The Tata Power Company Ltd		OPEN TENDER NOTIFICATION
Tender Reference: ***4100073948/CC27ADO018***		*Document Date: 13th November 2026*

The Tata Power Company Limited Invites Tender through E-TENDER Two-Part Bidding Process from interested bidders for the following package: -

A. Summary of the tendered package:

Sr. No.	Description	Tender Reference no.	Bid Guarantee Fee / EMD (Rs.)	Tender Fee (Rs.)	Last Date and Time for Bid Submission
For the following package please send mail to Mr. Amey Oak (amey.oak@tatapower.com) with copy to Mr. Selva Ganesh (selva.ganesh@tatapower.com).					
1.	Outline Agreement (OLA) for supply of HT Smart Meters for Mumbai Distribution.	4100073948/ CC27ADO018	Rs. 31,000/-	2,000 /-	4th December 2026,1500 Hrs.

B. Tender Fee Payment Details

1. 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 number –

Beneficiary Name – The Tata Power Co. Ltd.

Bank Name – HDFC Bank Ltd.

Branch Name – Fort Branch, Mumbai

Address – Maneckji Wadia Building, Nanik Motwani Marg, Fort, Mumbai 400023.

Branch Code – 60

Bank & Branch Code – 400240015

Account No – 00600110000763

Account type – CC

IFSC Code – HDFC0000060

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

Tender Enquiry number

Name of authorized person

Contact number

e-mail id

Details of submission of Tender Participation Fee

E-mail with necessary attachment of 1 and 2 above to be send to amey.oak@tatapower.com with a copy to selva.ganesh@tatapower.com before Last date and time mentioned above

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Interested bidders to submit Tender Participation Fee and Authorization Letter before Last date and time as indicated above. Bids of only those bidders will be accepted who have paid the tender fee and EMD. Link from Tata Power 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 Tata Power E-Tender system (Ariba).

No e-mail or verbal correspondence will be responded. All communication will be done strictly with the bidder 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 Tata Power E-Tender System (Ariba). Without this link vendor 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 Participation Fee / EMD by Bidder who have not done the pre-requisite will not be refunded.

Also all future corrigendum's to the said tender will be informed on Tender section on website https://www.tatapower.com only.

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OPEN TENDER NOTIFICATION

FOR

Outline Agreement (OLA) for supply of HT Smart Meters for Mumbai Distribution.

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The Tata Power Company Limited (Tata Power)
Smart Center of Procurement Excellence,2nd Floor,
Sahar Receiving Station, Near Hotel Leela,
Sahar Airport Road, Andheri East, Mumbai-400059

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1. Event Information

1.1 Scope of work

Open Tenders are invited in e-tender bidding process from interested Bidders for entering into an Outline Agreement as defined below:

Reference Number	4100073948/CC27ADO018
Description	Outline Agreement (OLA) for supply of HT Smart Meters for Mumbai Distribution.
Type of Tender	Out Line Agreement (Rate Contract)
Estimated Period	One Year
Tender Fee	Rs. Two Thousand Only (Rs. 2000/-)
Earnest Money Deposit (EMD)	Rs. Thirty-One Thousand Only (Rs. 31,000/-)
Price Basis	Firm Price Basis
Executive Handling this Tender*	Name: Mr. Amey Oak E-Mail ID: amey.oak@tatapower.com
Reporting Manager*	Name: Mr. Deepan Prasad N A E-Mail ID: deepan.prasad@tatapower.com
Technical Query *	Name: Ms. Himali Patel E-Mail ID: himali.patel@tatapower.com

*You may contact the above personnel from Monday to Friday during office hours only.

1.2 Availability of Tender Documents

Tender documents may be downloaded by interested eligible bidders from The Tata Power Company website www.tatapower.com with effect from 13.11.2026. In the event detailed tender documents are downloaded from The Tata Power Company website or are received through online tendering system ARIBA from The Tata Power Company, the Tender Fee shall be compulsorily submitted online through NEFT/ RTGS. Any such bid submitted without this Fee shall be rejected.

