminal block Dimensional drawings	√		√
4	Mounting arrangement drawing.	√		√
5	Manual/Catalogues		√	
6	Transport/ Shipping dimension drawing		√	√
7	QA &QC Plan	√	√	√
8	Routine, Acceptance and Type Test Certificates	√	√	√

Bidder shall subsequently provide soft copy of all the drawings, GTP, data-sheet of dis-connector switch, data-sheet/ comparative analysis (of material of terminal block, terminal cover, terminal screw, meter body, meter base) and Test certificates for the final approval of TATA POWER-DDL, before mass manufacturing. All the documents & drawings shall be in English language.

20.0 GUARANTEED TECHNICAL PARTICULARS

Clause-wise compliance to this specification.

21.0 SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH THE BID)

All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the TATA POWER - DDL 's specifications:

S. No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company:

Signature:

Designation:

Initiator		HoG (Plant Engineering)	

TATA POWER DELHI DISTRIBUTION LIMITED				
ANNEXURE I: INSPECTION TEST PLAN FOR 3-PH HT CONSUMER ENERGY METER				
No extra test to be performed without approval and standard process of testing declared from QAG/PE				
Sr. No.	**Item Requirement**	**Characteristics**	**Acceptance Criteria**	**Reference Document**
RAW MATERIAL INSPECTION				
1	Material for Meter Body	Physical Appearance	Smooth, Clean , free from welding marks on the body	Clause 5.1 of ENG-HV-2014
		Grade of Material	Unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II) with FV0 Fire Retardant, self - extinguishing, UV stabilize, recyclable and Anti oxidation properties	
		Flammability requirement	FV0	
		Materials		
		a) Base:	Opaque with polycarbonate LEXAN 500R or equivalent	
		b) Cover:	Transparent with polycarbonate LEXAN 143R/943A or equivalent	
		Thickness, Min.	2.0 mm	
2	Material for Terminals and Terminal Block, Terminal Cover	Physical Appearance	Smooth, Clean , free from grease.	Annexure 5.2, 5.3, 5.4 of ENG-HV-2014
		Grade of Material	Terminal block and terminal cover shall be of a material which complies with the requirements of IS11731 (part 1) method FH1. The material of which the terminal block is made shall be capable of passing the Heat Deflection temperature test given in ISO 75 for temperature of 135°C and pressure of 1.8 MPa as mentioned in IS 14697. Tested as per ISO 75-2/A or ASTM D648	
		Materials		
		a) Terminal Block:	Opaque with polycarbonate LEXAN500R or equivalent	
		Depth of Terminal Hole (min.)	20 mm	
		Internal Diameter of Terminal Hole (min.)	5 mm	
		Clearance between adjacent terminals (min.)	10 mm	

		Arrangement	Meter terminal should have 10 terminals arrangement consisting of neutral and neutral S2 shorted inside the meter. All terminals should be in one row only. The terminals should have center to center distance of min. 11.5mm, 5.2.13 Pin configuration shall be R-Cin, R volt, R-Cout, Y-Cin, Y volt, Y-Cout, B-Cin, B-volt, B-Cout, Neutral	
		a) Terminal Cover:	Short type and Transparent with polycarbonate LEXAN 143R/943A or equivalent	
		Material withstand temperature for terminal block	135 Deg C	
		Material pressure withstand for terminal block	1.8 M Pa	
3	PCB	Glass epoxy, fire resistance grade, with minimum thickness 1.6 mm(The PCB Serial number should be printed on PCB instead of sticker)Make of this component should be as mentioned in Clause 5(5) of Specification ENG-HV-2014.	Clause 5(5) of Specification ENG-HV-2014.	ENG-HV-2014
4	Battery	Lithium with guaranteed life of 15 years Make of this component should be as mentioned in Clause 5(7) of Specification ENG-HV-2014.	Clause 5(7) of Specification ENG-HV-2014.	ENG-HV-2014
5	Microcontroller and RTC having separate battery	Accuracy shall be as per relevent IEC/IS standards, RTC shall be provided with separate battery in its ckt. The microcntroller should be of superior quality from reputed make with long life. Make of this component should be as mentioned in Clause 5(8) of Specification ENG-HV-2014.	Clause 5(8) of Specification ENG-HV-2014.	ENG-HV-2014
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 dat atransfer easily. It should be magnetic locking type. Make of this component should be as mentioned in Clause 5(4) of Specification ENG-HV-2014.	Clause 5(4) of Specification ENG-HV-2014.	ENG-HV-2014
7	Memory chip/NVM	Chip should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.Life of NVM shall be 15 years.Make of this component should be as mentioned in Clause 5(2) of Specification ENG-HV-2014.	Clause 5(2) of Specification ENG-HV-2014.	ENG-HV-2014

8	Display modules	The display modules should be well protected from the external UV radiations. The display visibility should be sufficient to read the meter mounted between height of 0.5m and 2m. The construction of the modules should be such that the displayed quantity should not disturbed with the life of display. Should be with Green LED background. It should be trans-reflective STN type industrial grade with extended temperature range. Chip should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.Life of NVM shall be 15 years. Make of this component should be as mentioned in Clause 5(3) of Specification ENG-HV-2014.	Clause 5(3) of Specification ENG-HV-2014.	ENG-HV-2014
9	Electronic components	The active and passive components should be of the surface mount type and are to handled and soldered by the state of art assembly processes. Make of this component should be as mentioned in Clause 5(6) of Specification ENG-HV-2014.	Clause 5(6) of Specification ENG-HV-2014.	ENG-HV-2014
10	Mesurement/ computing chips	The Measurement/ computing chips used in the meter should be with the Surface mount type along with the ASICs. Make of this component should be as mentioned in Clause 5(1) of Specification ENG-HV-2014.	Clause 5(1) of Specification ENG-HV-2014.	ENG-HV-2014
Acceptance Tests				
1	AC High Voltage test	The ac voltage test shall be carried out in accordance with Table 17 for tacceptance test of new meters. For any subsequent test, the voltage applied shall be 80 percent of the test voltage indicated in Table 21	Clause no. 12.7.6.3 of IS 14697	IS 14697
2	Insulation test	The meter shall withstand the impulse voltage test and the ac voltage test as specified in Clause 12.7.6.4 of IS 14697 (Table 18).	Table 18 of Clause no. 12.7.6 of IS 14697	IS 14697
3	Test on limits of error as per Purchaser specification	The test shall be conducted as per Table 11 for Class 0.5.	Clause no. 11 of IS 14697	IS 14697
4	Test of meter constant	Relation between the test output and the indication in the display shall comply with the marking on the name plate.The requirement of Clause 11.5 shall be verified at one test point preferably at Imax UPF.	Clause no. 12.14 of IS 14697	IS 14697
5	Test of starting current	0.1% of Ib as per Table 15 of IS 14697	Clause no. 12.13 of IS 14697	IS 14697
6	Test of no load condition	For this test the current circuit must be open circuit and a voltage of 115 percent of the reference voltage shall be applied to the voltage circuits. The minimum test period shall be 20 times the actual test period of starting current, the maximum test period shall be limited to 200 min. During this test the test output of the meter shall not produce more than one output pulse/count.	Clause no. 12.12 of IS 14697	IS 14697

7	Test of repeatability of error.	Repeatability of error at 5 percent Ib, and UPF load shall not exceed 0.25 for class 0.5S as measured by ht dispersion method.	Clause no. 12.16 of IS 14697	IS 14697
8	Test of power consumption.	The active and apparent power consumption in each voltage circuit of a meter at reference voltage reference temperature and reference frequency shall not exceed 1.5 W and 10 VA.	Clause no. 12.7.1 of IS 14697	IS 14697
9	Test for Immunity against external influencing signals as per Tata Power-DDL specification	Clause 4.2 of Specification ENG-HV-2014	Clause 4.2 of ENG-HV-2014	ENG-HV-2014
10	Test for Immunity against DC Immunity as per Tata Power-DDL specification	Clause 4.3 of Specification ENG-LV-3008	Clause 4.3 of ENG-HV-2014	ENG-HV-2014
11	Test for Immunity against Tamper conditions as per Tata Power-DDL specification	Clause 4.4 of Specification ENG-LV-3009	Clause 4.4 of ENG-HV-2014	ENG-HV-2014
12	Error measurements with all abnormal conditions along with ESD, Magnet, Jammer	Clause 4.4 of Specification ENG-HV-2014	ENG-HV-2014	ENG-HV-2014
13	Test to Influence of Harmonics	Wave form: 10 percent of third harmonic in the current, at unity power factor, limit of variiation in percentage error shall be 0.1. The distortion factor of the voltage shall be less than lpercent. The variation in percentage error shall be measured under two conditions. The peak of third harmonic in the first measurement in phase and in the second easurement in antiphase of the peaks of the fundamental current. For polyphase meters, the voltage circuit shall be energized in parallel and the current circuit in series.	Table 13 of IS 14697	IS 14697
14	Supply voltage and frequency variation test	Voltage variation of ±10 percent, limit of variation in percentage error for meter at unity and 0.5 lagging shall be 0.7 and 1 respectively. For the voltage ranges-from -20 percent to -10 percent and +10 percent to + 20 percent the limits of variation in percentage error are three times the values. Frequency variation of ±5 percent, limit of variation in percentage error for meter at unity and 0.5 lagging shall be 0.2 respectively.	Clause 11.2 & 12.10 of IS 14697	IS 14697
15	Testing of self diagnostic features and tamper count increment and logging with date and time	The meter shall have logging with date and time in memory for un satisfactory / non-functioning of 1. Real Time Clock2. RTC battery 3. Non Volatile Memory	Clause 4, S No. 4.23 ENG-HV-2014	ENG-HV-2014
16	Tamper Count Increment and logging with Time and Date in Meter	As per Approved GTP	ENG-HV-2014	ENG-HV-2014

	Database, as per Tata Power-DDL specification			
17	All tests as defined in IS 15959 (Part-1):2011	All tests as defined in IS 15959(Part-1):2011 (as per clause no. 3.23 and Annex. K)	clause 3.23 and Annex. K	IS 15959 (Part-2):2016
18	Communication between Meter and MRI; MRI & BCS Software	The meter shall be compatible to communicate with GSM/GPRS/RF modems in DLMS protocol.	As perpproved Cat-A GTP	IS16444 Part2
19	Meter Dimensions	HxWxT shall be specified in Cat A GTP, Drawing.. Height is from the base of the terminal block. Should conform with Cat-A GTP and Drawing.	Approved Cat-A GTP	Approved Cat-A GTP
20	Parameters in Meter, BCS	Any data which is pushed or pulled from meter must have Meter Serial number as one of the parameter, time sync with RTC and overwrites on drift threshhold. Clarity on event logged in memory and server time-stamps matching. Should conform to Clause 5.7 of Specification. Auto Scroll mode & Push-button mode to be checked as per Clause 5.8.1	Clause 5.7, 5.8.1 of ENG-HV-2014	ENG-HV-2014
21	Marking	Following shall be printed in bar code on the meter nameplate. (shall be laser printed on name plate instead of any sticker). Name plate and marking to be ensured as per Clause 6.0 of Specifications	Clause 6.0 of ENG-HV-2014	ENG-HV-2014

TECHNICAL SPECIFICATION COVER SHEET

Document No: ENG-LV-90

Document Title: Specification for 3 Phase 4 wire Whole Current NET Meter

Rev No	Remarks	Date	Prepared By		Reviewed By		Approved By		Issued By	
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TATA POWER-DDL	TATA POWER DELHI DISTRIBUITION LIMITED, DELHI **TECHNICAL SPECIFICATION**		
Doc. Title	Specification for 3 Phase 4 wire Whole Current NET Meter		
Doc. No	ENG-LV-90		Eff. Date: 6/02/2015
Rev. No	00		Page 1 of 25
Prepared by: Manish Jain/ Iqbal Alam	Reviewed by: RK/DWB/NK/AS	Approved By: D R Dharmadhikari	Issued By: H.C. Sharma

CONTENTS

Initiator		HOG (ENGINEERING)	

1.0 SCOPE:

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site of 3-Phase 4-Wire 3 x 230 voltage, whole current NET meter of Accuracy class 1.0 (here after referred as meters) complete with all accessories for efficient and trouble free operation.

2.0 APPLICABLE STANDARDS:

The equipment covered by this specification shall conform to the requirements stated in latest editions of relevant Indian/ IEC Standards and shall conform to the regulations of local statutory authorities.

a) IS 13779 (1999) : A.C. Static Watt hour meter class 1.0 and 2.0
b) IS 9000 : Basic Environmental testing procedure for electrical and electronic items.
c) IS 12346 (1999) : Specification for testing equipment for A.C.Electrical energy meter.
d) IS 11000 (1984) : Fire hazard testing
e) IEC 62052-11 *(2003)* : Electricity Requirements (AC) General Requirements Tests and Test conditions for A.C.Static Watt hour meter for active energy Class 1.0 and 2.0.
f) IEC 62053-21 (2003) : A.C.Static Watt hour meter for active energy Class 1.0 and 2.0
g) IS 15707 (2006) : Testing Evaluation installation and maintenance of AC Electricity Meters - Code of practice.
h) IEC 60068 : Environmental testing.
i) CBIP – TR No.304 : Specification for A.C.Static Electrical Energy Meters (latest amendment).
j) CEA Regulation (2006) : Installation and operation of meters Dtd: 17/03/2006.
k) IEC 62056-21 (then IEC 1107) : Data exchange for meter reading, tariff and load control – Direct local data exchange (through Optical port)
l) IS:12063 (1987) & IEC: 60529 :Classification Of Degrees Of Protection Provided By Enclosures Of Electrical Equipment
m) ANSI / IPC-A-610 :Standard for assembly and production requirements of electronic equipment. and assemblies

3.0 CLIMATIC CONDITIONS OF THE INSTALLATION:

a) Max. Ambient Temperature : 50 deg.C
b) Max. Daily average ambient temp. : 40 deg.C
c) Min Ambient Temp : 0 deg C
d) Maximum Humidity : 95%
e) Minimum Humidity : 10%
f) Average No. of thunderstorm days per annum : 50
g) Maximum Annual Rainfall : 750 mm
h) Average No. of rainy days per annum : 60
i) Rainy months : June to Oct.
j) Altitude above MSL not exceeding : 300 meters
k) Wind Pressure : 126 kg/sq m

The atmosphere is generally laden with mild acid and dust in suspension during the dry months and is subjected to fog in cold months. The design of equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.3 g.

4.0 GENERAL TECHNICAL REQUIREMENTS:

S.No.	DESCRIPTION	REQUIREMENT
4.1	Type of the meter	Three phase four wire whole current NET meter-direct reading type.
4.2	Accuracy Class of the meter	1.0
4.3	Basic Current (I_b) & rated Maximum current (I_{max})	I_b= 20A; I_{max}= 100Amps
4.4	Reference Conditions for Testing the performance of the meter	V_{ref} = 230 V ± 1 % Frequency = 50hz ± 0.3% Temperature= 27 C± 2 ^{0}C
4.5	Operating Voltage	Meter shall be operational with required accuracy from 0.6 Vref to 1.2 Vref.
4.6	Operating Frequency	50 Hz± 5%.
4.7	Power Consumption	Voltage circuit: Maximum 1.5 W and 10 VA Current Circuit :Maximum 1 VA
4.8	Starting Current	40 mA (0.2% of Ib)
4.9	Short time over current	3000 Amp for 0.01sec (30Imax for one half cycles at rated frequency)
4.10	Influence of heating	Temperature rise at any point of the external surface of the meter shall not exceed by more than 20K with an ambient temperature at 45^0 C.
4.11	Rated Impulse withstand voltage	6KV (Shall be applied ten times with one polarity & then repeated with the other polarity and minimum time between each impulse to be 3 sec.
4.12	AC withstand voltage for 1 min	4 KV
4.13	Insulation resistance a) Between frame & current, voltage circuits connected together: b) Between each current (or voltage circuit) & each and every other circuit. :	5 M ohm 50 M ohm.
4.14	Mechanical requirements	Meter shall be in compliance with clause 12.3 of IS 13779
4.15	Resistance to heat and fire	The terminal block, terminal cover and Meter case shall ensure safety against spread of fire. They should not be ignited by thermal overload of live parts in contact with them as per clause 6.8 of IS 13779.

4.16	Protection against penetration of dust and water.	Degree of Protection: IP 51 as per IS 12063, but without suction in the meter.
4.17	Resistance against Climatic influence.	Meter shall be in compliance with clause 12.6 of IS 13779. IEC 62053-21
4.18	Electromagnetic Compatibility (EMC)	Requirements shall be as per CBIP technical report no 88 (latest amendment)
4.19	Accuracy requirements	Meter shall be in compliance with clause 11 of IS 13779.
4.20	Power factor range	Zero lag to Zero lead. (Meter shall be programmed for 'Lag only configuration' ie lead to be treated as unity PF for KVAh calculation)
4.21	Energy measurement	Fundamental energy +Energy due to Harmonics
4.22	Connection Diagram	The connection diagram for the system shall be provided on terminal cover.
4.23	Self-Diagnostic feature	The meter shall have indications for un satisfactory / non-functioning of, Time and calendar Real Time Clock RTC battery Non Volatile Memory
4.24	Initial startup of meter	Meter shall be fully functional within 5 sec after reference voltage is applied to the meter terminals.
4.24.1	Alternate mode of supply to the meters	In case of power failure, reading/data shall be to downloaded with the help of battery
4.24.2	Sleep Mode	Meter shall not go in sleep mode
4.25	Internal diameter of the terminal holes and Depth of terminal hole.	9.5mm (minimum) 25 mm
4.26	Clearance between adjacent Terminals.	10 mm (minimum)
4.27	Display	Backlit LCD, Scrolling, 10 seconds for each parameter
4.28	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication etc.
4.29	Software and communication compatibility	The BCS and CMRI software shall be supplied by the bidder for free of cost. Training for the use of the software shall also be provided by the bidder.
4.30	Calibration	Meters shall be software calibrated at factory and modifications in calibration shall not be possible at site by any means.

4-Quadrant measurement is mandate for Net metering, meter shall be capable to measure net energy at the point of time export and import.

kWh delivered
kWh received
kWh sum
kVAh delivered (Q1 + Q4)
kVAh received (Q2 + Q3)
kVAh sum (delivered + received)

4.31 Communication capabilities:

4.31.1 The meter shall have facilities for data transfer locally through CMRI PC, Laptop (through USB port)and remotely by GSM/ CDMA/ GPRS/ RF modems with proper security via an optically isolated communication port through serial communication. It shall be possible to reconfigure the meters for TOD Tariff, DIP, billing date etc through proper authentication process via communication port. Optical Communication port shall be available for local data downloading with RJ11 connector for remote data downloading. The hardware and Communication ports shall not be affected by any type of injection /unauthenticated signals as per IS 13779. The complete data shall be downloaded within 2 minutes.

4.31.2 The bidder shall supply software required for local "(CMRI) & remote (AMR/RMR)" connectivity and required training to use the software free of cost. Bidder shall provide common meter reading & conversion API (as per MIOS standards) as and when required by the Purchaser along with the necessary support required for integration with the Purchaser's legacy system. The APIs provided by the bidder shall work with all the meters supplied by the bidder till date – i.e. the read API shall be able to download data from all the meters supplied previously also and the convert API shall convert all the data pertaining to all the meters, downloaded through CFW as well as BCS. There shall be an option of configuring reset date through CFW as well as CMRI as when required. The bidder may provide DLMS compliance additionally if possible for communication with the meter. Bidder shall be responsible to provide compatible BCS & API's with RF communication.

The XML files of downloaded data of the meters shall at least contain the following tags:-

1. Billing Data file- D1, D2 and D3.
2. Load Survey Data file- D1, D2, D3, D4, D5, D6, D8, D9 and D10.

A mandatory acceptance testing of bidder's software shall be executed by the Purchaser's- IT where in compatibility of Purchaser's proprietary framework with bidder's Read & Convert API & related software would be tested and APIs provided should work.

4.32.0 Immunity against external influencing signals:

4.32.1 Magnetic Field:

Meter shall record accurate energy in case of any external influencing signals in line with IS 13779:1999 Cl.11.2 and variation in limits of error (up to 100%) shall be as per the table 17 of IS 13779. Meter shall be immune to magnetic field such that it shall not affect

the normal overall functionality However, incase of abnormal magnetic field as defined below meter shall perform as per the following features:

a) Meter shall log the event in its memory as" MAGNET" with date and time stamp within 2 min of application of abnormal magnetic field and shall start recording at 100% Imax and after removal of magnet, back to normal recording within 2 min.
b) Meter shall show "TAMPER" in the display.

Abnormal Magnetic field is defined as below;

a) Continuous DC magnetic induction: >0.27 Tesla ± 5% (Value of the magneto motive force to be applied shall be generally >17500 ATs, Should be immune up to 0.27Tesla)
b) AC magnetic induction: Immune for 10 milli Tesla (if produced with circular metal core with square cross section as specified in CBIP latest report with 2800 AT) / >0.2 Tesla ± 5% (if produced with 14 SWG 25,000 AT air cored magnet as specified in CBIP Technical report No 88)
c) Permanent Magnet: Immune up to 0.5T and Event logging >0.5T

4.32.2 Electrostatic Discharge (ESD)

Meter shall be immune up to 50 kV (ESD) and shall record accurate energy. Meter shall log (occurrence and restoration) of event into memory as 'HV ESD' with date & time stamp and instantaneous parameters (Voltage , Phase currents and Neutral current , Power factor ,Frequency. Energy ,active and apparent for both export & Import mode for any ESD greater than 50 kV and shall show 'TAMPER' in the display.

4.33.0 DC/ AC Injection:

The meter shall not saturate on passage of direct current, which can cause the meter either to stop recording/ record inaccurately. DC injection shall be tested both in phase and neutral. Measurement by meter shall not get influenced by injection of Chopped signal/ DC signal/ DC pulse up to 330V and for any value beyond this, the meter shall log the event into memory as 'ND i.e. Neutral Disturbance' with date & time stamp and shall show 'TAMPER 'in the display after time delay of 2 Min (occurrences and restoration time).

The meter shall record energy proportional to the current and V Ref (230V) when any of the tamper circuits used to tamper energy using a diode or a variable resistance or a variable capacitance energy saving device. The measurement by meter shall not get influenced by injection of AC Voltages/Chopped signal/DC signal/ DC pulse of low frequency and harmonics. In case the meter accuracy is disturbed under Neutral Disturbance, it should be able to log the event.

4.34.0 Abnormal and Tamper conditions:

Meter shall be capable of recording occurrence and restoration of abnormal events listed below along with date & time and snap shots of individual voltages, currents, power factors, active

energy and apparent energy for export & import mode at the time of occurrence of abnormal event and restoration of normal supply. During abnormal and Tamper conditions, the current shall be recorded as active current and line current. Each such event shall be provided compartment wise as mentioned below due to the limitation of FIFO. Persistence time for occurrence and restoration for the events along with their threshold values shall be as per table given below.

Compartment Detail

Compartment No.	Description of event type	No. of Event Logged	Snapshot parameters : Phase Voltages, Currents (both phase and neutral), power factor phase wise, Frequency, Active & Apparent Energy for both export & Import mode.
1	PT Missing , Voltage Unbalance, High Voltage,	50 50 25	Yes
2	CT Open, CT Bypass, Over Current , Current Imbalance	50 50 25 25	Yes
3	Neutral Disturbance, Magnet , Low Power Factor HV ESD	25 25 25 25	Yes
4	Power on off	25	No
5	Cover Open	5	YES

Abnormal tampering conditions

Persistence time for occurrences	**Persistence time for restoration**	**Threshold value for occurrence event.**	**Threshold value for restoration event.**
PT Missing= 0 Hr 5 Min 0 sec	PT Missing= 0 Hr 5 Min 0 sec	Voltage <70% of Vref: and current > 2% Ib.	Voltage >80% of Vref: and current > 2% Ib.

Voltage Unbalance= 0 Hr 5 Min 0 sec	Voltage Unbalance= 0 Hr 5 Min 0 sec	20% or more between the phases and current > 2% Ib.	Shall be less than 10 % between the phases and current > 2% Ib.
CT Open= 0 Hr 5 Min 0 sec	CT Open= 0 Hr 5 Min 0 sec	Ir + Iy + Ib + In ≥ 10 % of Ibasic (vector Sum). AND Phase current < 1% of Ibasic with All current +ve.	Ir + Iy + Ib + In <5 % of Ibasic. (vector Sum) AND Phase current > 10% of Ibasic with All current +ve.
CT Bypass= 0 Hr 5 Min 0 sec	CT Bypass= 0 Hr 5 Min 0 sec	Ir + Iy + Ib + In ≥ 10 % of Ibasic. (vector Sum) AND Phase current > 10% of Ibasic with All current +ve.	(I1+I2+I3+IN) < 5% Ib (vector Sum) AND Phase current > 10% of Ibasic with All current +ve.
Current unbalance= 0 Hr 15 Min 0 sec	Current unbalance= 0 Hr 15 Min 0 sec	> 30% difference between the phase	< 20% difference between the phase
Overload current = 0 Hr 5 Min 0 sec	Overload current= 0 Hr 5 Min 0 sec	>125% of I-Max	<110% of I-Max
Neutral Disturbance = 0 Hr 2 Min 00 sec	Neutral Disturbance= 0 Hr 2 Min 00 sec	Voltage >145% of Vref ,Current >2% Ib OR freq <47 Hz OR Freq>52 OR DC Voltage/signal injection	Voltage < 110% of Vref ,Current >2% Ib AND Freq>47 Hz OR Freq<52
Magnet= 0 Hr 2Min 00 sec	Magnet= 0 Hr 2Min 00 sec	> 0.5 Tesla (permanent magnet) Or DC magnetic induction:>0.27 Tesla or AC Magnetic induction >0.2 Tesla	< 0.5 Tesla (permanent magnet) DC magnetic induction: <0.20 Tesla AC Magnetic induction <0.15 Tesla
Power On Off= 0 Hr 5 Min 0 sec	Power On Off= 0 Hr 5 Min 0 sec		

Note: "Meter shall have neutral CT for tamper identification and analysis."

4.34.1 The meter shall resistor correctly if supply neutral is not available at the meter neutral terminal or one/ two phase is/ are not available at meter terminal. It shall keep recording correctly in case of unbalance system voltage.

4.34.2 The meter shall keep working accurately irrespective of the phase sequence of the supply. The meter shall be functional even if somehow change in the phase sequence takes place. Meter shall sufficiently record this feature.

4.34.3 Meter shall be immune to Influence of Magnet and HV ESD in all the conditions as defined above. If value of Magnet / ESD is abnormal then, "Tamper event "shall be logged.

4.34.4 All the tamper events i.e. MAGNET/ HV ESD/ METER TOPCOVER OPEN / NEUTRAL DISTURBANCE shall be logged in the memory of the meter with date and time stamp. Cumulative tamper count shall be increased by 1 and tamper events shall be displayed in push button mode (as per clause 5.8.2).

The shielding around the meter shall be such that it does not get affected by high Voltage and high energy or low energy impulse when comes in contact with meter from any side.

5.0 . GENERAL CONSTRUCTIONAL REQUIREMENT:

The 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 shock, safety against effect of excessive temperature, protection against spread of fire, protection against penetration of solid objects, dust and water.

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.

The meters shall be designed and manufactured using SMT (Surface Mount Technology) components

All the material and electronic power components used in the manufacture of the meter shall be of highest quality and reputed make to ensure higher reliability, longer life and sustained accuracy as given below or any other equivalent make with the strict approval of TPDDL.

Components should be upgraded as per latest available design/make

S No	Component Function	Requirement	Makes and Origin
1.	Measurement/ computing chips	The Measurement/ computing chips used in the meter should be with the Surface mount type along with the ASICs	USA: Anolog Devices, Cyrus Logic, Atmel, Phillips South Africa: SAMES Japan: NEC
2.	Memory chips	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	USA: Atmel, National Semiconductors, Texas Instruments, Phillips Japan: Hitachi or Oki
3.	Display modules	The display modules should be well protected from the external UV radiations . The display visibility should be sufficient to read the meter mounted between height of 0.5m and 2m. The construction of the modules should be such that the displayed quantity should not disturbed with the life of display. (Pin Typ be trans-reflective STN type industrial grade with extended temperature range.	Taiwan: Holtek Singapore: Bonafied Technologies Korea: Advantek China: Xiamen
4.	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 Holland / Korea: Phillips Taiwan: MAXIM Japan: Hitachi
5	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	A class vendor
6.	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 Semiconductor Phillips, Texas Instruments Japan: Hitachi, Oki, AVX or Ricoh Korea: Samsung
7.	Battery	Lithium with guaranteed life of 15 years	Varta / Tedirun /Sanyo or equivalent.
8.	RTC / Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Philips , Dallas, Atmel, Motorola Japan: NEC or Oki

Note: The makes of the components are in the preferential order.

5.1 Meter Body:

Meter body shall be made of unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II) with FVo Fire Retardant, self-extinguishing, UV stabilize, recyclable and Anti oxidation properties. The minimum thickness of the meter enclosure shall be 2mm.Meter base shall be opaque with polycarbonate LEXAN 500R or equivalent on prior approval from the Purchaser. Meter cover shall be transparent with polycarbonate LEXAN 143R/943A or equivalent on prior approval from the Purchaser. Meter cover & base shall be provided with continuous and seamless Ultrasonic welding/Chemical bonding such that it is not opened without breaking the enclosure. Front cover & base shall be such that it is not possible to cut & open the meter without certainly damaging the meter body and by no means shall an attempt to reassemble would not leave physical evidence. The meter body shall be sealed in such a way that opening of meter base and cover is possible only after breaking the seal(s). Unidirectional screws to be used on meter covers where ever required.

However single case meter body would be highly preferred. I.e. meter top cover and base shall be of single mould, thus nullifying the possibility of opening of meter case.

5.2 Terminals, Terminal Block

Terminal block should be single mould with meter body base. (Not separate)

Terminals may be grouped in terminal block having adequate insulating properties and mechanical strength. In order to satisfy such requirements when choosing insulating materials for the terminal block adequate testing of materials shall be taken into account. Terminal block and terminal cover shall be of a material which complies with the requirements of IS11731 (part 1) method FH1. The material of which the terminal block is made shall be capable of passing the test given in ISO 75 for temperature of 135°C and pressure of 1.8 M Pa. The terminal block shall be of opaque with polycarbonate LEXAN500R or equivalent on prior approval from the Purchaser

The terminals and connections shall be suitable to carry up to 120 % of I-max continuously (Imax 100 A).

The terminal block, the terminal cover and the meter case shall ensure reasonable safety against the spread of fire. They shall not be ignited by thermal overload of live parts in contact with them.

The manner of fixing the conductors to the terminals shall ensure adequate and durable contact such that there is no risk of loosening or undue heating. Terminals should be bottle type not cage clamp, shall be preferably of MS cage clamp type as per IS: 15707 or of flat end screw with at least 9 mm dia of screw for better contact area.

Internal diameter of the terminal holes shall be minimum 9.5 mm; minimum clearance between adjacent terminals shall be 10 mm. Depth of the terminal holes shall be of 25 mm.

Terminal block 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 is not transmitted through insulating material.

5.3 Terminal Cover:

Terminal cover shall be of short type and shall be transparent with polycarbonate LEXAN 143R/943A or equivalent on prior approval from the Purchaser. Appropriate space shall be available for incoming /outgoing cables without damaging/stressing terminal cover (terminal cover design shall be as per the Purchaser approval). After sealing the cover, terminals shall not be accessible without breaking the seals.

5.4 Sealing of meter

Reliable sealing arrangement shall be provided to make the meter tamper evident and to avoid fiddling or tampering by unauthorized persons. For this, one no. Polycarbonate seal and one no. Hologram seal shall be provided by the Purchaser. One no polycarbonate seal and two no. hologram seal shall be provided by the bidder. All the seals shall be fixed on meter body by the bidder at his works before dispatch.

Two sealing provision shall be provided at meter terminal cover, such that terminal shall not be accessible without breaking the seals. Length of the seal wire should not be loose, that meter top cover should not be opened without cutting/breaking the seal wire. All the seals shall be provided on front side only and as per the Purchaser specification. Rear side sealing arrangement shall not be accepted. Bidder shall provide seals be as per CEA regulation (2006). Only patented seals to be used as per CEA requirements

5.5 TOD Feature:

The meter shall be capable of measuring Cumulative Energy KWh, KVAh, KVARh Lag/Lead and MD (KW), (KVA) with time of day (TOD) registers for both export & import mode having profiles (No. of seasons & time slot shall be programmable locally and remotely with adequate security label . The meter should have 3 zones i.e. off peak, Normal & Peak Hours, however shall be programmable to 6 Zones as & when required. Also every time slot should have 3 internal sub register. However for current supply shall have season and daily profile shall be programmed as per following (no. of zones & time slot shall be programmable by CMRI/ AMR with adequate security level).

Seasons	Month	Off Peak T0	Normal T1	Peak T2
Season-1	April - September	0000-0600hrs	0600-1500hrs	1500-2400hrs
Season-2	October - March	2300-0600hrs	0600-1700hrs	1700-2300hrs

The Bidder shall be open to further modification in the software if required by the purchaser free of cost;

(a) Remote configuration through AMR shall be possible.

(b) Software data files and system files should be stored in different directories.

(c) Real time clock should be based on Quartz crystal timer so as to make it independent of line frequency. Manual and Remote synchronization with server shall be made possible.
(d) The meter should have hardware /software lock for programming change of parameters & the same should be protected with two label password.
(e) Record number files should be 12 digits alphanumeric for unique contract account no. (CA No.)

5.6 MD Integration:

The MD integration period shall be 30 minutes (integration period-programmable by CMRI at site and also thru AMR with adequate security level). The MD resetting shall be automatic at the 1 st of the month i.e. 00:00 hours of 1st of the month. Last six MD values shall be stored in the memory and four to be displayed in the Auto scroll mode. MD shall be recorded and displayed with minimum three digits before decimal and minimum two digits after decimal points. MD integration shall be sliding method, not in time block.

Measurement in Memory BCS end

5.7 Load survey:

The meter shall be capable of recording 30 minute average of the following parameters for at least last 90 days ~~60 days~~.

a) Voltage for each phase
b) Current for each phase & Neutral
c) PF for each phase
d) Average kWh import
e) Average kVAh import
f) kVArh (Lagging) import
g) kVArh(Leading) import
h) Average kWh Export
i) Average kVAh Export
j) kVArh (Lagging) export
k) kVArh(Leading) export
l) Average kWh Net
m) Average kVAh Net
n) kVArh (Lagging) Net
o) kVArh(Leading) Net
p) Demand KW Import
q) Demand KVA Import
r) Demand KVARh Lag Import
s) Demand KVARh Lead Import

5.8 Display units:

The display unit shall be Pin type built-in liquid crystal display (Permanently backlit type LCD Green color). The LCD shall be of STN (Super Twisted Nematic) construction suitable for maximum temperature withstands 65 C degree and minimum temperature withstands 0 degree C during normal operating condition. The LCD display shall have a wide viewing angle of 120 degree. When the meter is not energized the electronic display need not be visible. The display

shall not be affected by electrical, magnetic disturbances and ESD. The back lit must be green in color while in normal registration modes

The KWh register shall have minimum 7 digits and size of the digits shall be minimum 10mmx5mm. Cumulative energy (KWh) shall be displayed without decimal in auto scroll mode. (However decimal shall be available in push button mode for high resolution display for testing)

5.8.1 Scroll mode:

Persistence time for each parameter shall be 10 second. Values followed by header shall be avoided. (I.e. if MD1 is displayed in Auto scroll mode, Header (as given in x below) and value (say 5.23 KW) shall be shown simultaneously; it shall not be shown in successive displays. Off time shall not be available in auto scroll mode between each cycle. Auto scroll mode is restored after 10 sec, if push button is not operated.

Following shall be continuously displayed in auto scroll mode in the given order;

LCD segment check (all elements and 7 segments on display will be ON)

Meter Serial No.

Present date and time.

C KWh Cumulative Import (T0+T1+T2) KWh reading.
C T0 KWh KWh reading import
C T1 KWh KWh reading import
C T2 KWh KWh reading import

C KWh Cumulative Export (T0+T1+T2) KWh reading.
C T0 KWh reading Export
C T1 KWh reading Export
C T2 KWh reading Export

C KWh Cumulative Net (T0+T1+T2) KWh reading.
C T0 kWh reading Net
C T1 KWh readingNet
C T2 KWh reading Net

C kVAh Cumulative Import (T0+T1+T2) KWh reading.
C T0 kVAh reading import
C T1 kVAh reading import
C T2 kVAh reading import

C kVAh Cumulative Export (T0+T1+T2) KWh reading.

C T0 kVAh reading Export
C T1 kVAh reading Export
C T2 kVAh reading Export

C. kVAh Cumulative Net (T0+T1+T2) KWh reading.
C T0 kVAh reading Net
C T1 kVAh readingNet
C T2 kVAh reading Net

b 1 KWh Cumulative Import (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 KWh Cumulative Export (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 KWh Cumulative Net (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 kVAh Cumulative Import (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 kVAh Cumulative Export (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 kVAh Cumulative Net (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.

b 1 MD KW import KW reading on 1st of month at 00.00 hrs.
b 1 MD KVA import KVA reading on 1st of month at 00.00 hrs

C MD -KW import
C MD –KVA import

V1 V A Phase Voltage (Instantaneous value).
V2 V B Phase Voltage (Instantaneous value).
V3 V C Phase Voltage (Instantaneous value).
I1 A A Phase Current (Instantaneous value).
I2 A B Phase Current (Instantaneous value).
I3 A C Phase Current (Instantaneous value).
N A Neutral Current (Instantaneous value)
PF Instantaneous power factor
KW Import Instantaneous load in KW
KVA Import Instantaneous load in KVA

5.8.2 Push Button Mode:

Following parameters shall be displayed in Push button mode in the given order after display of all the tamper events.

C KWh Cumulative Import (T0+T1+T2) KWh reading.
C T0 KWh KWh reading import
C T1 KWh KWh reading import
C T2 KWh KWh reading import

C KWh Cumulative Export (T0+T1+T2) KWh reading.
C T0 KWh reading Export
C T1 KWh reading Export
C T2 KWh reading Export

C KWh Cumulative Net (T0+T1+T2) KWh reading.
C T0 kWh reading Net
C T1 KWh readingNet
C T2 KWh reading Net

C kVAh Cumulative Import (T0+T1+T2) KWh reading.
C T0 kVAh reading import
C T1 kVAh reading import
C T2 kVAh reading import

C kVAh Cumulative Export (T0+T1+T2) KWh reading.
C T0 kVAh reading Export
C T1 kVAh reading Export
C T2 kVAh reading Export

C. kVAh Cumulative Net (T0+T1+T2) KWh reading.
C T0 kVAh reading Net
C T1 kVAh readingNet
C T2 kVAh reading Net

b 1 KWh Cumulative Import (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 KWh Cumulative Export (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 KWh Cumulative Net (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 kVAh Cumulative Import (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 kVAh Cumulative Export (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.
b 1 kVAh Cumulative Net (T0+T1+T2) KWh reading on 1st of month at 00.00 hrs.

b 1 MD KW import KW reading on 1st of month at 00.00 hrs.
b 1 MD KVA import KVA reading on 1st of month at 00.00 hrs

C MD -KW import
C MD –KVA import

V1 V A Phase Voltage (Instantaneous value).
V2 V B Phase Voltage (Instantaneous value).