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

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1.3 Calendar of Events

(a)	Date of availability of tender documents on TPC Website	From 13.11.2026 to 04.12.2026, 15:00 Hrs.
(b)	Date & Time of Pre-Bid Meeting (If any)	Shall be intimidated in advance.
(c)	Last Date of receipt of pre-bid queries, if any	18.11.2026 up to 15:00 Hours
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	23.11.2026 up to 17:00 Hours
(e)	Last date and time of receipt of Bids	04.12.2025 up to 15:00 Hrs.
(f)	Date & Time of opening of Price of qualified bids	Will be notified to the successful bidders through our website / e-mail.

Note:- * These date and time are as planned and tentative. In case of change the same shall be intimated to Authorized Person of Interested Bidder through E-Tender System.

Please note post submission of Bids relevant communication will be done with Authorized Person of Interested Bidder through E-Tender System

1.4 Mandatory documents required along with the Bid.

1.4.1 Bid Guarantee Fee (EMD) of requisite value and validity. PLEASE NOTE THAT BID GUARANTEE ONLY IN FORM OF BANK GUARANTEE WILL BE ACCEPTED.

1.4.2 Requisite Documents to ascertain fulfilling of Technical and Commercial Pre-Qualification Requirement as detailed in Tender Enquiry.

1.4.3 Technical Submission including Drawings, Type Test details, data sheets etc. as detailed in Technical Specification.

1.4.4 Required Commercial Submission as detailed in Tender Document

1.4.5 Technical and Commercial Clarification and Deviations as per the format attached in the Tender Enquiry

1.4.6 Proper authorization letter to sign the tender and participate in Tata Power E-Tender system on the behalf of bidder.

1.4.7 **For vendor not registered with Tata Power, duly filled Vendor Registration form with all supporting documents is mandatory to participate in the Tender**.

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

Also please note that whenever editable format are shared it is requested that data be filled in relevant cells. No formatting or addition / deletion of rows / columns to be done. Wherever editable Excel submission are requested the file should be free from references, macros etc.

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 Query / Clarification / Deviation (QCD) Format. Deviations must be mandatorily submitted in editable Excel sheet.

Technical or Commercial Deviation should be mentioned in Deviation Format only. Deviation in any other document or Format will not be considered.

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1.6 Right of Acceptance/Rejection

1.5.1 Bids are liable for rejection in absence of following: -
1.5.2 Mandatory Documents as listed in 1.3 above.
1.5.3 Price Bid as per the Price Schedule mentioned in Tender Document
1.5.4 Receipt of Bid and Response to queries within the due date and time
Tata Power reserves the right to accept/reject any or all the bids without assigning any reason thereof.

1.7 Qualification Criteria

Sr No	Parameter	Tata Power Requirement	Documents to be submitted by Bidder
A	Bid submission		
1	OEM	Bidder should be Meter Manufacturer and should meet all criteria pertaining to meter manufacturing.	
B	General Pre-Qualification Requirements		
1	Registered Entity	The Bidder must be a single entity having at least one permanent establishment of its own office in India and registered in India under companies Act 1956 or Companies Act 2013, or firm registered with Registrar of firms and societies in India who fulfils the eligibility criteria.	Certificate of Incorporation and Registration certificate along with Memorandum & Articles of Association.
2	Turnover	The Bidder should have average annual turnover of Rs. 100 Cr. in previous 3 financial years.	Copy of audited balance Sheet and Profit & Loss account to be submitted in this regard. UDIN No. shall be mandatorily mentioned on the audited documents.
C	Pre-Qualification Requirements for Meter Manufacturer (OEM)		
1	Technical Experience - Meter Manufacturer	Bidder(s) should be in the business of manufacturing Static Energy Meters/Smart meter and should have state of the art facility in India. Should be in this Business from the last 5 years in India as on date of Bid Submission.	Factory License Certificate/ MoA mentioning nature of Business.
		The bidder should have manufactured & supplied 2 Lakh (Quantity) Number of Smart Meters in last 3 years as on original bid submission date. Out of which, minimum of 50,000 (Quantity) of Smart Meter should have been in satisfactory commercial operation with remote	Individual Client's PO/ WO/ LOI/ LOA/ Contract/ Certification on client letterhead. Performance certificate and contact details of client's needs to be submitted