V3	V	C Phase Voltage (Instantaneous value).
I1	A	A Phase Current (Instantaneous value).
I2	A	B Phase Current (Instantaneous value).
I3	A	C Phase Current (Instantaneous value).
N	A	Neutral Current (Instantaneous value)
P1	PF	Instantaneous power factor
P2	PF	Instantaneous power factor
P3	PF	Instantaneous power factor
KW		Import Instantaneous load in KW
KVA		Import Instantaneous load in KVA

Frequency
SEQ: Vryb: Iryb Phase Sequence

All these parameters shall be downloaded locally or remotely and interpreted in PC/Laptop. All the parameters shall be recorded and memorized in its Nonvolatile Memory (NVM). The corresponding nonvolatile memory shall have a minimum retention time of 10 years. Last twelve months history data (KWh reading and MD with data and time) and at least compartment wise) shall be available in the nonvolatile memory.

5.9 Output Device:

5.9.1 Output: The meters shall have a suitable test output device. Red color blinking LED (marked as imp/kWh) shall be provided in the front left side. One more red color blinking LED shall be provided in the front right side & should be configurable through push button. This device shall be suitable for using with sensing probe used with test benches or reference standard meters. The test output device shall have the impulse rate defined as impulse / KWh and impulse / kVArh. Impulse/unit should be 800 for each type energy unit (KWh/KVArh).

6.0 NAME PLATE AND MARKING:

Meter name plate parameters should be laser print and inside the top cover. Meters shall have a name plate clearly visible and effectively secured against removal. Indelibly and distinctly marked with all essential particulars as per relevant standards along with the following.

i. Manufacturer's name
ii. Type designation
iii. Number of phases and wires
iv. Meter Serial number
v. Month and Year of manufacture
vi. Unit of measurement
vii. Reference voltage ,
viii. Frequency
ix. Ref. temperature if different from 27 deg. C
x. Rated basic and maximum Current
xi. Meter constant (imp/kWh)
xii. 'BIS' Mark
xiii. Class index of meter

xiv. "Property of TPDDL"
xv. Purchase Order No. & date
xvi. Guarantee period.
xvii. Sign of double square
xviii. Country of manufacture.

However the following shall be printed in bar code on the meter nameplate. .(shall be printed on name plate instead on sticker).

i. Manufacturer's code No.(given by TPDDL)
ii. Meter Sr. No
iii. TPDDL Property
iv. Month/Year of manufacture.

7.0 TESTS:

All routine, acceptance & type tests shall be carried out on the meter and meter body separately in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted in addition to the tests specified in IS/IEC

7.1 **Routine Test**

i. AC High Voltage test
ii. Insulation test
iii. Test on limits of error
iv. Test of starting current
v. Test of no load condition

7.2 **Acceptance test:**

i. AC High Voltage test
ii. Insulation test
iii. Test on limits of error with following loads

120% I max(120A)	I max (100A)	Ib(20A)	0.5 Ib (10A)	0.1Ib (2A)	0.05Ib (1A)
UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 Lead and 0.5 lag	UPF

iv. Test of meter constant
v. Test of starting current
vi. Test of no load condition
vii. Test of repeatability of error.
viii. Test of power consumption.

7.3 **Type test:**

i. All tests as defined in IS 13779:1999.

ii. Test against abnormal magnetic influence as per CBIP TR 88.
iii. DC immunity test (injection both on phase and neutral terminal)
iv. Test for Material used for Terminal Block and meter body as per relevant standards.

7.4 **Special test:**

The bidder shall demonstrate the communication capability of the meter through communication modes as defined in the specification before conducting acceptance tests. The bidder shall ensure that API (Application protocol interface) is compatible with TPDDL CFW. Special test are as below:

i. Test for Immunity against external influencing signal as per the Purchaser specification
ii. Test for Immunity against DC Immunity as per the Purchaser specification
iii. Test for Immunity against Tamper conditions as per the Purchaser specification.
iv. Error measurements with all abnormal conditions
v. Test to Influence of Harmonics
vi. Supply voltage and frequency variation test
vii. Testing of self-diagnostic features and tamper count increment and logging with date and time.

8.0 TYPE TESTS CERTIFICATES:

The bidder shall furnish the type test certificates of the meter for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI / ERDA as per the relevant standards. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to NDPL.

9.0 PRE-DISPATCH INSPECTION:

The successful bidder shall submit two prototype samples for further testing and compliance as per specifications and getting approval before mass manufacturing. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection

Equipment shall be subject to inspection by a duly authorized representative of the Purchaser. Bidder shall grant free access to the places of manufacture to TPDDL representatives at all times when the work is in progress. Inspection by the TPDDL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPDDL.

Following documents shall be sent along with material

a) Test reports
b) MDCC issued by TPDDL
c) Invoice in duplicate
d) Packing list
e) Drawings & catalogue
f) Guarantee / Warrantee card
g) Delivery Challan
h) Other Documents (as applicable)

10.0 INSPECTION AFTER RECEIPT AT STORE:

The material received at Purchaser's store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department.

The successful bidder shall submit two extra boxes (unpaid) per lot delivered, with serial nos. in continuation to the lot (lot size shall be 2,000 numbers or as defined in the order) to the Purchaser for further testing and confirmation in line with the specifications and the material shall be liable for rejection, if test results are found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department.

11.0 GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the purchaser up to a period of at least 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract whichever is earlier, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Company, failing which the purchaser will be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the bidder or from the " Security cum Performance Deposit" as the case may be.

Bidder shall further be responsible for 'free replacement at site' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the purchaser.

12.0 PACKING:

Bidder shall ensure that all material covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The material used for packing shall be environmentally friendly.
Packing and transportation shall be as per IS 15707:206 clauses 9.1 and 9.2. Routine test report of the individual meter shall be kept inside each card board carton of the meter.

13.0 TENDER SAMPLE:

Bidders are required to manufacture 3 sample meters as per NDPL specification (sealed, unsealed and openable base and cover to view/test the inner circuits) and submit the sample along with bid to Purchaser for approval.

14.0 QUALITY CONTROL:

The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished.
Quality should be ensured at the following stages:

- At PCB manufacturing stage, each board shall be subjected to computerized bare board testing.
- At insertion stage, all components should under go computerized testing for conforming to design parameter and orientation.
- Complete assembled and soldered PCB should under go functional testing using Automatic Test Equipment (ATEs).
- Prior to final testing and calibration, sample meters shall be subjected to ageing test (i.e. meters are kept in ovens for 24 hours at 55 Deg.C temperature and atmospheric humidity under real-life condition at its full load current. After 24 hours meter should work satisfactorily)

The Purchaser's engineer or its nominated representative shall have free access to the bidder's/manufacturer's works to carry out inspections.

15.0 MINIMUM TESTING FACILITIES:

Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards. The bidder shall have duly calibrated Reference Standard meter of Class 0.05 accuracy.

16.0 MANUFACTURING ACTIVITIES:

The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.

17.0 SPARES, ACCESSORIES & TOOLS:

Not Applicable

18.0 DRAWINGS:

Following drawings & Documents shall be prepared based on TPDDL specifications and statutory requirements and shall be submitted with the bid:

a) Completely filled-in Technical Parameters.
b) General arrangement drawing of the meter
c) Terminal Block dimensional drawing
d) Mounting arrangement drawings.
e) General description of the equipment and all components with makes and technical requirement
f) Type Test Certificates
g) Experience List
h) Manufacturing schedule and test schedule

After the award of the contract, four (4) copies of following drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings	√		√

3	Terminal block Dimensional drawings	√		√
4	Mounting arrangement drawing.	√		√
5	Manual/Catalogues		√	
6	Transport/ Shipping dimension drawing		√	√
7	QA &QC Plan	√	√	√
8	Routine, Acceptance and Type Test Certificates	√	√	√

Bidder shall subsequently provide Four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, Test certificates shall be submitted after the final approval of the same to purchaser.

All the documents & drawings shall be in English language.
Instruction Manuals: Bidder shall furnish two softcopies (CD) and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices.

19.0 GUARANTEED TECHNICAL PARTICULARS:

S.No	Description	Units	As Furnished by Bidder
1	Type of meter		
2	Accuracy Class of the meter		
3	Ib & Imax	A	
4	Operating Voltage	V	
5	Operating Frequency	*Hz*	
6	Power Consumption and Burden		
7	Starting Current	mA	
8	Short time over current	A	
9	Influence of heating		
10	Rated impulse withstand voltage	KV	
11	AC withstand Voltage for 1 min	KV	
12	Insulation resistance a) Between frame & Current, voltage circuits connected	M ohm	

	together: b) Between each current (or voltage circuit) & each and every other circuit.		
13	Mechanical requirement as per IS 13779		
14	Resistance to heat and fire (As per specification)		
15	Degree of protection		
16	Resistance against climatic influence (as per IS 13779)		
17	Electromagnetic Compatibility (EMC) as per CBIP Technical report no 88(latest amendment		
18	Accuracy requirements (As per IS 13779		
19	Power factor range		
20	Energy measurement		
21	Connection Diagram for system on terminal cover	Yes/No	
22	Self diagnostic feature		
23	Initial start up of meter (meter shall be fully functional within 5 sec after reference voltage is applied to the meter terminals)		
24	Terminal block a) Depth of the Terminal holes b) Internal diameter of terminal holes c) Clearance between adjacent terminals	 mm mm mm	
25	Communication capabilities as per clause 4.31		
26	Immunity against abnormal Magnetic influence, as defined in Cl. 4.32.1		
27	Immunity against HV ESD as defined in Cl. 4.32.2		

28	DC Immunity as defined in Cl. 4.33		
29	Grade of material for a) Meter base b) Meter cover c) Terminal block d) Terminal cover		
30	Tamper counts		
31	Recording forward energy in all conditions as per annexure I (including current/potential reversal)	Yes/No	
32	Makes of all components used in the meter.	Yes/No	
33	Non Volatile memory (Retention period)		
34	Measuring elements used in the meter		
35	Power supply to circuit in case of supply failure		
36	Display of measured values (As per specification –clause 5.8)	Yes/No	
37	LCD display (Type and viewing angle)		
38	Pulse rate	Imp/kWh, Imp/kVArh	
39	Name plate marking	Yes/No	
40	Routine test certificates	Yes/No	
41	Acceptance test certificates	Yes/No	
42	Type test certificates	Yes/No	
43	Guarantee certificates	Yes/No	

20.0 SCHEDULES OF DEVIATIONS:

The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless **specifically** mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.

(TO BE ENCLOSED WITH THE BID)

All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

S.No.	Clause No.	Details of deviation with justifications

We confirm that there are no deviations apart from those detailed above.

Seal of the Company.

Designation

Signature

TECHNICAL SPECIFICATION COVER SHEET

Document No: ENG-LV-92

Document Title: Specification for 3 Phase 4 wire LT CT NET Meter

Rev No	Remarks	Date	Prepared By: Initials	Prepared By: Sign	Reviewed By: Initials	Reviewed By: Sign	Approved By: Initials	Approved By: Sign	issued By	
00	For tender purpose	06.02.15	IA		MJ		DRD		HCS	

Issuing Office
HOD (Engg)
<Tata Power Delhi Distribution Limited>
<33KV Grid Sub Station Building,>
<Hudson Lines, Kingsway Camp, Delhi – 110 009.>

		<table><tr><th>Register</th><th>TOD</th><th>April-Sep</th><th>Oct-Mar</th></tr><tr><td>1</td><td>Off peak</td><td>0000-0600</td><td>2300-0600</td></tr><tr><td>2</td><td>Normal</td><td>0600-1500</td><td>0600-1700</td></tr><tr><td>3</td><td>Peak</td><td>1500-2400</td><td>1700-2300</td></tr></table>
3.14	Load survey	15 parameters with 30 days, 30 IP Load survey parameters: 3 phase voltage (R,Y,B) 3 phase currents (R,Y,B) Active import Active export Active net Apparent import Apparent export Reactive import while active import Reactive import while active export Reactive export while active import Reactive export while active export
3.15	Time required for data reading from meter and downloading on desktop PC	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). 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 outside the terminal cover 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) Bidder 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 (with the updated versions). Reading can be done through scheduling in BCS or trough 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. e) Offered meter shall have open protocol. F) Bidder shall provide read and convert API on MIOS standard and also integrate communication with the TPDDL system.

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 - 60°C and humidity up to 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	**KVA shall be computed as Modulus of Active and reactive energy. However incase of capacitive Reactive energy, the KVA shall 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	**Constructional Feature**	
	Parameters	**Technical Requirements**
4.1	Body of Meter	a) Top transparent and base opaque material polycarbonate of LEXAN 143A 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 grade and shall form Integral part of the meter base, brass terminal inserts & MS screws. Internal diameter of terminal holes-5.5 mm (minimum), depth of terminal hole- 25 mm and clearance between adjacent terminal shall be 10 mm(minimum)
4.3	Terminal cover	Transparent terminal cover with provision of sealing through sealing screw. Terminal cover shall be of short type and shall be transparent with polycarbonate LEXAN 143R/943A or equivalent on prior approval from the Purchaser. Appropriate space shall be available for incoming /outgoing cables without damaging/stressing terminal cover (terminal cover design shall be as per the Purchaser approval). After sealing the cover, terminals shall not be accessible without breaking the seals.
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 & as specified by purchaser.
4.6	Meter Sealing	Reliable sealing arrangement shall be provided to make the meter tamper evident and to avoid fiddling or tampering by unauthorized persons. For this, one no. Polycarbonate seal and one no. Hologram seal shall be provided by the Purchaser. One no polycarbonate seal and two no. hologram seal shall be provided by the bidder. All the seals shall be fixed on meter body by the bidder at his works before dispatch. Two sealing provision shall be provided at meter terminal cover, such that terminal shall not be accessible without breaking the seals. Length of the seal wire should not be loose, that meter top cover should not be opened without cutting/breaking the seal wire. All the seals shall be provided on front side only and as per the Purchaser specification. Rear side sealing arrangement shall not be accepted. Bidder shall provide seals be as per

		CEA regulation (2006). Only patented seals to be used as per CEA requirements
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.
4.10	Protection against penetration of dust and water.	Degree of Protection: IP 51 as per IS 12063, but without suction in the meter.
5	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 indicated in tamper logic sheet. 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 programmable
5.3	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.
5.4	Snap shots	Meter shall log all three phase voltage, current, power factor at the time of tamper attempt for all such occurrences
5.5	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.
5.6	Over Load	Meter shall record Over Load as an event, in terms of defined % threshold value of load (Programmable at factory)
5.7	Voltage High/Voltage Low	Meter shall record case of High Voltage/Low Voltage in terms of defined value Voltage Threshold (Vref.)
5.8	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

5.9	RTC Drift	For TOD tariff the proper RTC functioning shall be of prime importance. Software to adjust the RTC drifts to be provided along with BCS.
5.10	Protection against HV spark	Meter shall continue to record energy if it is disturbed using spark gun/ignition coil of strength upto 35 KV. Beyond which either meter should be immune or it should record an event (Occurrence and restoration) with date & time stamping as HV ESD. Reversal of reading is not accepted in any condition"
5.11	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.
5.12	Power off	Meter shall be capable to record On/Off event logging in case all the three phase are not available.
5.13	Abnormal voltage/ load	Meter shall record invalid voltage and if either the angle between two phases is beyond 120 +/- 10deg.
5.14	Top cover open	Tamper indication for top cover open shall not get reset on downloading the meter. Time of logging of cover open shall be the actual time of logging cover open (event snap shot shall be taken when meter is powered up again).
5.15	Wiring connection Display	Meter shall have connection check display parameter for this requirement and also meter shall have phase enunciators to indicate the availability of phases on display. However meter shall have phase association event to capture phase association error.
5.16	Abnormal and Temper Condition	Meter shall be capable of recording occurrence and restoration of abnormal events listed below along with date & time and snap shots of individual voltages, currents, power factors, active energy and apparent energy for export & import mode at the time of occurrence of abnormal event and restoration of normal supply. During abnormal and Tamper conditions, the current shall be recorded as active current and line current. Each such event shall be provided compartment wise as mentioned below due to the limitation of FIFO. Persistence time for occurrence and restoration for the events along with their threshold values shall be as per table given below.

Compartment No.	Description of event type	No. of Event Logged	Snapshot parameters : Phase Voltages, Currents (both phase and neutral), power factor phase wise, Frequency, Active & Apparent Energy for both export & Import mode.
1	PT Missing , Voltage Unbalance, High Voltage,	50 50 25	Yes

2	CT Open, CT Bypass, Over Current , Current Imbalance	50 50 25 25	Yes
3	Neutral Disturbance, Magnet , Low Power Factor HV ESD	25 25 25 25	Yes
4	Power on off	25	No
5	Cover Open	5	YES

Abnormal tampering conditions

S.No	Persistence time for occurrences	Persistence time for restoration	Threshold value for occurrence event.	Threshold value for restoration event.
1	PT Missing= 0 Hr 5 Min 0 sec	PT Missing= 0 Hr 5 Min 0 sec	Voltage <70% of Vref: and current > 2% Ib.	Voltage >80% of Vref: and current > 2% Ib.
2	Voltage Unbalance= 0 Hr 5 Min 0 sec	Voltage Unbalance= 0 Hr 5 Min 0 sec	20% or more between the phases and current > 2% Ib.	Shall be less than 10 % between the phases and current > 2% Ib.
3	CT Open= 0 Hr 5 Min 0 sec	CT Open= 0 Hr 5 Min 0 sec	Ir + Iy + Ib + In ≥ 10 % of Ibasic (vector Sum). AND Phase current < 1% of Ibasic with All current	Ir + Iy + Ib + In <5 % of Ibasic. (vector Sum) AND Phase current > 10% of Ibasic with All current

				+ve.	+ve.
		4	CT Bypass= 0 Hr 5 Min 0 sec	CT Bypass= 0 Hr 5 Min 0 sec	Ir + Iy + Ib + In ≥ 10 % of Ibasic. (vector Sum) AND Phase current > 10% of Ibasic with All current +ve.	(I1+I2+I3+IN) < 5% Ib (vector Sum) AND Phase current > 10% of Ibasic with All current +ve.
		5	Current unbalance= 0 Hr 15 Min 0 sec	Current unbalance= 0 Hr 15 Min 0 sec	> 30% difference between the phase	< 20% difference between the phase
		6	Overload current = 0 Hr 5 Min 0 sec	Overload current= 0 Hr 5 Min 0 sec	>125% of I-Max	<110% of I-Max
		7	Neutral Disturbance = 0 Hr 2 Min 00 sec	Neutral Disturbance= 0 Hr 2 Min 00 sec	Voltage >145% of Vref ,Current >2% Ib OR freq <47 Hz OR Freq>52 OR DC Voltage/signal injection	Voltage < 110% of Vref ,Current >2% Ib AND Freq>47 Hz OR Freq<52
		8	Magnet= 0 Hr 2Min 00 sec	Magnet= 0 Hr 2Min 00 sec	> 0.5 Tesla (permanent magnet) Or DC magnetic induction:>0.27 Tesla or AC Magnetic induction >0.2 Tesla	< 0.5 Tesla (permanent magnet) DC magnetic induction: <0.20 Tesla AC Magnetic induction <0.15 Tesla
		9	Power On Off= 0 Hr 5 Min 0 sec	Power On Off= 0 Hr 5 Min 0 sec		

6	COMPONENT SPECIFICATIONS		
	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 clauses under 5.2.h	The current transformer should withstand for the clauses under 5.2.h
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: Analog 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 Ever light Korea: Advantech China: Success 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 Ever light Japan: Hitachi Taiwan: Ligitek Germany: Siemens
6.6	Optical port	Optical port should be used to transfer the meter data to meter reading	USA: National Semiconductors ,HP Holland / Korea: Phillips Ever light

		instrument. The mechanical construction of the port should be such to facilitate the data transfer easily.	Japan: Hitachi, Taiwan: Ligitek
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, Tekcell
6.11	RTC & Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	USA: Philips, Dallas Atmel, Motorola, Microchip Built into microcontroller Japan: NEC or Oki
6.12	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm	
7	GENERAL REQUIREMENTS		
7.1	On the meter nameplate	Meter name plate parameters should be laser print and inside the top cover. Meters shall have a name plate clearly visible and effectively secured against removal. Indelibly and distinctly marked with all essential particulars as per relevant standards along with the following. i. Manufacturer's name ii. Type designation iii. Number of phases and wires iv. Meter Serial number v. Month and Year of manufacture vi. Unit of measurement vii. Reference voltage , viii. Frequency ix. Ref. temperature if different from 27 deg. C x. Rated basic and maximum Current xi. Meter constant (imp/kWh) xii. 'BIS' Mark xiii. Class index of meter	

		xiv. "Property of TPDDL" xv. Purchase Order No. & date xvi. Guarantee period. xvii. Sign of double square xviii. Country of manufacture. However the following shall be printed in bar code on the meter nameplate.(shall be printed on name plate instead on sticker). i. Manufacturer's code No.(given by TPDDL) ii. Meter Sr. No (printed inside the meter Top cover) iii. TPDDL Property iv. Month/Year of manufacture.
7.2		Bidder shall supply software suitable for energy measurement & energy spot billing through CMRI. Meter Sr. Nos. should be printed in black on the name plate. (printed inside the meter Top cover) Meter shall be sealed as per CEA guideline. Terminal cover should be fixed on Meter before dispatch. Box number, Meter serial number, type, rating should be mentioned on cases / cartons. Meters shall be suitably packed with environmental friendly material in order to avoid damage or disturbance during transit or handling and to prevent in grace of moisture and dust. Identification for different types of meters shall be provided on the name plate. For eg. NET METERING
8	ANNEXURE 1: DISPLAY SEQUENCE FOR THE PARAMETERS	
8.1	**Default Display**: Auto scroll mode, Scroll time 10 Sec. i. All Segment on display ii. Date iii. Real Time iv. Mete Serial No v. Cumulative Active import energy vi. Cumulative Active export energy vii. Cumulative Active net energy viii. Cumulative Apparent import Energy ix. Cumulative Apparent export Energy x. Maximum demand in Active import xi. Maximum demand in Active export xii. Cumulative Reactive import while active import energy xiii. Cumulative Reactive import while active export energy	

	xiv. Cumulative Reactive export while active import energy xv. Cumulative Reactive export while active export energy xvi. Instantaneous Average Power Factor xvii. Maximum Demand in Apparent import while Active import xviii. Maximum Demand in Apparent import while Active export xix. TOD Active energy import (Reg.1 to Reg.3) xx. TOD Active energy export (Reg.1 to Reg.3) xxi. TOD Apparent energy while Active import (Reg.1 to Reg.3) xxii. TOD Apparent energy while Active export (Reg.1 to Reg.3) xxiii. TOD Reactive import while active import energy (Reg.1 to Reg.3) xxiv. TOD Reactive import while active export energy (Reg.1 to Reg.3) xxv. TOD Reactive export while active import energy (Reg.1 to Reg.3) xxvi. TOD Reactive export while active export energy (Reg.1 to Reg.3) xxvii. Phase To Neutral Voltage R xxviii. Phase To Neutral Voltage Y xxix. Phase To Neutral Voltage B xxx. R Phase Line Current xxxi. Y Phase Line Current xxxii. B Phase Line Current xxxiii. Neutral Current xxxiv. History 1 Active import energy xxxv. History 1 Active export energy xxxvi. History 1 Reactive import while active import energy xxxvii. History 1 Reactive import while active export energy xxxviii. History 1 Reactive export while active import energy xxxix. History 1 Reactive export while active export energy xl. History 1 Apparent import Energy xli. History 1 Apparent export Energy xlii. History 1 Maximum demand in Active import xliii. History 1 Maximum demand in Active import Occurrence Time and Date xliv. History 1 Maximum demand in Active export xlv. History 1 Maximum demand in Active export Occurrence Time and Date xlvi. History 1 Maximum Demand in Apparent while Active import xlvii. History 1 Maximum demand in Apparent while Active import Occurrence Time and Date xlviii. History 1 Maximum Demand in Apparent while Active export xlix. History 1 Maximum demand in Apparent while Active export Occurrence Time and Date **History 1 TOD register reading of active, apparent and reactive of import and export mode shall be displayed in auto display.**
8.2	**<u>On-demand Display:</u>** (pushbutton the following parameters should be displayed) a. All Segment on display b. Date c. Real Time d. Meter serial no. e. Cumulative Active import energy f. Cumulative Active export energy g. Cumulative Active net energy h. Cumulative Apparent import Energy

i. Cumulative Apparent export Energy
j. Maximum demand in Active import
k. Maximum demand in Active export
l. Cumulative Reactive import while active import energy
m. Cumulative Reactive import while active export energy
n. Cumulative Reactive export while active import energy
o. Cumulative Reactive export while active export energy
p. Instantaneous Average Power Factor
q. Maximum Demand in Apparent while Active import
r. Maximum Demand in Apparent while Active export
s. TOD Active energy import (Reg.1 to Reg.3)
t. TOD Active energy export (Reg.1 to Reg.3)
u. TOD Apparent energy while Active import (Reg.1 to Reg.3)
v. TOD Apparent energy while Active export (Reg.1 to Reg.3)
w. TOD Reactive import while active import energy (Reg.1 to Reg.3)
x. TOD Reactive import while active export energy (Reg.1 to Reg.3)
y. TOD Reactive export while active import energy (Reg.1 to Reg.3)
z. TOD Reactive export while active export energy (Reg.1 to Reg.3)
aa. Phase To Neutral Voltage R
bb. Phase To Neutral Voltage Y
cc. Phase To Neutral Voltage B
dd. R Phase Line Current
ee. Y Phase Line Current
ff. B Phase Line Current
gg. Neutral Current
hh. History 1 Active import energy
ii. History 1 Active export energy
a. History 1 Reactive import while active import energy
b. History 1 Reactive import while active export energy
c. History 1 Reactive export while active import energy
d. History 1 Reactive export while active export energy
jj. History 1 Apparent import Energy
kk. History 1 Apparent export Energy
ll. History 1 Maximum demand in Active import
mm. History 1 Maximum demand in Active import Occurrence Time and Date
nn. History 1 Maximum demand in Active export
oo. History 1 Maximum demand in Active export Occurrence Time and Date
pp. History 1 Maximum Demand in Apparent while Active import
qq. History 1 Maximum demand in Apparent while Active import Occurrence Time and Date
rr. History 1 Maximum Demand in Apparent while Active export
ss. History 1 Maximum demand in Apparent while Active export Occurrence Time and Date
tt. Cumulative Tamper Count
uu. Present PT Status
vv. Present CT Status
ww. Present Others Status
xx. Last Occurrence Tamper ID
yy. Date of Last Tamper Occurrence
zz. Time of Last Tamper Occurrence

		aaa. Last Restoration Tamper ID bbb. Date of Last Tamper Restoration ccc. Time of Last Tamper Restoration ddd. Front Cover Open Count eee. Last Cover open date fff. Last Cover open time ggg. Meter Serial Number BIS hhh. Program Name iii. SML Tariff Name jjj. Supply Frequency kkk. R Phase Power Factor Q1 lll. Y Phase Power Factor Q2 mmm. B Phase Power Factor Q3 nnn. Instantaneous Load Active ooo. Instantaneous Load Reactive ppp. Instantaneous Load Apparent qqq. MD Reset Time and Date rrr. MD Reset Or Bill Count sss. Cumulative power off duration ttt. Number of Power-Failures uuu. High Resolution Cumulative Active import energy vvv. High Resolution Cumulative Active export energy www. High Resolution Cumulative Active net energy xxx. High Resolution Cumulative Reactive import while active import energy yyy. High Resolution Cumulative Reactive import while active export energy zzz. High Resolution Cumulative Reactive export while active import energy aaaa. High Resolution Cumulative Reactive export while active export energy bbbb. High Resolution Cumulative Apparent import Energy cccc. High Resolution Cumulative Apparent export Energy dddd. Phase Sequence eeee. Battery Status ffff. Self Diagnostic Flags gggg. Connection Check Note: The meter display should return to Default Display mode (mentioned above) if the 'push button' is not operated approx. more than 10 seconds. Provision for scroll lock by pressing for approx 5 sec and sent to normal after by same action or after mid night cross over.
9	Test	All routine, acceptance & type tests shall be carried out on the meter and meter body separately in accordance with the relevant IS/IEC. All routine/acceptance tests shall be witnessed by the purchaser/his authorized representative. All the components shall also be type tested as per the relevant standards. Following tests shall be necessarily conducted in addition to the tests specified in IS/IEC **1. Routine Test** i. AC High Voltage test ii. Insulation test

iii. Test on limits of error
iv. Test of starting current
v. Test of no load condition

2. **Acceptance test:**
   i. AC High Voltage test
   ii. Insulation test
   iii. Test on limits of error with following loads

120% I max(120A)	I max (100A)	Ib(20A)	0.5 Ib (10A)	0.1Ib (2A)	0.05Ib (1A)
UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 lead and 0.5 lag	UPF, 0.8 Lead and 0.5 lag	UPF

i. Test of meter constant
ii. Test of starting current
iii. Test of no load condition
iv. Test of repeatability of error.

Test of power consumption

3. **Type test:**
   i. All tests as defined in IS 13779:1999.
   ii. Test against abnormal magnetic influence as per CBIP TR 88.
   iii. DC immunity test (injection both on phase and neutral terminal)
   iv. Test for Material used for Terminal Block and meter body as per relevant standards.

4. **Special test:**

The bidder shall demonstrate the communication capability of the meter through communication modes as defined in the specification before conducting acceptance tests. The bidder shall ensure that API (Application protocol interface) is compatible with TPDDL CFW. Special test are as below:

i. Test for Immunity against external influencing signal as per the Purchaser specification
ii. Test for Immunity against DC Immunity as per the Purchaser specification
iii. Test for Immunity against Tamper conditions as per the Purchaser specification.
iv. Error measurements with all abnormal conditions
v. Test to Influence of Harmonics
vi. Supply voltage and frequency variation test
vii. Testing of self-diagnostic features and tamper count increment and logging with date and time.

10	Type Test Certificate	The bidder shall furnish the type test certificates of the meter for the tests as mentioned above as per the corresponding standards. All the tests shall be conducted at CPRI /

		ERDA as per the relevant standards. Type test should have been conducted in certified Test Laboratories during the period not exceeding 5 years from the date of opening the bid. In the event of any discrepancy in the test reports i.e. any test report not acceptable or any/all type tests (including additional type tests, if any) not carried out, same shall be carried out without any cost implication to TPDDL
11	**PRE-DISPATCH INSPECTION**	The successful bidder shall submit two prototype samples for further testing and compliance as per specifications and getting approval before mass manufacturing. Inspection may be made at any stage of manufacture at the discretion of the purchaser and the equipment, if found unsatisfactory as to workmanship or material, the same is liable to rejection Equipment shall be subject to inspection by a duly authorized representative of the Purchaser. Bidder shall grant free access to the places of manufacture to TPDDL representatives at all times when the work is in progress. Inspection by the TPDDL or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by TPDDL. Following documents shall be sent along with material a) Test reports b) MDCC issued by TPDDL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warrantee card g) Delivery Challan Other Documents (as applicable)
12	Inspection After Receipt at Store	The material received at Purchaser's store shall be inspected for acceptance and shall be liable for rejection, if found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department. The successful bidder shall submit two extra boxes (unpaid) per lot delivered, with serial nos. in continuation to the lot (lot size shall be 2,000 numbers or as defined in the order) to the Purchaser for further testing and confirmation in line with the specifications and the material shall be liable for rejection, if test results are found different from the reports of the pre-dispatch inspection and one copy of the report shall be sent to Project Engineering department.
13	Guarantee	Bidder shall stand guarantee towards design, materials, workmanship & quality of process / manufacturing of items under this contract for due and intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the purchaser up to a period of at least 60 months from the date of commissioning or 66 months from the date of last supplies made under the contract whichever is earlier, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame, and to the entire satisfaction of the Company, failing which the purchaser will be at liberty to get it replaced/rectified at bidder's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the bidder or from the " Security cum Performance Deposit" as the case may be.

		Bidder shall further be responsible for 'free replacement at site' for another period of THREE years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the purchaser.
14	Packing	Bidder shall ensure that all material covered under this specification shall be prepared for rail/road transport (local equipment) and be packed in such a manner as to protect it from damage in transit. The material used for packing shall be environmentally friendly. Packing and transportation shall be as per IS 15707:206 clauses 9.1 and 9.2. Routine test report of the individual meter shall be kept inside each card board carton of the meter
15	Tender Sample	Bidders are required to manufacture 3 sample meters as per NDPL specification (sealed, unsealed and openable base and cover to view/test the inner circuits) and submit the sample along with bid to Purchaser for approval.
16	Quality Control	The bidder shall submit with the offer Quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and bought out items and fully assembled component and equipment after finishing. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. Quality should be ensured at the following stages: • At PCB manufacturing stage, each board shall be subjected to computerized bare board testing. • At insertion stage, all components should under go computerized testing for conforming to design parameter and orientation. • Complete assembled and soldered PCB should under go functional testing using Automatic Test Equipment (ATEs). • Prior to final testing and calibration, sample meters shall be subjected to ageing test (i.e. meters are kept in ovens for 24 hours at 55 Deg.C temperature and atmospheric humidity under real-life condition at its full load current. After 24 hours meter should work satisfactorily) The Purchaser's engineer or its nominated representative shall have free access to the bidder's/manufacturer's works to carry out inspections.
17	Minimum Testing Facility	Bidder shall have adequate in house testing facilities for carrying out all routine tests & acceptance tests as per relevant International / Indian standards. The bidder shall have duly calibrated Reference Standard meter of Class 0.05 accuracy.
18	Manufacturing Activities	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer. This bar chart will have to be submitted within 15 days from the release of the order.
19	Drawing	Following drawings & Documents shall be prepared based on TPDDL specifications and statutory requirements and shall be submitted with the bid:

a) Completely filled-in Technical Parameters.
b) General arrangement drawing of the meter
c) Terminal Block dimensional drawing
d) Mounting arrangement drawings.
e) General description of the equipment and all components with makes and technical requirement
f) Type Test Certificates
g) Experience List
h) Manufacturing schedule and test schedule

After the award of the contract, four (4) copies of following drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	General Arrangement drawings	√		√
3	Terminal block Dimensional drawings	√		√
4	Mounting arrangement drawing.	√		√
5	Manual/Catalogues		√	
6	Transport/ Shipping dimension drawing		√	√
7	QA &QC Plan	√	√	√
8	Routine, Acceptance and Type Test Certificates	√	√	√

Bidder shall subsequently provide Four (4) complete sets of final drawings, one of which shall be auto positive suitable for reproduction, before the dispatch of the equipment. Soft copy (Compact Disk CD) of all the drawing, GTP, Test certificates shall be submitted final approval of the same to purchaser.

All the documents & drawings shall be in English language.Instruction Manuals: Bidder shall furnish two softcopies (CD) and four (4) hard copies of nicely bound manuals (In English language) covering erection and maintenance instructions and all relevant information and drawings pertaining to the main equipment as well as auxiliary devices

20	GUARANTEED TECHNICAL PARTICULARS		
	Description	**Units**	**As Furnished by Bidder**
1	Type of meter		
2	Accuracy Class of the meter		
3	Ib & Imax	A	
4	Operating Voltage	V	
5	Operating Frequency	*Hz*	
6	Power Consumption and Burden		
7	Starting Current	mA	
8	Short time over current	A	
9	Influence of heating		
10	Rated impulse withstand voltage	KV	
11	AC withstand Voltage for 1 min	KV	
12	Insulation resistance a) Between frame & Current, voltage circuits connected together: b) Between each current (or voltage circuit) & each and every other circuit.	M ohm	
13	Mechanical requirement as per IS 13779		
14	Resistance to heat and fire (As per specification)		
15	Degree of protection		
16	Resistance against climatic influence (as per IS 13779)		
17	Electromagnetic Compatibility (EMC) as per CBIP Technical report no 88(latest amendment		
18	Accuracy requirements (As per IS 13779		
19	Power factor range		
20	Energy measurement		

21	Connection Diagram for system on terminal cover	Yes/No	
22	Self diagnostic feature		
23	Initial start up of meter (meter shall be fully functional within 5 sec after reference voltage is applied to the meter terminals)		
24	Terminal block		
	a) Depth of the Terminal holes	Mm	
	b) Internal diameter of terminal holes	Mm	
	c) Clearance between adjacent terminals	Mm	
25	Communication capabilities As per specs		
26	Immunity against abnormal Magnetic influence, as defined in specifications		
27	Immunity against HV ESD as defined in specs		
28	DC Immunity as defined in Specifications		
29	Grade of material for a) Meter base b) Meter cover c) Terminal block d) Terminal cover		
30	Tamper counts		
31	Recording energy in all conditions as per given in specifications	Yes/No	
32	Makes of all components used in the meter.	Yes/No	
33	Non Volatile memory (Retention period)		
34	Measuring elements used in the meter		
35	Power supply to circuit in case of supply failure		
36	Display of measured values (As per specification)	Yes/No	
37	LCD display (Type and viewing angle)		

38	Pulse rate	Imp/kWh, Imp/kVArh	
39	Name plate marking	Yes/No	
40	Routine test certificates	Yes/No	
41	Acceptance test certificates	Yes/No	
42	Type test certificates	Yes/No	
43	Guarantee certificates	Yes/No	
21	**SCHEDULES OF DEVIATIONS**	The bidders shall set out all deviations from this specification, Clause by Clause in this schedule. Unless **specifically** mentioned in this schedule, the tender shall be deemed to confirm the purchaser's specifications.	

(TO BE ENCLOSED WITH THE BID)

All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications

S.No.	Clause No.	Details of deviation with justifications

TATAPOWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	Specification for 3P 4W LTCT NET Meter		Eff. Date: 04.06.2015
Document No.	ENG-LV-92		
Revision No.			
Prepared By Iqbal Alam	Reviewed By Manish Jain	Approved By D R Dharmadhikari	Issued By HC Sharma

Initiator		HOG (Plant Engineering)	

TATA POWER-DDL	TATA POWER DELHI DISTRIBUTION LIMITED, DELHI		
	TECHNICAL SPECIFICATION		
Document Title	**Specification for 3P 4W LTCT NET Meter**		
Document No.	**ENG-LV-92**		**Eff. Date: 04.06.2015**
Revision No.			
Prepared By Iqbal Alam	Reviewed By Manish Jain	Approved By D R Dharmadhikari	Issued By HC Sharma

Initiator		HOG (Plant Engineering)	

Annexure VII

General Conditions of Contract – Attached separately with the tender.

CONTENTS

CONTENTS	
CLAUSE NO.	**DESCRIPTION**

CONTENTS

1.0 ORGANIZATIONAL VALUES

The Tata Group has always been a value driven organization. These values continue to direct the Group's growth and businesses. The six core Tata Values underpinning the way we do business are:

Integrity - We must conduct our business fairly, with honesty and transparency. Everything we do must stand the test of public scrutiny.

Understanding - We must be caring, respectful, compassionate and humanitarian towards our colleagues and customers around the world and always work for the benefit of India.

Excellence - We must constantly strive to achieve the highest possible standards in our day to day work and in the quality of goods and services we provide.