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		communication for a minimum period of 2 years as on original bid submission date.	
2	ISI Certification.	Smart Meters offered shall have Certification for 'ISI marking as per IS:16444 with latest amendment. The certification should be valid on the date of Tender opening.	Copy of Certificate for the Smart Meter offered should be furnished.
3	In-house Testing Facility	The bidder should have in-house fully automatic smart meter testing Facility for last 3 years.	A valid registration certificate mentioning issue / renewal / expiry date
4	Capacity	Bidder(s) should have manufacturing capacity of minimum 3 Lakh (3,00,000) Smart Meters per annum.	Proof of Work order & performance certificate/ work order completion certificate to be submitted.
5	Quality	The vendor should have valid ISO9001 & 14001 for the manufacturing facility.	ISO Certificate.
6	Technical Support	Vendor shall have a dedicated representative for Mumbai city for after sales technical support and coordination.	Self-undertaking in letter head
7	Experience of Tata Power existing HES	Vendor supplied Meter should be able to work with TPC Smart Meter backend system.	Self-undertaking by the Bidder regarding the integration with UHES and or MDM based on solution.

1.8 Pre-Bid Queries

Pre-Bid Queries if any, must be sent through message in E-Tender System. Pre-Bid Query must be sent only in the Query / Clarification / Deviation (QCD) Format. Technical Pre-Bid Query and Commercial Pre-Bid Queries have to be submitted in Separate Editable Excel File in Prescribed Format. Pre-Bid Queries sent in any other format or send through any other communication channel will not be accepted and answered. Pre-Bid Queries have to be sent in the stipulated timeline as defined in the Tender Document. No Pre-Bid Query will be accepted after the due time and date as specified as "Last Date of receipt of pre-bid queries, if any."

1.9 Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts and other parts of Tender Documents. Bidders must agree to these rules prior to participating. In addition to other remedies available, Tata Power 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 or other part of the Tender Documents. A bidder who violates the marketplace rules or engages in behavior 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.

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- Submit irrelevant documents or frequently cases of missing documents as part of compliance to Qualifying, Technical or Commercial Requirements causing unnecessary delay in Tender Evaluation.

1.10 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 Tata Power. This includes all bidding information submitted to Tata Power. All tender documents remain the property of Tata Power and all suppliers are required to return these documents to Tata Power upon request. Suppliers who do not honor these confidentiality provisions will be excluded from participating in future bidding events.

2 Evaluation Criteria

- The bids will be evaluated technically on the compliance to tender terms and conditions.
- The bids will be evaluated commercially on overall all-inclusive lowest cost for the complete tender BOQ as calculated in Price Bid Format. Tata Power, however, reserves right to split the order line item wise and/or quantity wise among more than one Bidder. Hence all bidders are advised to quote their most competitive rates against each line item.
- Bidder must mandatorily quote against each item of Schedule of Items. Failing to do so, Tata Power may reject the bids.

NOTE: In case of a new bidder not registered with Tata Power, factory inspection and evaluation shall be carried out to ascertain bidder's manufacturing capability and quality procedures. However, Tata Power 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 Tata Power shall be final and binding on the bidder in this regard.

Price Variation Clause and Cap: Not Applicable. The prices shall remain firm during the entire contract period.

3. Submission of Bid Documents

3.1 Bid Submission

Bidders are requested to submit their offer in line with this Tender document. Bids shall be submitted in 3 (three) parts:

FIRST PART: "EMD – BANK GUARANTEE" of Value detailed in 1.1 valid for 180 days from the due date of bid submission in the form of Bank Guarantee favoring 'The Tata Power Company Limited'. The EMD has to be strictly in the format as mentioned in Tender Document, failing which it shall not be accepted by Tata Power and the bid as submitted shall be liable for rejection.

Note: BG of 180 days and further claim period of 180 days is needed. In case the same cannot be issued by your bank then BG valid for 365 days can be provided.

Note: At times bidders have sought Tata Power bank details which is needed by them to make BG. Hence the same is reproduced below. These details are only provided to facilitate making of BG if needed

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Tata Power's Bank Details for submitting EMD BG:
Bank Name & Address – ICICI Bank, 163 HT Marg,
Backbay Reclamation, Churchgate, Mumbai 400 020.
A/c no. - 000451000293
IFSC Code – ICIC0000393

The hard copy of EMD in a sealed envelope should be sent on address mentioned in Tender document.