Unity - We must work cohesively with our colleagues across the group and with our customers and partners around the world to build strong relationships based on tolerance, understanding and mutual co-operation.

Responsibility - We must continue to be responsible and sensitive to the countries, communities and environments in which we work, always ensuring that what comes from the people goes back to the people many times over.

Agility - We must work in a speedy and responsive manner and be proactive and innovative in our approach.

2.0 Tata Code of Conduct

The Business Associate and TPNODL shall be bound by the provisions/ clauses mentioned in Tata Code of Conduct (TCoC) in all their dealings with stakeholders. The Associate is advised to go through the TCoC document available as Annexure-J.

3.0 CONTRACT PARAMETERS

3.1 Issue/Award of Contract

TPNODL awards the contract to the Associate in writing in the form of Purchase Order (PO) or Rate Contract (RC), hereafter referred as Contract, through in any or all of following modes physical handover / post / e-mail / web document / fax with all the attachments/enclosures which shall be part of the contract document.

On receipt of the contract, the associate shall return to TPNODL copy of the contract document duly signed by legally authorized representative of associate, within two days of Effective Date of Contract for contracts having contract execution time less than 30 days and within five days for all other contracts.

Note- In case of RC though, further Release Orders (RO) shall be issued by TPNODL on RC rates and terms & Conditions as per the requirement of TPNODL.

3.2 Contract Commencement Date

The date of issue/award of contract shall be the Effective Date of Contract or Contract Commencement date.

3.3 Contract Completion Date

The date of expiry of Guarantee Period shall be deemed as the Contract Completion Date.

3.4 Contract Period/Time

The period from Contract Commencement Date to Contract Completion Date shall be deemed as the Contract Period/Time.

3.5 Contract Execution Completion Date

The stipulated date for completing the supply as per schedule of quantities shall be deemed as the Contract Execution Completion Date.

3.6 Contract Price /Value

The total all inclusive price/value mentioned in the PO/RC is the Contract Price/Value and is based on the quantity, unit rates and prices quoted and awarded and shall be subject to adjustment based on actual quantities supplied and accepted and certified by the authorized representative of the company unless otherwise specified in schedule of quantities or in contract documents.

3.7 Contract Document

The Contract Document shall mean and include but not limited to the following:

- NIT/Tender Enquiry, QR, Instruction to Bidders, Special Condition of Contract (SCC) of tender, GCC, Technical & Commercial Specifications including relevant annexure and attachments).
- Bids & Proposals Received from Associate including relevant annexure/attachments.
- RC/PO with agreed deviations from the tender/bid documents.
- All the Inspection and Test reports, Detailed Engineering Drawings.
- Material Dispatch Clearance Certificate (MDCC).
- Minutes of Meeting (MoM)

3.8 Contract Language

All documents, instructions, catalogues, brochures, pamphlets, design data, norms and calculations, drawings, operation, maintenance and safety manuals, reports, labels, on deliveries and any other data shall be in English Language.

The Contract documents and all correspondence between the TPNODL, Third Parties associated with the contract, and the Associate shall be in English language.
However, all signboards required indicating "Danger" and/or security at site and otherwise statutory required shall be in English, Hindi, and local languages.

3.9 Reverse Auction

TPNODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products / services being asked for in the tender. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached in Annexure F. The

bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form as mentioned in the Annexure J as a token of acceptance for the same.

4.0 SCOPE OF WORK

All the activities that are to be undertaken by the Associate to realize the contractual deliverables in completeness form Scope of Work. Following clauses list, but not limited to, major requirements of the scope of work.

The associate shall satisfy himself and undertake fully the technical/commercial requirements of items to be supplied as listed in the Schedule of Quantities together with the tests to be performed /test reports to be furnished before dispatch, arrangement of stage and final inspections during manufacturing as per terms and conditions of contract, technical parameters & delivery terms and conditions including transit insurance to be met in order to fully meet TPNODL's requirements.

Completeness: Any supplies and services which might have not been specifically mentioned in the Contract but are necessary for the scope mentioned in Special Terms & Conditions and/or completeness of the works at the highest possible level, including any royalties, license fees & compensation to be paid, whether incurred by the associates or by a third party for the work covered in the scope, regardless of when incurred, shall be supplied/provided by the associate without any extra cost and within the time schedule for efficient , smooth and satisfactory operation and maintenance of the works at the highest possible level under Indian conditions (but according to international standards for facility of this type), unless expressly excluded from the scope of supplies and services in this Contract.

TPNODL have the right, during the performance of the Contract, to change the scope and/or technical character of the Project and/or of the supplies and services stipulated in the Contract by submitting a request in writing to the Associate. The Associate shall, within fifteen days of receipt of such request from the TPNODL, provide Purchaser with a reasonably detailed estimate of the cost of the change outlined in the request.

In the event, TPNODL requests a change, the Contract price and time shall be adjusted upwards or downwards, as the case may be and shall be mutually agreed to. The associate shall not be entitled to any extension of time unless such changes adversely affect the time schedule.

The Associate shall not proceed with the changes as requested till adjustment of contract price and time schedule where so applicable in terms of or otherwise directed by the TPNODL.

4.1 Bid Evaluation- Commercial & Technical

TPNODL reserves the right to evaluate the bid on below parameters as per the requirement:

Commercial Evaluation: The bid shall be evaluated on the basis of Qualifying Requirement parameters and other commercial parameters as mentioned in tender.

Technical Evaluation: The bid shall be evaluated on the parameters and not limited to Bidder Experience, Bidder Performance with other utility/company, internal performance feedback, Technical Specification, General Technical Parameters (GTP), Layout, Drawings etc.

TPNODL reserves the right to carry out Factory Evaluation of Manufacturer along with the Visit to executed Sites for further evaluation to ascertain bidder's manufacturing capability, quality procedures & Performance of executed works.

5.0 PRICES/RATES/TAXES

Unless specified elsewhere in the contract document, the prices/rates are inclusive of cost of finished product for which MDCC will be issued by TPNODL, packaging and forwarding charges, freight and transit insurance charges covering loading at Associate's works, transportation to TPNODL store/site & unloading & delivery at TPNODL stores/TPNODL site, cost of documentation including all the relevant test certificates and other supportive documents to be furnished.

The Prices/Rates are inclusive of all taxes, levies, cess and duties, particularly Goods and Services Tax as applicable. All government levy / taxes shall be paid only when the invoice is submitted according to the relevant act.

The prices/rates shall remain firm till actual completion of entire supply of goods/material/equipment as per contract is achieved and shall remain valid till the completion of the contract.

The prices shall remain unchanged irrespective of TPNODL making changes in quantum in all or any of the schedules of items of contract.

5.1 Changes in Statutory Tax Structure

If rate of any or all of the statutory taxes and duties applicable to the contract changes, such changes shall be incorporated by default if the changes occur within the contract execution time and shall be applicable if the contract is executed by the Associate within the Contract Execution Time.

For execution of contracts beyond contract execution time, where the delay is not attributable to TPNODL no upward revision in tax /duties shall be considered irrespective of changes in the statutory tax structure either within the contract execution time or beyond. However, in such cases, benefits due to any downward revisions in statutory tax rates shall be passed on to TPNODL.

6.0 TERMS OF PAYMENT

On delivery of the materials in good condition and certification of acceptance by TPNODL official, Associate shall submit the Bills/Invoices in original in the name of "TPNODL Limited" to invoice desk, complete with all required documents as under:

- Test Reports (4 sets).
- MDCC issued by TPNODL.
- Packing List.
- Drawing and Catalogue.
- Guarantee/Warrantee Card.
- Delivery Challan.
- O&M Manual.
- Copy of Order.
- Minutes of Meeting.

- E-Way challan (if applicable)

Bills/ invoices shall mention Supplier's GST Number. TPNODL will make 100% payment within 30 days of submission of the Bill/Invoice complete in all respects and along with all the requisite documents mentioned above, subject to condition that Associate has furnished the requisite Security-cum-Performance Guarantee as stipulated in the contract.

6.1 Quantity Variation

Payment will be made on the basis of actual quantity of supplies/actual measurement of works accepted by TPNODL and not on the basis of contract quantity.

6.2 Full and Final Payment

Full & Final Payment in all contracts shall be made subject to the associate submitting "No Demand Certificate" in the format as per Annexure-C.

7.0 MODE OF PAYMENT

Payment shall be made through crossed RTGS/ NEFT/ Online Net banking mode whichever of the two modes chosen by the Associate, in favour of Associate's Bank Account on TPNODL records, on whose name Contract has been issued. Those Associates opting for the RTGS mode shall submit the details of Bank Account and other details as per annexure G. Further, for any payments made, TPNODL is not responsible for any consequences/disputes Associate have among the owners channel partners, sub-Associates and all such dispute/concerns shall be settled solely by the Associate.

8.0 SECURITY CUM PERFORMANCE DEPOSIT

Associates shall submit within 15 days from the effective date of issue of PO/RC, Security Performance Bank Guarantee (SPBG) in the format as per Annexure B of this document from banks acceptable to TPNODL for:

(a) 5% of the PO value if purchase order value is more than Rs 5 Crores.

(b) 10% of the PO value if purchase order value is less than Rs 5 Crores.

This shall remain valid till the end of the Guarantee Period of contract, plus one month.

(c) 5% of the RC value in case of Rate Contract. This shall remain valid till the Guarantee period plus one month.

- For PO/RC values less than Rs. 5 lacs, Associate may request for deduction of amount equivalent to SPBG value from their first invoice. Such amount shall be withheld by TPNODL while processing the invoice and shall be released after completion of Guarantee Period plus one month.
- For PO/RC values less than Rs. 3 lacs, the clause (8.0) for Security cum Performance Bank Guarantee (SPBG) shall not be applicable.
- In case of RC (Rate Contract) after the expiry of RC validity, Associate shall have to submit SPBG. However, the Associate has the option to re-submit the SPBG as per actual RO

  (Release Order) value issued against the RC, valid for Guarantee Period plus one month. The Guarantee Period shall be considered as per the last RO issued against the said RC. The original SPBG as submitted against the RC shall be released on submission of

the new SPBG to TPNODL. Alternatively, Associate may extend the validity of original SPBG only till the requisite period, i.e. Guarantee Period plus one month.

9.0 STATUTORY COMPLIANCE

9.1 Compliance to Various Acts

Associate should ensure adherence to all applicable laws, rules and regulation applicable under this contract from time to time. In case of violation any risk, costs etc shall be in associates account and keep TDPPL indemnified always till completion of contracts.

9.2 SA 8000

As TPNODL is SA 8000 compliant, it expects its Associates to follow guidelines of SA 8000:2014 on the following aspects

1. Child Labour
2. Forced or Compulsory Labour
3. Health & Safety
4. Freedom of Association & Right to Collective Bargaining
5. Discrimination
6. Disciplinary Practices
7. Working Hours
8. Remuneration
9. Management System

9.3 Affirmative Action

TPNODL appreciate and welcome the engagement/employment of persons from SC/ST community or any other deprived section of society by their business associates.

Relaxation in Contract Clauses under Affirmative Action for SC/ ST Business Associates**

TPNODL believes that inclusive growth is the key to sustainable development, and to promote the same Policy on Affirmative Action for Scheduled Caste & Scheduled Tribe Communities has been adopted across the company.

Under the same pre-text, and to promote entrepreneurship among SC/ST community TPNODL has taken initiative by proposing relaxations in contract clauses as per below:

S. No	Initiative	for SC/ ST BA's	Guideline Document
1	Tender Fees	100% waiver for SC/ST community	All Open Tenders
2	Earnest Money Deposit	50 % relaxation of estimated EMD value	All limited and Open Tenders
3	Performance Bank Guarantee	50% relaxation in PBG for order value above 50 lacs else 25% relaxation	All limited and Open tenders
4	Turnover	25% relaxation in company turnover under qualifying requirement criteria	All Open Tenders

****Classification of BAs under SC/ST shall be governed under following guidelines:**

- Proprietorship/ Single Ownership Firm: Proprietor of the firm should be from SC/ST community. Governing document shall be duly audited balance Sheet for the last FY bearing the name of proprietor.
- Partnership Firm: Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed and audited balance sheet/ ITR for last FY.
- Private limited company: Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).

Note: Certification from SC/ST commission shall be required for deciding upon SC/ST status of a person.

9.4 MSME Development ACT 2006

Provisions for Firms falling in The Micro, Small and Medium Enterprise Development Act 2006:-

- Business Associate is requested to inform the TPNODL if they fall under provisions of The Micro, Small and Medium Enterprises Development Act, 2006 legislation, and provide necessary documents to TPNODL. The Associate also needs to mention the relevant details on their invoice/ bill.
- Business Associate shall submit the self-undertaking of registration in MSME category at the time of bidding as well as on an annual basis to TPNODL, enabling them to avail the consequent benefits, failing which TPNODL may take appropriate action against such defaults.
- Business Associates falling in MSME category shall submit the Tender Fee when participating in TPNODL tenders. However, they are eligible to submit concessional EMD at 50% of the EMD otherwise applicable.

9.5 ISO 14001

The vendor to confirm whether their organization is ISO 14001 certified. If not, the Vendor must certify that the handling, use and disposal of their product/ by-products conform to practices consistent with sound environment management and local statues. The Vendor shall ensure that all the wastes are disposal in environmental friendly way with strict compliance to applicable laws including adherence to MoEF guidelines with respect to the disposal of batteries, lead waste, copper cables, ash, waste oil, e-waste etc. which shall be disposed through MoEF approved parties only. The vendor shall also dispose off the e-waste generated at the end of the product life cycle at its own costs and risk as per the MoEF guidelines/ Orders

10.0 QUALITY

10.1 Knowledge of Requirements

The Associate shall be deemed to have carefully examined and to have knowledge of the equipment, the general and other conditions, specifications, schedules, drawings, etc. forming

part of the Contract and also to have satisfied himself as to the nature and character of the work to be executed and the type of the equipment and duties required including wherever necessary of the site conditions and relevant matters and details. Any information thus procured or otherwise obtained from TPNODL/Consultants shall not in any way relieve the Associate from his responsibility and executing the works in accordance with the terms of contract.

10.2 Material/Equipment/Works Quality

The items / works under the scope of the Associate shall be of the best quality and workmanship according to the latest engineering practice and shall be manufactured from materials of best quality considering strength and durability for their best performance and, in any case, in accordance with the specifications set forth in this Contract. All material shall be new. Substitution of specified material or variation from the process of fabrication/ construction/ manufacture may be permitted but only with the prior written approval of the TPNODL.

10.3 Adherence to Rules & Regulations

The Associate shall procure and/or fabricate/erect all materials and equipment in accordance with all requirements of Central and State enactment, rules and regulations governing such work in India and at site. This shall not be construed as relieving the Associate from complying with any requirement of TPNODL as enumerated in the Contract which may be more rigid than and not contrary to the above mentioned rules, nor providing such construction as may be required by the above mentioned rules and regulations. In case of variance of the Technical Specification from the laws, ordinance, rules and regulations governing the work, the Associate shall immediately notify the same to the TPNODL. It is the sole responsibility of the Associate, however, to determine that such variance exists. Wherever required by rules and regulations, the Associate shall also obtain the statutory authorities' approval for the plant, machinery and equipment to be supplied by the Associate.

10.4 Specifications and Standards

The Associate shall follow all codes and standards referred in the Contract Document. Codes and standards of other may be followed by the Associate with the prior written approval of TPNODL, provided materials, supplies and equipment according to the standard are equal to or better than the corresponding standards specified in the Contract.

Brand names mentioned in the Contract documents are for the purpose of establishing the type and quality of products to be used. The Associate shall not change the brand name and qualities of the bought out items without the prior written approval of the TPNODL. All such products and equipment shall be used or installed in strict accordance with original manufacturer's recommendations, unless otherwise directed by the TPNODL. In any circumstances the codes, specimen and standards prescribed by any government agency should not be violated.

11.0 INSPECTION/PARTICIPATION

11.1 Right to Carry Out Inspection

TPNODL reserves the right to send its representatives for inspection or participation at various stages of contract execution listed below, applicable as per contract construction.

- During basic design and detail engineering of material/ Equipment carried out by Associate /Outsourced Agencies.
- During manufacturing stages of the product at Associate's/Associate's Outsourced Agency's Plant/Facility.
- During Pre-dispatch Inspection and Testing of finished/manufactured product at Associate's/Associate's outsourced Agency's Plant/Facility.
- During Installation & Commissioning Activities/Stages.
- Prior to Clearing of the completed installation for commissioning.
- Any other stage as find appropriate by TPNODL during contract execution time.

All inspections and participations shall be carried out by TPNODL giving written intimation to the Associate or receiving appropriate advance written inspection call from the Associate, unless otherwise specified elsewhere in the contract document.

MDCC request shall be submitted by BA to TPNODL at least 7 days before inspection date.

11.2 Facilitating Inspection

The Associate shall provide all opportunities and information to TPNODL's engineers to get acquainted with the technical know-how and the methods and practices adopted by the Associate in basic and detail engineering. The Associate shall provide documents, drawings, calculations etc. as may be required by TPNODL's Engineers.

The Associate shall provide free of charge office accommodation, office facilities, secretarial services, communication facilities, general and drawing office stationary, etc. as may be reasonably required by the TPNODL's engineers. Similarly, facilities shall also be provided by Associate's outsource agencies/partners/authorized dealers (collectively termed as sub associates) if such basic and detail engineering activities are carried out in the design offices of sub-Associates.

The Associate shall be responsible for the safety of employees of TPNODL/Third Party Agency when they are at the Associate's /Associate's outsource agency's plant or facility for carrying out/witnessing inspection/testing. All statutory safety precautions as applicable shall be followed by the Associate during Inspection Testing. If TPNODL inspectors are not satisfied with the safety arrangements at the plant, TPNODL have the right to call off inspection till such time corrective action is taken by the Associate.
Before raising the call for pre-dispatch final inspection and testing, the Associate shall conduct all the tests—type tests, routine tests etc-as specified in the contract document and submit copies of the test certificates to TPNODL along with the inspection call, for scrutiny of TPNODL.

The Associate and TPNODL shall jointly document all the observations, comments and action points after completion of inspection and it shall be binding on the Associate to provide compliance on all the points requiring compliance and furnish the compliance report to the designated authority of TPNODL for receiving clearance for dispatch of materials

11.3 Third Party Nomination

TPNODL also may nominate a third party for the purpose of carrying out the inspection and such an agency shall be entitled to all the rights and privileges of TPNODL as far as conducting the inspection.

11.4 Waiver of Inspections

TPNODL on its own discretion shall chose to waive off any inspection and ask the Associate to submit all the test reports as applicable as per contract specifications, related to inspection and testing of the goods ordered for scrutiny and clearance for dispatch.

11.5 Incorrect Inspection Call

In case it is observed that the material offered for inspection is not ready at the time of TPNODL inspection visit rendering it as futile, all costs towards such inspection shall be recovered from the BA. Taxes as applicable on such recoveries shall be borne by the BA.

12.0 MDCC & DELIVERY OF MATERIALS

12.1 Material Dispatch Clearance Certificate

Associate shall deliver material/goods/equipment against Supply Contracts or Supply Part of Composite/Service Contracts only after receiving Material Dispatch Clearance Certificate (hereafter termed as MDCC) issued by designated authority of TPNODL. Material delivered at TPNODL stores or at project site without a valid MDCC issued by the designated official of TPNODL shall be rejected. MDCC shall be issued to associate furnishing compliance report on the action points documented during pre-dispatch inspection and testing at Associate's/ Sub Associate's plant/ facility. In case Pre-dispatch inspection is waived at the discretion of TPNODL, then, MDCC shall be issued on receiving all the test reports-routine& type-from the Associate and finding them in order.

The associate shall include and provide for securely protecting and packing the materials so as to avoid loss or damage during handling and transport by air, sea, rail and road or any other means.

All such packing shall allow to the extent possible for easy removal and checking at Site. The associate shall take special precautions to prevent rusting of steel and iron parts during transit by sea. Gas seals or other materials shall be utilized by the associate for protection against moisture during transit of all Plant and Equipment.

Each Equipment or parts of Equipment shall be tagged with reference to the assembly drawings and corresponding part numbers. Each bale or package shall contain a packing note quoting specifically the name of the associate, item description, quantity, item / package identification.

All packing cases, containers, packing and other similar materials shall be new and supplied free by the associate and it shall not be required to be returned to the associate.
Notwithstanding anything stated in this clause, the associate shall be entirely responsible for loss, damage or depreciation or deterioration to the materials and supplies due to faulty and/or insecure packing or otherwise during transportation to the Site until otherwise provided herein.

In case of the consignments dispatched by road, the associate shall ensure that it or its subcontractors:

i) Identify and obtain the correct type of trucks/trailers, keeping in view the nature of consignments to be dispatched.

ii) Take such actions as may be necessary to avoid all possible chances of damages during transit and to ensure that all packages are firmly secured.

Timelines for inspection and MDCC is as below:

S. No.	Inspection	MDCC issuance time including Inspection time (max.)
1	Outside Odisha	12 days
2	Within Odisha	5 days
3	Waiver*	3 working days

* Associate is expected to raise the inspection call assuming that Inspection shall be carried out by TPNODL. The decision for waiver of inspection shall be on sole discretion of TPNODL.

12.2 Right to Rejection on Receipt

Goods/Material/Equipment delivered in condition physically damaged & incomplete as a product ordered, or not packed and transported as per the terms and conditions of the contract is liable to be rejected. Such item shall be lifted back by Associates within 15 days from receipt of rejection note from TPNODL and have to supply back the material within next 30 days or within the timeframe mutually decided by Associate and TPNODL.

If delivery of the material is beyond the agreed time, Liquidated damage clause, mentioned in this GCC separately shall be applicable; but the period for levy of LD shall be considered as per the original delivery schedule and not from the agreed timelines for material rectification.

12.3 Consignee

Unless otherwise specified in the Contract Document, Materials/Goods/Equipment shall be consigned to “Stores-In-Charge”, TPNODL, Bhubaneswar.

12.4 Submission of mandatory documents on Delivery

Following documents shall be mandatorily submitted by BA along with supply of material to TPNODL stores/site:

S. No.	Documents	Requisite
1	Invoice copy in original	With all consignments
2	LR copy	Wherever required
3	Packing list	With all consignments
4	MDCC	With all consignments
5	Purchase order / Release order	Signed copy
6	Test certificates	With all consignments
7	Inspection/JVR report	In case pre-dispatch inspection is conducted
8	Device data in CD as per template for metering items	Wherever applicable

12.5 Dispatch and Delivery Instructions

S. No.	Instructions
1	Purchase order/ Release order no. shall be mentioned on invoice and on material
2	TPNODL material code and material description shall be mentioned in invoice and on material.

3	"Property of TPNODL" shall be embossed on material.
4	The material shall be properly sealed and packed in standard packing as per purchase order terms & conditions.
5	The weight and quantity of material shall be mentioned wherever applicable
6	The material supplied shall be co-related with the packing list.
7	The name plate detail on equipment shall include Material code, Material description, specification detail of material [as applicable], Serial No. Year of manufacturing, PO/RO no. and date, "PROPERTY OF TPNODL, Bhubaneswar", Guarantee period and Associate's name.
8	In case of manual unloading, supplier / transporter shall deploy sufficient Labour for unloading the material at TPNODL central store. For heavy item(s), crane will be provided by TPNODL [unloading cost will be recovered from the associate].
9	The driver should have valid License and one helper in truck. All the documents of truck like registration papers, PUC etc. should be available in Truck.
10	BA representative should accompany the material and get it unloaded / stacked in his presence wherever possible.

13.0 GUARANTEE

13.1 Guarantee of Performance

Associates shall stand guarantee that the equipment and material supplied under the contract is free from design, manufacturing, material, construction, erection & installation and workmanship & quality defects and is capable of its due, rated and intended quality performance, as an integrated product delivered under the contract, for a specific period termed as Guarantee Period(as elaborated elsewhere in this clause). The Associate should also guarantee that the equipment/material is new and unused except for the usage required for the tests and checks required as part of quality assurance.

13.2 Guarantee Period

The Guarantee Period will be equipment/service/work specific and shall be as specified in the Standard Specifications of TPNODL for the equipment/material/service/work and where standard specifications are not part of contract documents or guarantee period is not specified in the standard specifications,, the guarantee period shall be as per the Special Terms and Conditions of the Contract. In case of no mention of the guarantee period in standard specifications or SCC Guarantee Period will be 12 Months from the Date of Commissioning or 24 months from the date of delivery of final lot of supplies made, whichever is earlier.

13.3 Failure in Guarantee Period (GP)

If the equipment and material supplied under the contract fails to perform its due, rated & intended quality performance, during the Guarantee period, the associate is liable to undertake repair/rectify/replace the equipment and material supplied within time frame specified in the SCC or elsewhere in the contract documents at associate's cost to make the equipment and material supplied/service or work rendered under the contract of performing its due, rated and intended quality performance. If Associate fails to repair/rectify/replace the equipment or material supplied rendered under the contract, failed in Guarantee Period, TPNODL will be at liberty to get the same done at Associate's risks and costs and recover all such expenses plus the TPNODL's own charges (@ 20% of expenses incurred), from the Associate or from the "Security cum Performance Deposit" as the case may be.

If during the Warranty/ Guarantee period some parts of the supplies are replaced owing to the defects/ damages under the Warranty, the Warranty period for such replaced parts shall be until the expiry of twelve months from the date of such replacement or renewal or until the end of original Guarantee period, whichever is later.

Any repairs during the Guarantee Period shall be carried out by the Associate within 30 days of reporting the issue to Associate by TPNODL. However, if replacement of the Equipment is required, Associate shall notify the same to TPNODL within 7 days of reporting the issue by TPNODL. Thereafter, the total time for supply of new equipment/ material shall be equal to the original delivery period of that equipment/ material as specified in the Contract. In case the Associate is not able to rectify/ replace the faulty equipment/ material within the stipulated timelines as mentioned above, penalty shall be levied as per the Liquidated Damages clause mentioned in this document. The penalty amount shall be recovered from the payment due to the vendor or by encashment of the SPBG as the case may be.

13.4 Cost of repairs on failure in GP

The cost of repairs/rectification/replacement, required transportation, site inspection /mobilization/dismantling and re-installation costs as applicable, to be borne by Associate. The Associate has to ensure that the interruption in the usage of intended purpose of the equipment is minimized to the maximum extent In lieu of the time taken for repairs/rectification/replacement.

13.5 Guarantee period for Goods Outsourced

If the Associate outsources partly equipment/materials/services from third party as mutually agreed upon at the pre award stage of contract, TPNODL shall have the benefit of any additional guarantee period if provided by the third party for the part supplied/executed by them.

13.6 Latent Defect

Hidden defects in manufacturing or design of the product supplied and which could not be identified by the tests conducted but later manifested during operation of the equipment are termed as latent defects. Associates shall further be responsible for ‘free replacement’ for another period of THREE years from the end of the guarantee period for any ‘Latent Defects’ if noticed and reported by the Company.

13.7 Support beyond the Guarantee Period

The Associate shall ensure availability of spares and necessary support for a period of atleast 10 years post completion of guarantee period of equipment supplied against the contract.

14.0 LIQUIDATED DAMAGES

a) For supplies which are of standalone use, multiple in quantities and having a single final delivery schedule, Liquidated damages shall be levied without prejudice to any of the other contractual rights of TPNODL, as described below:

   For delay of each week and part thereof from the delivery schedule specified in the contract, 1% of contract value corresponding to undelivered quantity, provided full quantity is supplied within 130% of the original contract time. If full contractual quantity is not delivered within 130% of contract time for delivery, TPNODL has the right to levy LD on the entire contract value, subject to a maximum of 10% of the total contract value.

b) For Supplies having phased delivery schedule as per contract terms, standalone use and multiple in quantities, Liquidated damages shall be levied without prejudice to any of the other contractual rights of TPNODL, as described below:

For the purpose of calculating and applying LD, each delivery lot shall be considered separately. For delay of each week and part thereof, from the delivery schedule specified for the lot, 1% of the contract value corresponding to the undelivered quantity of the lot subject to a maximum of 10% of the total contract value of the subject lot. However, if full contractual quantity is not delivered within 130% of contract time for delivery, TPNODL has the right to levy LD on the entire contract value, subject to a maximum of 10% of the total contract value. Deduction of LD shall be on landed cost i.e contract value inclusive of taxes and in pursuant statutory compliance GST would be applicable at the stipulated rate and the same shall be borne by Business Associate. In case of LD deduction, a GST invoice shall be issued by TPNODL as a proof of deduction/ recovery.

14.1 LD Waiver Request

Any request of LD waiver shall be submitted within thirty (30) days of deducting LD. Request submitted beyond the timeline shall not be entertained.

15.0 UNLAWFUL ACTIVITIES

The Associate shall have to ensure that none of its employees are engaged in any unlawful activities (whether covered under the scope of the present GCC or not) subversive of the TPNODL's interest failing which appropriate action (legal or otherwise) may be taken against the Associate by the TPNODL, in accordance with the terms of the present GCC.

16.0 CONFIDENTIALITY

Associate and its employees or representatives thereof shall strictly maintain the confidentiality of various information they come across while executing the contract as detailed below.

16.1 Documents

All maps, plans, drawings, specifications, schemes and other documents or information related to the Contract/Project and the subject matter contained therein and all other information given to the Associate by the TPNODL in connection with the performance of the contract shall be held confidential by the Associate and shall remain the property of the TPNODL and shall not be used or disclosed to third parties by the Associate for any purpose other than for which they have been supplied or prepared. The Associate may disclose to third parties, upon execution of confidentiality agreements, such part of the drawings, specifications or information if such disclosure is necessary for the performance of the Work provided such third parties agree in writing to keep such information confidential to the same extent and degree as provided herein, for the benefit of the TPNODL.

16.2 Geographical Data

Maps, layouts and photographs of the unit/plant including its surrounding regions showing vital installation for national security of country or those of TPNODL shall not be published or disclosed to the third parties or taken out of the country without prior written approval of the TPNODL and upon execution of confidentiality agreements satisfactory to the TPNODL with such third parties prior to disclosure.

16.3 Associate's Processes

Title to secret processes if any developed by the Associate on an exclusive basis and employed in the design of the equipment shall remain with the Associate. TPNODL shall hold in confidence such processes and shall not disclose such processes to the third parties without prior approval of the Associate and execution by such third parties of secrecy agreements satisfactory to the Associate prior to disclosure. Upon completion of contract, such processes shall become the property of the TPNODL. Title to technical specifications, drawings, flow sheets, norms, calculations, diagrams, interpretations of test results, schematics, layouts and such other information, which the Associate has supplied to the TPNODL under the Contract shall be passed on to the TPNODL. The TPNODL shall have the right to use these for construction, erection, start-up, Trial Run, operation, maintenance, modifications and/or expansion of the works including for the manufacture of spare parts.

16.4 Exclusions

The provision of Clauses 16.1 to 16.3 shall not apply to information:

- Which at the time of disclosure are in the public domain which later on become part of public domain through no fault of the party concerned, or
- Which were in the possession of the party concerned prior to disclosure to him by the other party, or
- Which were received by the party concerned after the time of disclosure without restriction on disclosure or use, from a third party who did not acquire such information directly or indirectly from the other party or has no obligation of confidentiality for such information.

16.5 Violation

In case of violation of this clause, the Associate is liable to pay compensation and damages as may be determined by the competent authority of TPNODL.

17.0 INTELLECTUAL PROPERTY RIGHTS

If, in the course of performance of its functions and duties as envisaged by the scope of the present GCC, the Associate acquires or develops, any unique knowledge or information which would be covered, or, is likely to be covered within the definition of a trademark, copyright, patent, business secret, geographical indication or any other form of intellectual property right, it shall be obliged, under the terms of this present GCC, to share such knowledge or information with the TPNODL. All rights, with respect to, or arising from such intellectual property, as afore mentioned, shall solely vest in TPNODL.

Moreover, the Associate undertakes not to breach any intellectual property right vesting in a third party/parties, whether by breach of statutory provision, passing off, or otherwise. In the event of any such breach, the Associate shall be wholly liable to compensate, indemnify or make good any loss suffered by such third party/parties, or any compensation/damages arising from any legal proceeding/s, or otherwise. No liability of TPNODL shall arise in this respect, and any costs, damages, expenses, compensation payable by TPNODL in this regard to a third party/parties, arising from a legal proceeding/s or otherwise, shall be recoverable from the Associate.

18.0 INDEMNITY

The Associate shall at all times indemnify, keep indemnified and hold harmless the TPNODL and its officers, directors, employees, affiliates, agents, successors and assigns against all actions, claims, demands, costs, charges and expenses arising from or incurred by reason of any infringement of patent, trade mark, registered design, copy rights and/or industrial property rights by manufacture, sale or use of the equipment supplied by the Associate whether or not the TPNODL is held liable for by any court judgement. In this connection, the TPNODL shall pass on all claims made against him to the Associate for settlement.

The Associate assumes responsibility for and shall indemnify and save harmless the TPNODL from all liability, claims, costs, expenses, taxes and assessments including penalties, punitive damages, attorney's fees and court costs which are or may be required to be paid by the TPNODL and its officers, directors, employees, affiliates, agents, successors and assigns arising from any breach of the Associate's obligations under the Contract or for which the Associate has assumed responsibilities under the Contract including those imposed under any local or national law or laws, or in respect to all salaries, wages or other compensation for all persons employed by the Associate or his Sub-Associates or suppliers in connection with the performance of any work covered by the Contract. The Associate shall execute, deliver and shall cause his Sub-Associate and suppliers to execute and deliver, such other further instruments and to comply with all the requirements of such laws and regulation as may be necessary there under to conform and effectuate the Contract and to protect the TPNODL.

The TPNODL shall not be held responsible for any accident or damages incurred or claims arising, due to the Associate's error there from prior to completion of work. The Associate shall be liable for such accidents and after completion of work for such accidents as the case may be due to negligence on his part to carry out Work in accordance with Indian laws and regulations and the specifications set forth herein.

19.0 LIABILITY & LIMITATIONS

19.1 Liability

Except for any specific liability which may be identified in the Contract and which may be payable hereunder, Associate shall not be liable for any special, incidental, indirect, or consequential Damages or any loss of business Contracts, revenues or other financial loss (or equivalents thereof no matter how claimed, computed or characterized) arising out of or in connection with the Performance of the Work or supply of Goods ***unless caused by Associate's negligence, willful misconduct or breach of contract.***

If the Associate is a joint venture or consortium, all concerned parties shall be jointly and severally bound to the TPNODL for the fulfillment of the provisions of the Contract. The consortium or the joint venture shall designate one party as their leader, who will be the coordinator between the parties and TPNODL. The constituents & leader of the consortium or joint venture shall not be changed without the prior consent of TPNODL.

TPNODL shall have no liability or any special, incidental, indirect or consequential Damages for any loss of Business Contracts, revenues or other financial loss arising out of this Contract.

19.2 Limitation of Liability

The total liability of Associate against any contract shall be limited to the Total All Inclusive Contract Value.

20.0 FORCE MAJEURE

Force Majeure applies if the performance by either Party ("the Affected Party") of its obligations under Contract is materially and adversely affected.

“Force Majeure” shall mean any event or circumstance or combination of events or circumstances referred below and their consequences that wholly or partly prevents or unavoidably delays any Party in the performance of its obligations under this Agreement, but only and to the extent that such events and circumstances are not within the reasonable control, directly or indirectly, of the Affected Party and could not have been avoided even if the Affected Party had taken reasonable care:

- Act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, embargo, blockade, revolution, riot, bombs, religious strife or civil commotion, etc. ▪ Politically motivated sabotage, or terrorism, etc.
- Action or Act of Government or Governmental agency for which remedy is beyond the control of the affected parties. ▪ Any act of God.

Note: Causes like power breakdown/ shortages/fire/strikes, accidents etc do not fall under Force Majeure.

Time being the essence of the Contract, if either party is prevented from the performance of its obligations in whole or in part due to an event of Force Majeure, then provided Notice of happening of any event by the Affected Party is given to the other party within seven (7) days from the date of occurrence of such event, which DIRECTLY has impact on works and submitted details and quantum of resulting effect, but at the same time had made all possible efforts to mitigate and overcome effects thereof, the Affected Party’s performance under this Contract shall be suspended until such event ceases and the Scheduled Completion shall be delayed accordingly.

If Force Majeure event(s) continue for a period of more than three months, the parties shall hold consultation to discuss the further course of action.

Neither party shall be considered to be in default or in breach of its obligation under the Contract to the extent that performance of such obligation by either party is prevented by any circumstances of Force Majeure which arise after effective date of Contract.

Neither party can claim any compensation from the other party on account of Force Majeure.

21.0 SUSPENSION OF CONTRACT

21.1 Suspension for Convenience

TPNODL may, at any time and at its sole option, suspend execution of all or any portions of the schedule of items of contract to be supplied/work to executed by Associate under the contract by providing to the Associate atleast two business days written notice for contracts having contract completion period less than sixty days and atleast seven business days’ notice for all other contracts.

Upon receipt of any such notice, the Associate shall respond as follows as applicable as per contract construction.

- Immediately discontinue further supply of material/goods specified in the suspension notice for supply contracts

- Immediately discontinue further service/work and supply of materials of those services/materials/work specified in the suspension notice for service /composite contract
- Promptly make every reasonable effort to obtain suspension, upon terms satisfactory to TPNODL, of all orders, outsourcing arrangements, and rental Contracts to the extent that they relate to performance of the portion of Work suspended by the notice.
- Protect and maintain the portion of the service/Work already completed, including the portion of the Work suspended hereunder, unless otherwise specifically stated in the notice.
- Continue delivering/carrying out the supply/service/work items as per contract conditions, which do not fall under purview of the suspension notice.

On receipt of resumption notice from TPNODL, the Associate shall resume execution of contract as specified in the resumption notice, within the time frame specified in the resumption notice.

21.2 Suspension for Breach of Contract conditions.

TPNODL shall suspend execution of whole/or part thereof the contract till such time Associate complies with the conditions stipulated under section clause 22.1 for breach/default of contract conditions.

21.3 Compensation in lieu of Suspension

If the suspension of the contract in whole or in part is for convenience of TPNODL and not due to any breach of contract conditions by the associate, TPNODL at its discretion shall consider compensating all reasonable additional costs incurred by Associate in lieu of suspension of whole or part of contract, on representation of the Associate providing justified estimates of such additional costs and such estimates are found acceptable and approved by competent authority of TPNODL.

If the suspension of contract in whole or part thereof is due to breach of contract conditions (refer clause 22.1) by the Associate, Associate shall not be entitled for any compensation for any cost incurred in lieu of suspension of whole or part of contract and also shall be liable for compensating all the losses arising to TPNODL in lieu of suspension of contract. Resumption notice shall be subject to the Associate taking corrective action for the breach of contract conditions within the time frame and as per the terms specified in the suspension notice.

22 TERMINATION OF CONTRACT

22.1 Termination for Default/Breach of Contract

The contract / PO /RC shall be subject to termination by TPNODL in case of breach of the contract by the Associate which shall include but not be limited to the following:

a. Withdrawal or intimation by the Associate of its intent to withdraw or surrender the execution / completion of the contracted work /PO or failure in ensuring adherence to any delivery schedules, in deviation of the contract/PO.

b. Refusal or neglect on the part of the Associate to supply material/equipment of quantity or quality as specified by TPNODL and within the timeframe as specified in the contract document or refusal or neglect to execute the services/work in terms of the agreed standards of quantity or quality and/or within the timeframe specified in the contract/PO.

c. Failure in any respect to perform any portion of the Work contracted with promptness, diligence, or in accordance with the terms of the contract.

d. Failure to furnish guarantees as specified and /or failure to comply with the terms thereof.

e. Failure to furnish such relevant documents or information within the time specified which may be necessary for due execution / completion of the works and documentation.

f. Liquidation, bankruptcy either voluntary or involuntary OR entering into any composition or compromise with its creditors, or Insolvency.

g. In case any reasonable information has been received by TPNODL that Associate has adopted/ or attempted to adopt any unethical conduct, action in award of the contract /PO or at any time thereafter.

h. Failure to comply with applicable statutory provisions as contained in the contract or failure to comply with the applicable laws.

i. Failure to comply with safety regulations/clauses stipulated in the contract or as may be generally instructed by TPNODL.

If the default or breach as specified under clause 22 (except sub clause g thereof) be committed by the associate for the first time, TPNODL shall issue, along the with notice of default or breach, a warning notice instructing the associate to take remedial/corrective action within the time frame stipulated in the warning notice and not to repeat the same in future. The timeframe for corrective action by the associate shall be specific to the nature of breach of contract and the same shall not be objected to by the Associate. If the Associate fails to comply with the instructions in the warning notice or in taking corrective action to the satisfaction of TPNODL then TPNODL may terminate the entire or part of contract at its discretion by issuing termination notice without incurring any liability on this ground.

In case the contract is terminated for any breach of the nature specified in clause 22 g stated above, TPNODL shall have the right to terminate all the contracts TPNODL is having with the Associate by issuing termination notice which shall be without prejudice to the other rights of TPNODL available to it under law.
Without prejudice to its right to terminate for breach of contract, TPNODL may, without assigning any reason, terminate the Contract in whole or in part at any time at its discretion while the contract is in force by serving a written notice of two weeks to the Associate.

In the event of TPNODL having proceeded with termination of the contract the associate shall comply and proceed further in the following manner:

a) Associate shall discontinue the supply, on the expiry of the said period of two weeks.

b) Associate shall ensure that no further steps are being taken towards discharge of the obligations, terms and conditions as contained in the contract/PO. This shall include initiation of actions not limited to discontinuation of other allied and associated arrangements which the associate might have entered into with third parties for due discharge of its obligations under the contract with TPNODL.

c) The Associate shall perform thereafter such tasks as may be necessary to preserve and protect the terminated portion of the material/service/work in progress and the materials and equipment at TPNODL sites or in transit thereto. However the associate shall

continue to fulfill its contractual obligations with regard to the part of contract not terminated.

d) It shall be open for TPNODL to conduct a joint assessment with the associate of the material, supplies, equipment ,works or in general as to the subject matter of the contract in regard to which the associate claims having completed its obligations before or during such termination.

e) It shall be open to TPNODL to seek invocation of the performance bank guarantee or any other guarantee or other security deposit by whatever name called submitted by the associate, which shall not be objected to or protested against by the associate.

In case of termination of the contract the parties agree to be governed inter alia by the following:

a) In case TPNODL exercises its right of termination as stated above the associate shall not dispute or object to the same.

b) The Associate shall be entitled to receive and claim only such payments OR sums of money from TPNODL as may be found payable to it in regard to works executed by it under the terms of the contract and no other claim of any nature whatsoever shall be made by the Associate.

c) All such provisions which the parties have agreed to survive and prevail even after termination of the contract shall remain effective despite the termination.

In the event of such termination, TPNODL may finish the Work by whatever method it may deem expedient, including the hiring of services and /or purchase of material equipment from such third parties as TPNODL may deem fit or may itself provide any labor or materials and perform any part of the Work. The associate undertakes to bear the incremental costs if any paid by TPNODL in such a case attributable to failure on the part of the associate. The Associate in such a case shall not be entitled to receive any further payments and any sums found payable to it may be adjusted by TPNODL against the amount recoverable from him on this ground. The same shall be without prejudice to other rights available to TPNODL under law against the associate.
Upon the termination of any of the contract due to occurrence of any circumstances provided in clauses stated above and constituting repeated breach or misconduct , TPNODL shall be entitled to bar the associates its agents , affiliates from undertaking any negotiation / tendering, bidding , participation activities concerning TPNODL for a period of two years from date of such termination. The same shall be without prejudice to other rights available to TPNODL.

22.2 Termination for Convenience of Associate

Associate at its convenience may request for termination of contract, clearly assigning the reason for such request. TPNODL has full right to accept, reject or partially accept such request. However, associate shall continue its supply as per contract till final approval is given to associates for such termination.

22.3 Termination for Convenience of TPNODL

TPNODL at its sole discretion may terminate the contract by giving 30 days prior notice in writing or through email to the Associate. TPNODL shall pay the Associate for all the supplies/

services rendered till the actual date of contract termination against submission of invoice by the Associate to that effect.

23.0 DISPUTE RESOLUTION & ARBITRATION

In case of any dispute or difference the parties shall endeavour to resolve the same through conciliatory and amicable measures within 15 Days failing which the matter may be referred by either party for resolution by the sole arbitrator to be appointed mutually by both the parties. The arbitral proceedings shall be conducted in accordance with Arbitration and Conciliation Act 1996 and the place of arbitration shall be Bhubaneswar. The language to be used at proceedings shall be English and the award of the arbitrator shall be final and binding on the parties. The parties shall bear their respective costs of arbitration. The associate shall continue to discharge its obligations towards due performance of the works as per the terms of the contract during the arbitration proceedings unless otherwise directed in writing by TPNODL or suspended by the arbitrator. Further, TPNODL shall continue making such payments as may be found due and payable to the associate for such works.

23.1 Governing Laws and Jurisdiction

The parties shall be subject to the jurisdiction of the courts of law in Bhubaneswar and any matter arising here from shall be subject to applicable law in force in India.

24.0 ATTRIBUTES OF GCC

24.1 Cancellation

The Company reserves the right to cancel, add, delete at its sole discretion, all or any terms of this GCC or any contract, order or terms agreed between the parties in pursuance without assigning any reasons and without any compensation to the Associates.

24.2 Severability

If any portion of this GCC is held to be void, invalid, or otherwise unenforceable, in whole or part, the remaining portions of this GCC shall remain in effect.

24.3 Order of Priority

In case of any discrepancies between the stipulations in General Conditions of the Contract (GCC) and Special Conditions of Contract (SCC), the GCC shall stand superseded by the SCC to the extent stipulated hereinabove while balance portion of respective clauses of GCC shall continue to be applicable.

25.0 ERRORS AND OMISSIONS

The Associate shall be responsible for all discrepancies, errors and omissions in the drawings, documents or other information submitted by him, irrespective of whether these have been approved, reviewed or otherwise accepted by the TPNODL or not. However any error in design/drawing arising out of any incorrect data/written information from TPNODL will not be considered as error and omissions on part of the Associate.

26.0 TRANSFER OF TITLES

The title of ownership and property to all equipment, materials, drawings & documents shall pass to the TPNODL on acceptance of material by store/site after Inspection.

However, such passing of title of ownership and property to the TPNODL shall not in any way absolve, dilute or diminish the responsibility and obligations of the Associate under this Contract including loss or damages and all risks, which shall vest with the Associate.

27.0 INSURANCE

The Contractor shall take out the Insurance Policies which shall cover all risks including the following, as applicable:-

a) The value of the policy shall cover the total value of all the items till they are handed over to TPNODL.

b) TPNODL shall be the principal holder of the policy. The Associate shall be the loss payee under the policy. Associate / Sub-contractor of the Associate shall not be holders or beneficiaries in the policy nor shall they be named in the policy. TPNODL reserves the exclusive right to assign the policy.

c) While the payment of premium may be phased in agreement with the insurance company, at no time shall goods and services required to be provided by the associate shall remain uninsured in accordance with (a) above.

d) A copy of the Insurance policy shall be made available to TPNODL prior to first dispatch lot of any Equipment and policy shall be kept alive and valid at all times up to the stage of final acceptance.

e) TPNODL reserves the right to take out whatever policy that is deemed necessary by him if the associate fails to keep the said policy alive and valid at all times and/or causes lapses in payment of premium thereby jeopardizing the said policy. The cost of such policy(s) shall be recovered / deducted from the amount payable to the associate.

f) The policy shall ensure that the TPNODL's decision regarding replacement of goods damaged, lost or rendered unusable shall be final.

In all cases, the associate shall lodge the claims with the underwriters and also settle the claims and shall also notify TPNODL of any filed claims. However, the associate shall proceed with the repairs and/or replacement of the equipment/components without waiting for the settlement of the claims. In case of seizure of materials by concerned authorities, the associate shall arrange prompt release against bond, security or cash as required. TPNODL, upon request by the associate, will extend all reasonable assistance to the associate in such a case.

All the insurance claims shall be processed and settled by the associate and the missing/damaged items shall be replaced/repaired by them without any extra cost to TPNODL and without affecting the completion time.

28.0 SUGGESTIONS & FEEDBACK

We welcome all our Business Associates to write to us about their experience with TPNODL; be it our Company, our services or our people. Each and every concern, issue, query and suggestion from you will help us to become a better company to work with and shall help us develop a strong bonding of trust and a long term relationship with you.

You may send your feedback by filling up our Business Associate Feedback Form enclosed herewith as *Annexure-I.* You can also log on to our website www.tpnodl.com to provide your feedback.

- Suggestions for us
- Feedback form
- Knowledge Sharing/ Experience with TPNODL
- Any issues with TPNODL.

Submission of feedback form is mandatory before the release of final payment to the BA.

29.0 CONTACT POINTS

In case Business Associate needs information with respect to payments or has any grievances, same may be lodged by log on to our website www.tpnodl.com

30.0 LIST OF ANNEXURES

S. No.	Subject	Annexure
1.	Performa for Bid Security Bank Guarantee	A
2.	Performa for Performance Bank Guarantee (CP cum EP)	B
3.	Performa for No Demand Certificate by Associate	C
4.	Performa For Application For Issuance of Consolidated TDS Certificate	D
5.	Business Associate Feedback Form	E
6.	Acceptance Form For Participation In Reverse Auction Event	F
7.	Form for RTGS Payment	G
8.	Vendor Appraisal Form	H
9.	Manufacturer Authorization Form	I
10.	Tata Code of Conduct	I

ANNEXURE-A

PROFORMA FOR BID SECURITY BANK GUARANTEE

TP Northern Odisha Distribution Limited
Balasore

WHEREAS, (Name of the Bidder) _____

(hereinafter called "the BIDDER") has submitted his bid dated_____ for the (Tender No. & Name of Contract) _____ (hereinafter called "the BID").

KNOW ALL men by these presents we (Name of the Bank) _____ of (Name of the Country) _____ having our registered office at_____(hereinafter called "the BANK) are bound unto

TPNODL Limited (TPNODL) in the sum of _____ for which payment well and truly to be made to the TPNODL the Bank binds himself, his 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**:**

i) If the Bidder withdraws his Bid during the period of bid validity specified in the Proforma of Bid or

ii) If the Bidder having been notified of the acceptance of his Bid by the TPNODL during the period of bid validity fails or refuses to furnish the Contract Performance Bank Guarantee, in accordance with the Instructions to Bidders.

We undertake to pay the TPNODL upto the above amount upon receipt of its first written demand, provided that in its demand the TPNODL will note that amount claimed by it is due to it owing to the occurrence of one or both conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force upto and including the date (No of days as mentioned in tender enquiry) days after the closing date of submission of bids as stated in the Invitation to Bid or as extended by you at any time prior to this date, notice of which extension to the Bank being hereby waived, and any demand in respect thereof should reach the Bank not later than the above date.

DATE …… SIGNATURE OF THE BANK ……..

WITNESS …… SEAL ……..

(Signature, Name & Address) (At least 2 witnesses)

ANNEXURE- B

PROFORMA FOR PERFORMANCE BANK GUARANTEE (CP cum EP)

(On Rs.100/- Stamp Paper) Note:

a) Format shall be followed in toto
b) Claim period of one month must be kept up
c) The guarantee to be accompanied by the covering letter from the bank confirming the signature to the guarantee

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TP Northern Odisha Distribution Ltd.

Mumbai

CP cum EP BG No.…….

Order/Contract No……dated……

1. You have entered into a Contract No _____ with M/s._____ (hereinafter referred to as "the Vendor") for the supply cum erection / civil work of _____ (hereinafter referred to as" the said Equipment") for the price and on the terms and conditions contained in the said contract.
2. In accordance with the terms of the said contract, "the Vendor" agreed to furnish you with an irrevocable, unconditional and acceptable bank guarantee for 10% of the value of contract and to be valid till the end of Guarantee period plus one month towards "Contract cum Equipment performance". For this purpose you have agreed to accept the guarantee.
3. In consideration thereof, we, _____ hereby irrevocably and unconditionally guarantee to pay to you on demand but in any case before the end of five working days from the date of the claim and without demur and without reference to "the Vendor" such amount or amounts not exceeding the sum of Rs._____ (Rupees _____ only) being _____% (_____ percent) of the total value of the contract on receipt of your intimating that "the Vendor" has not fulfilled his contractual obligations. You shall be the sole judge for such non-fulfillment and "the Vendor" shall have no right to question such judgment.
4. You shall have the right to file / make your claim on us under the guarantee for a **further period of one month** from the date of expiry.
5. This guarantee shall not be revoked without express consent and shall not be affected by your granting time or any other indulgence to "the Vendor", which shall include but not be limited to, postponement from time to time of the exercise the same in you or any right which you may have against "the Vendor" and to exercise the same in any covenant contained or implied in the said contract or any other course or remedy or security available to you, and our Bank shall not be released from its obligations under this guarantee by

your exercising any of your rights with reference to matters aforesaid or any of them or by reasons of any other act or forbearance or other acts of omission or commission on your part or any other indulgence shown by you or by any other matter or thing whatsoever which under the law would, but for this provision have the effect of relieving our bank from its obligation under this guarantee.

6. We also agree that you shall be entitled at your option to enforce this guarantee against our bank as a principal debtor, in the first instance, notwithstanding any other security or guarantee that you may have in relation to “the Vendor’s” liabilities in respect of the premises

7. This guarantee shall not be affected by any change in the constitution of our Bank or “the Vendor” or for any other reason whatsoever.

8. Any claim / extension under the guarantee can be lodge-able at outstation banks or at Mumbai branch and claim will also be payable at Mumbai Branch (to be confirmed by Mumbai Branch by a letter to that effect in case BG is from the branch outside Mumbai).

9. Notwithstanding anything herein contained, our liability under this guarantee is limited to Rs._____ (Rupees_____ only and the guarantee will remain in force upto and including _____(Date) and shall be extended from time to time for such period or period as may be desired by “the Vendor”.

10. Unless a demand or claim under this guarantee is received by us in writing within one months from_____ (expiry date) i.e. on or before _____ (claim period end date), we shall be discharged from all liabilities under this guarantee thereafter.

Dated at_____ this_____ day of _____ 20__

Bank’s rubber stamp

1. Banks full address

Designation of Signatory

2. Bank official number

ANNEXURE-C

PROFORMA FOR "NO DEMAND CERTIFICATE" BY ASSOCIATE

(On Company's Letter head or with Company Seal)
(To be submitted by the Associate to TPNODL Accounts Department at the time of receipt of full and final payment)

(Certificate No. CCP/002)

Name of the Project Order/

Contract No.

Dated

Name of the Associate Scheme

No. / Job No.

We, M/s._____ (Associate) do hereby acknowledge and confirm that we have received the full and final payment due and payable to us from TPNODL, in respect of our aforesaid Order No _____ dated_____ including amendments, if any, issued by TPNODL to our entire satisfaction and we further confirm that we have no claim whatsoever pending with TPNODL under the said contract / W.O.

Notwithstanding any protest recorded by us in any correspondence, documents, measurement books and / or final bills etc., we waive all our rights to lodge any claim or protest in future under this contract.

We are issuing this "NO DEMAND CERTIFICATE" in favour of TPNODL, with full knowledge and with our free consent without any undue influence, misrepresentation, coercion etc.

Place **Name**

(Company Seal)

ANNEXURE-D

PROFORMA FOR APPLICATION FOR ISSUANCE OF CONSOLIDATED TDS CERTIFICATE

To be printed on the letterhead

To,

TPNODL Limited,

Bhubaneswar

Sub: Application for issuance of Consolidated TDS Certificate for the FY _____

Dear Sir,

I / we hereby request / authorize you to issue me / us a consolidate TDS Certificate for the financial year _____ against tax deducted at source by you from my / our payments / bills during the said year from time to time under Chapter XVII – B of the Income Tax Act, 1961.
For and on behalf of

Signature

Name

Address

Contact No. (Land Line)

(Mobile)

PAN #

Assessing authority

ATTACH THE COPY OF PAN CARD

ANNEXURE-E

BUSINESS ASSOCIATE FEEDBACK FORM

With an objective to improve our internal processes and systems, and serve you better, we solicit your valuable feedback & suggestions. It is estimated that it will take about 10 minutes to complete this survey. We assure you that your feedback shall be kept confidential. Please send the duly filled feedback form in the "TPNODL addressed - attached envelop"

You are associated with us as

☐ OEMs ☐ Service Contractor ☐ Material Suppliers ☐ Material & Manpower Supplier

You are associated with us for

☐ Less than 1 year ☐ More than 1 year but less than 3 years ☐ More than 3 years

Your office is located at

☐ Bhubaneswar ☐ Within 200 kms from Bhubaneswar ☐ More than 200 kms from Bhubaneswar

Your nearly turnover with TPNODL

☐ Less than 25 Lacs ☐ 25 Lacs to 1 Crore ☐ More than 1 Cr.

Additional Information

Your Name	
Your Designation	
Your Organization	
Contact Nos.	
Email	

We once again thank you for your participation in this survey. Please spare 10 minutes to give your feedback on following pages (Section A to E)

SECTION – A

(Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement).

S. No.	Parameters	1 Do Not Agree	2 Slightly in Agreement	3 In Fair Agreement	4 Mostly in Agreement	5 Fully Agree	Remarks/ Suggestion
1	You receive all relevant queries / tenders from us in timely manner.						
2	We provide you enough lead time to respond to our queries / tenders.						
3	We provide you adequate support (drawings, documents, clarifications, briefing etc.) to enable you meet our requirements.						
4	All following elements of our contract / purchase order are rational :						
4.1	Scope of Work						
4.2	Delivery / Execution Schedule						
4.3	Payment Terms						
4.4	Liquidated Damages						
4.5	Performance Guarantee						
5	Our purchase orders / contracts are simple, specific & easy to understand						
6	TPNODL demonstrate willingness to be flexible in administration of Contract / Purchase Order						
7	We provide timely responses / clarifications to your queries						
8	TPNODL representative you interact / coordinate with is adequately empowered to support you in meeting contractual obligations						
9	TPNODL provide you all necessary infrastructure support for timely and quality completion of work (including AMC)						
10	TPNODL Engineer-in-Charge timely certifies the jobs executed/ material supplied						
11	TPNODL Engineer-in-Charge efficiently supervises the job execution for timely completion of job						
12	BIRD (Bill Inward Receipt Desk) initiative has improved payment disbursement process						

S. No.	Parameters	1 Do Not Agree	2 Slightly in Agreement	3 In Fair Agreement	4 Mostly in Agreement	5 Fully Agree	Remarks/ Suggestion
13	Our approach for Inspection and Quality Assurance effective to expedite project completion?						
14	TPNODL never defaults on contractual terms						
15	In TPNODL Contracts closure is done within set time limit						
16	Our material receiving procedures are well defined and efficiently deployed to reduce mutual inconvenience						
17	Bank Guarantees are released in time bound manner						
18	Our processes related to payment / account settlement are effective.						
19	You get payments on time						
20	TPNODL Employees follow Ethical behaviour						

SECTION – B

SECTION – B (Please rate the following parameters on a scale of 1 to 5, where 1 - Minimum; 5 - Maximum)

S. No.	Parameters	1	2	3	4	5	Remarks/ Suggestion
1	How do you rate courtesy/ empathy/ attitude level and warmth of TPNODL employees you interact with from following team?						
1.1	Project Engineering						
1.2	District / Zones						
1.3	Projects/HOG (TS &P)						
1.4	Inspection & Quality Assurance						
1.5	Stores						
1.6	Metering & Billing						
1.7	Accounts / Finance						
1.8	Administration						
1.9	IT & Automation						
2	How would you rate TPNODL in comparison to your other clients in terms of **fairness of treatment and transparency** with its Business Associates?						
3	How would you rate TPNODL in comparison to your other clients in terms of **processes and systems to manage partnership** with its Business Associates						
4	How would you rate TPNODL in comparison to your other clients in terms of **building long term & mutually relations**hip with its Business Associates						

SECTION – C

Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement.

S. No.	Parameters	Certainly No	Probably No	Certainly Yes	Probably Yes	Remarks/ Suggestion
1	Based on your experience with TPNODL, would you like to continue your relationship with TPNODL?					
2	If someone asks you about TPNODL, would you talk “positively” about					

	TPNODL?					
3	Would you refer TPNODL name to others in your community, fraternity and society as a professional & dynamic organization?					

SECTION - D

If we ask you to rate us on a scale of 1 to 10, how will you rate TPNODL, that truly represents your overall satisfaction with us (please tick appropriate box) -

1	2	3	4	5	6	7	8	9	10

SECTION – E

Please √ mark in the relevant box and give your remarks / suggestions / information for our improvement.

Please spare your thoughts for TPNODL's improvement in particular areas of weaknesses, particularly relating to some great practices, attitudes that you have seen elsewhere in Indian and International Organizations, which you recommend TPNODL to adopt. Please give your valuable salient recommendations.

Please spare your thoughts for TPNODL's improvement in particular areas of major concerns for you. We also welcome your suggestions to adopt any best practices, altitudes that you

Recommendation	*Please tick (√) your top 5 expectations out of the following 10 points listed below -*	
(Please list down improvement you expect from TPNODL)	*Timely payment*	
1	*Flexibility in Contracts/PO*	
	Clarity in PO,s & Contracts	
2	*Timely response to quarries*	
	Timely certification of works executed	
3	*Clarity in Specs, drawings, other docs etc.*	
	Adequate information provided on website for tender notification, parties qualified etc.	
4	*Timely receipt of material at site for execution*	
	Performance Guarantee/EMD released in time	

5	*Inspection & quality assurance support for timely job completion*	

We thank you for your time and courtesy!!

ANNEXURE-F

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

(To be signed and stamped by the bidder prior to participation in the auction event)

In a bid to make our entire procurement process more fair and transparent, TPNODL intends to use the reverse auctions through SAP-SRM tool as an integral part of the entire tendering process. All the bidders who are found as technically qualified based on the tender requirements shall be eligible to participate in the reverse auction event.

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

1. TPNODL shall provide the user id and password to the authorized representative of the bidder. (Authorization Letter in lieu of the same shall be submitted along with the signed and stamped Acceptance Form).
2. TPNODL will make every effort to make the bid process transparent. However, the award decision by TPNODL would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPNODL, bid process, bid technology, bid documentation and bid details.
4. The bidder is advised to understand the auto bid process to safeguard themselves against any possibility of non-participation in the auction event.
5. In case of bidding through Internet medium, bidders are further advised to ensure availability of the entire infrastructure as required at their end to participate in the auction event. Inability to bid due to telephone line glitch, internet response issues, software or hardware hangs, power failure or any other reason shall not be the responsibility of TPNODL.
6. In case of intranet medium, TPNODL shall provide the infrastructure to bidders. Further, TPNODL has sole discretion to extend or restart the auction event in case of any glitches in infrastructure observed which has restricted the bidders to submit the bids to ensure fair & transparent competitive bidding. In case an auction event is restarted, the best bid as already available in the system shall become the start price for the new auction.
7. In case the bidder fails to participate in the auction event due any reason whatsoever, it shall be presumed that the bidder has no further discounts to offer and the initial bid as submitted by the bidder as a part of the tender shall be considered as the bidder's final no regret offer. Any offline price bids received from a bidder in lieu of non-participation in the auction event shall be out rightly rejected by TPNODL.
8. The bidder shall be prepared with competitive price quotes on the day of the bidding event.
9. The prices as quoted by the bidder during the auction event shall be inclusive of all the applicable taxes, duties and levies and shall be FOR at TPNODL site.
10. The prices submitted by a bidder during the auction event shall be binding on the bidder.
11. No requests for time extension of the auction event shall be considered by TPNODL.
12. The original price bids of the bidders shall be reduced on pro-rata basis against each line item based on the final all inclusive prices offered during conclusion of the auction event for arriving at Contract amount.

Signature & Seal of the Bidder

ANNEXURE-G

To,

DGM (Finance)
TPNODL Limited
Bhubaneswar

Sub: **e-Payments through National Electronic Fund Transfer (NEFT) OR Real Time Gross Settlement System (RTGS)**

Dear Sir,

We request and authorize you to affect e-payment through NEFT/RTGS to our Bank Account as per the details given below:-

Vendor Code :

Title of Account in the Bank :

Account Type :

(Please mention here whether account is Savings/Current/Cash Credit)

Bank Account Number :

Name & Address of Bank :

Bank Contact Person's Names :

Bank Tele Numbers with STD Code :

Bank Branch MICR Code :

(Please enclose a Xerox a copy of a cheque. This cheque should not be a payable at par cheque)

Bank Branch IFSC Code :

(You can obtain this from branch where you have your account)

Email Address of accounts person: : (to send payment information)

Name of the Authorized Signatory: :

Contact Person's Name:

Official Correspondence Address:

We confirm that we will bear the charges, if any, levied by our bank for the credit of NEFT/RTGS amounts in our account. Any change in above furnished information shall be informed to TPNODL well in time at our own. Further, we kept TPNODL indemnified for any loss incurred due to wrong furnishing of above information.

Thanking you,

For _____

(Authorised Signatory)

(Signature with Rubber Stamp)

Certification from Bank:

We confirm that we are enabled for receiving NEFT/RTGS credits and we further confirm that the account number (specify Bank a/c no.) of (Please mention here name of the account holder), the signature of the authorised signatory and the MICR and IFSC Code of our branch mentioned above are correct.

This also is certified that the above information is correct as per Bank record

(Manager's/ Officers Signature under Bank Stamp)

ANNEXURE-H

VENDOR APPRAISAL FORM

TO BE SUBMITTED BY VENDOR (To be filled as applicable)			
Part A			
1.0	**DETAILS OF THE FIRM**		
	1.1	NAME (IN CAPITAL LETTERS)	
	1.2	TYPE OF CONCERN (PROPRIETORY) PARTNERSHIP PVT.LTD., PUBLIC LTD. ETC.	
	1.3	YEAR OF ESTABLISHMENT	
	1.4	LOCATION OF OFFICE POSTAL ADRESS	
	1.5	CONTACT DETAIL OF BA's REPRESENTATIVE NAME E-MAIL ID CELL NO.	
	1.6	LOCATION OF MANUFACTURING UNITS	:
		i) UNITS 1	:
		ii) OTHER UNITS	:
2.0	**PRODUCTS / SERVICES BEING OFFERED**		:
3.0	**TURNOVER DURING THE LAST 3 YEARS (TO BE VERIFIED WITH THE LATEST PROFIT & LOSS STATEMENT).**		:
4.0	**AVALABILITY OF STATUTORY DOCUMENTS I.E. COPY OF PAN CARD**		:
5.0	AVALABILITY OF STATUTORY DOCUMENTS I.E. COPY OF **GST REGISTRATION**		÷
6.0	**APPLICABILITY UNDER MSME CERTIFICATION**		÷
7.0	**BA BELONGS TO AA COMMUNITY (SC/ST)**		÷
8.0	**DOCUMENTS VERIFYING ADDRESS PROOF (SUPPORTED BY ANY GOVT. ISSUED DOCUMENT)**		÷

9.0	**TECHNICAL**		
	9.1	NO.OF DESIGN ENGINEERS (INDICATE NO.OF YEARS EXPERIENCE IN RELATED FIELDS)	:
	9.2	NO.OF DRAUGHTSMEN	:
	9.3	COLLABORATION DETAILS (IF ANY)	:
		9.3.1 DATE OF COLLABORATION	:
		9.3.2 NAME OF COLLABORATOR	:
		9.3.3 RBI APPROVAL DETAILS	:
		9.3.4 EXPERIENCE LIST OF COLLABORATOR	:
		9.3.5 DURATION OF AGREEMENT	:
	9.4	AVAILABILITY OF STANDAR0DS / DESIGN PROCEDURES / COLLA-BORATOR'S / DOCUMENTS (CHECK WHETHER THESE ARE LATEST/CURRENT	:
	9.5	TECHNICAL SUPPORT, BACK-UP GUARANTEE, SUPERVISION, QUALITY CONTROL BY COLLABORATOR (WHEREVER ESSENTIAL). (THIS CLAUSE IS RELEVANT WHEN VENDOR'S EXPERIENCE IS INADEQUATE)	:
	9.6	QUALITY OF DRAWINGS	:
10.0	**MANUFACTURE**		
	10.1	SHOP SPACE, LAYOUT LIGHTING, VENTILATION, ETC.	:
	10.2	POWER (KVA)	:
		MAINS INSTALLED	:
		UTILISED	:
		STANDBY POWER SOURCE	:
	10.3	MANUFACTURING FACILITIES (ATTACH LIST OF EQUIPMENTS AS APPLICABLE)	:
		10.3.1 MATERIAL HANDLING	:
		10.3.2 MACHINING	:
		10.3.3 FABRICATION	:

		10.3.4 HEAT TREATMENT	:
		10.3.5 BALANCING FACILITY	:
		10.3.6 SURFACE TREATMENT PRIOR TO PAINTING/ COATING, POLISHING, PICKLING, PASSIVATION, PAINTING, ETC.	:
	10.4	SUPERVISORY STAFF	:
	10.5	ADEQUACY OF SKILLED LABOURS (MACHINISTS, WELDERS, ETC.)	:
	10.6	NO. OF SHIFTS	:
	10.7	TYPE OF MATERIAL HANDLED (SUCH AS CS, SS, ETC.)	
	10.8	WORKMANSHIP	:
	10.9	MATERIAL IN STOCK AND VALUE	:
	10.10	TRANSPORT FACILITIES	:
	10.11	CARE IN HANDLING	:
11.0	**INSPECTION / QC / QA / TESTING**		
	11.1	NUMBER OF PERSONNEL (INDICATE NO.OF YEARS OF EXPERIENCE)	:
	11.2	INDEPENDENCE FROM PRODUCTION	:
	11.3	AVAILABILITY OF PROCEDURAL WRITE UP/QUALITY PLAN	:
	11.4	INCOMING MATERIAL CONTROL AND DOCUMENTATION	:
	11.5	RELIABILITY/REPUTATION OF SUPPLY SOURCES	:
	11.6	STAGE INSPECTION AND DOCUMENTATION	:
	11.7	SUB-ASSEMBLY & DOCUMENTATION	:
	11.8	FINAL INSPECTION AND DOCUMENTATION	:
	11.9	PREPARATION OF FINAL DOCUMENTATION PACKAGE	:
	11.10	TYPE TEST FACILITIES	:
	11.11	ACCEPTANCE TEST FACILITIES	:

	11.12	CALIBRATION OF INSTRUMENTS AND GAUGES (WITH TRACEABILITY TO NATIONAL STANDARDS) (ATTACH LIST)	:
	11.13	STATUTORY APPROVALS LIKE BIS, IBR, ETC.(AS APPLICABLE)	:
	11.14	SUB-VENDOR APPROVAL SYSTEM AND QUALITY CONTROL	:
	11.15	DETAILS OF TESTS CARRIED OUT AT INDEPENDENT RECOGNISED LABORATORIES	:
		i) FURNISH LIST OF TESTS CARRIED OUT AND THE NAME OF THE LABORATORY WHERE THE TESTS WERE CONDUCTED	:
		ii) CHECK AVAILABILITY OF CERTIFICATES AND REVIEW THESE WHEREVER POSSIBLE	:
12.0	**EXPERIENCE (INCLUDING CONSTRUCTION / ERECTION / COMMISSIONING) TO BE FURNISHED IN THE FORMAT INDICATED IN APPENDIX)**		:
13.0	**SALES, SERVICE AND SITE ORGANISATIONAL DETAILS**		:
14.0	**CERTIFICATE FROM CUSTOMERS (ATTACH COPIES OF DOCUMENTS)**		:
15.0	**POWER SITUATION**		:
16.0	**LABOUR SITUATION**		:
17.0	**APPLICABILITY OF SC/ST RELAXATION (Y/N)** **IF YES, SUPPORTING DOCUMENTS TO BE ATTACHED**		
Part C Supporting Documents			

18.0	**DOCUMENTS TO BE ENCLOSED:** 1. Factory License 2. ISO Certificate 3. Registration of Central Excise 4. Income Tax Clearance. 5. PF Registration 6. ESI Registration 7. Insurance for Workman Compensation Act No. 8. Electrical Contract LIC No. 9. PAN No. 10. GST Registration 11. MSME Certification 12. WC Tax Registration 13. Organogram of Co. having organogram of Design, safety, quality, production and other teams. 14. Details of subscription of BIS, IEC, IEE, ASTM or other. 15. Details of the team in Design, Quality, Safety, Production. 16. List of manufacturing equipment as per Part C. 17. List of calibrated equipment as per Part C. 18. List of clients and order executed in past two years. 19. Complaint escalation matrix. 20. Performance Certificates of same product from Minimum two utilities. **21. e-Payment Form as per enclosed Annexure-G**	

*** Classification of BA s under SC/ST shall be governed under following guidelines:**

- **Proprietorship/ Single Ownership Firm:** Proprietor of the firm should be from SC/ST community. Governing document shall be Proprietorship Deed.
- **Partnership Firm:** Only such firms shall qualify which have SC/ST partners holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Partnership Deed.
- **Private Limited Company:** Only such firms shall qualify which have SC/ST directors holding equal to or more than 50% of the total ownership pattern of the firm. Governing document shall be Memorandum of Understanding (MoU) and/or Article of Association (AoA).
- The relaxation available for BAs under SC / STs shall be as per GCC for Tender Fees, EMD, PBG and Turnover criteria.

NOTE: Certification from SC/ST Commission shall be required for deciding upon SC/ST status of a person.

Annexure-G (e-Payment detail form) must be filled by Associate along with this form.

ANNEXURE-I

MANUFACTURER AUTHORIZATION FORM

(To be submitted on OEM's Letter Head)

Date: …….

Tender Enquiry No.: ……..

To,

Chief (Procurement & Stores)

TPNODL Limited,
Mumbai

Sir,

WHEREAS M/s. *[name of OEM]*, who are official manufacturers of …… having factories at *[address of OEM]* do hereby authorize M/s *[name of bidder]* to submit a Bid in relation to the Invitation for Bids indicated above, the purpose of which is to provide the following Goods, manufactured by us

……and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with the Special Conditions of Contract or as mentioned elsewhere in the Tender Document, with respect to the Goods offered by the above firm in reply to this Invitation for Bids.

We hereby confirm that in case, the channel partner fails to provide the necessary services as per the Tender Document referred above, M/s *[name of OEM]* shall provide standard warranty on the materials supplied against the contract. The warranty period and inclusion / exclusion of parts in the warranty shall remain same as defined in the contract issued to their channel partner against this tender enquiry.

Yours Sincerely,

For ……..

Authorized Signatory

Annexure-J

TATA CODE OF CONDUCT (TCoC)

Introducing Tata Code of Conduct (TCoC) in GCC, the following clause is proposed for inclusion as per suggestions from Chief Ethics Counsellor -

"TCoC is the overarching policy framework that applies to all TATA Group companies including TPNODL. TCoC provides for stakeholder-wise approach in each of the seven chapters.

The chapter "Our Value Chain Partners" states the policy as follows:

1. We shall select our suppliers and service providers fairly and transparently.
2. We seek to work with suppliers and service providers who can demonstrate that they share similar values. We expect them to adopt ethical standards comparable to our own.
3. Our suppliers and service providers shall represent our company only with duly authorized written permission from our company. They are expected to abide by the Code in their interactions with, and on behalf of us, including respecting the confidentiality of information shared with them.
4. We shall ensure that any gifts or hospitality received from, or given to, our suppliers or service providers comply with our company's gifts and hospitality policy.
5. We respect our obligations on the use of third party intellectual property and data.

To effectively implement TCoC, there is a 3-tier framework comprising of Ethics Management Apex Team headed by the CEO, who is also the Principal Ethics Officer (PEO), TPNODL; Locational Ethics Counsellors (LECs) who cover various locations/offices of TPNODL; and LECs are assisted by 4-5 Ethics Champions (ECs).

In case any Ethical Concern is faced during the course of your business dealings with TPNODL, one may utilize any one or more of the following avenues:

1. Ethics Portal on website – www.tpnodl.com
2. Ethics Box
3. IVRS No. 19124
4. Locational Ethics Counsellor (LEC)
5. **Third Party Ethics Helpline – 1800-22-7697 (Toll Free) ***
6. Chief Ethics Counsellor

TPNODL is committed to follow Core Values and Core Principles mentioned in TCoC, cited below, in carrying out various activities as well as in discharge of bi-lateral and multi-lateral obligations involving other entities/organizations:

Core Values:

All six core values are already mentioned in GCC.

Core Principles:

1. **Zero tolerance to bribery or corruption** in any form.

2. Committed to **good corporate citizenship**
3. Contribute to the **economic development of the communities** of the countries & regions we operate in.
4. No compromise on **Safety**
5. Our conduct shall be **fair & transparent**
6. Respect the **human rights & dignity** of our stakeholders
7. **No unfair discrimination** of any kind
8. Statements made to stakeholders shall be **truthful** & made in **good faith**
9. Not engage in any restrictive or **unfair trade practice**
10. Provide avenues for our stakeholders to **raise concerns in good faith**
11. Environment **free from fear** of retribution to deal with concerns that are raised
12. Expect the leaders to be **role model**
13. **Comply with the laws** of the countries in which we operate

Gift Policy:

Principles for acceptance of gifts/benefits –

A gift or benefit may be accepted only if it complies with all of the following principles:

- ✓ it does not influence,
- ✓ does not have the potential to influence, an employee in such a way as to compromise or appear to compromise integrity and impartiality
- ✓ does not create a conflict of interest or perception of conflict of interest;

Principles for non-acceptance of gifts/benefits -

The gift or benefit may not be accepted or given if any of the following principles apply:

- ✓ causes the recipient or donor **to act in partial manner** in the course of duty
- ✓ apprehension of the recipient becoming **obligated to the donor**
- ✓ it is **not offered openly**
- ✓ if is an **offer of money** or something readily convertible to money (e.g. Shares)

Violation –

1. Not abiding with this policy would constitute violation of “Our Employees” Stakeholder group Clause “Gifts and Hospitality” of the Tata Code of Conduct (TCoC) 2015. Prompt action will be taken against violations.
2. Any deviation from this policy must be supported by appropriate rationale and must be duly approved by CEO who is also the Principal Ethics Officer. In any case, in dealing with such deviations, the spirit of the TCoC should in no case be compromised.

2. If it is determined that an employee / associate has violated this policy, appropriate action including termination of the employee’s / associate’s employment or association with TPNODL may be decided upon.