First Part must be submitted in hard copy in Sealed Envelope.

SECOND PART: "TECHNICAL / UN-PRICED COMMERCIAL BID" shall contain the following documents:

a) Documentary evidence in support of Technical, Commercial qualifying criteria
b) Technical literature/GTP/Type test report/Details of Qualified Manpower Available/ Testing Facility available etc. *(complete in all respect as desired and detailed in Technical Specification and Technical Requirement Section)*
c) Duly filled Technical and Commercial Deviation Sheets, if applicable
d) Duly filled formats like Authorization affidavit form
e) *Unpriced Commercial Bid*

The technical / un-priced commercial bid shall be properly indexed and is to be submitted in Soft Copy though E-Tender system of Tata Power. Hard Copy of Technical Bids need not be submitted.

Second Part has to be submitted through E-Tender System Only

THIRD PART: "PRICE BID" shall contain only the price details and strictly in Price Bid format along with explicit break up of basic prices and applicable GST. Basic price should include packaging forwarding, freight, transit insurance and any other cost envisaged by the bidder.

Third part must be submitted through E-Tender System. Hard Copy of Third Part, "Price Bid" need not be submitted.

FOR BIDS INVITED THROUGH E-TENDER SYSTEM (TECHNICAL, UN-PRICED COMMERCIAL BID and PRICE BID):

In response to advertisement Bidder must provide details of person authorized to Bid on behalf of the Bidder. An e-mail will be generated by E-Tender System and the authorized person can download the Tender Documents from the system.

SECOND and THIRD PART of the Bid must be submitted in E-Tender System.

Bidders must mandatorily submit SECOND PART and THIRD PART (Technical, Un-priced commercial Bid, and Price Bid) only through E-Tender system of Tata Power. Bids submitted through any other form/ route shall not be admissible.

FOR BIDS INVITED IN SEALED ENVEOPE PROCESS (FIRST PART):

First part of the bid shall be sealed in an envelope which shall be clearly marked as below:

EMD
"Please mention Tender Reference No"

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Please mention our Tender Reference No on the Tender and drop the same in our Tender Box located at The Tata Power Company Limited (Tata Power), Corporate Contracts, Tata Power Sahar Receiving Station, T2 Airport Road, Sahar, Andheri-E, Mumbai 400 059.

The bids and the outer envelope shall be addressed to:

Head - Procurement
Corporate Contracts, Tata Power Sahar Receiving Station, T2 Airport Road, Sahar, Andheri-E,
Mumbai 400 059

The envelope shall also bear the Name and Address of the Bidder along with our Tender No. and subject.

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

Bids submitted by Email/Telex/Telegram /Fax will be rejected. No request from any Bidder to Tata Power to collect the proposals from Courier/Airlines/Cargo Agents etc. shall be entertained.

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

Communication Details: Detailed in 1.1

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

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of Tata Power. 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. It also may be noted that the denomination of Purchase Order / Outline Agreement / Rate Contract and associated Payment to Successful Bidder shall also be in Indian Rupees Only. In case Bidder intends to import any equipment, part etc. and supply to Tata Power then all liability and costs related to import will rest with the Bidder. All statutory compliances, payments, expenditure etc. related to importing of equipment will be responsibility of the bidder.

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, Tata Power 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 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 Tata Power against the risk of bidder's conduct which would warrant forfeiture.

The EMD shall be in following form:

- Bank Guarantee valid for 180 days after due date of submission.

The EMD shall be forfeited in case of:

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

Or

- In case of a successful bidder, if the Bidder, within 15 days, does not.
- accept the purchase order, or.
- furnish the required Contract Performance Bank Guarantee (CPBG).

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Original Bank Guarantee submitted as EMD shall be returned only after completion of award process for unsuccessful bidders and issue of Contract Performance Bank Guarantee (CPBG) for successful bidder.

4. 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 Tata Powers processing of Bids or award decisions may result in the rejection of the Bidder's Bid.

4.2 Technical Bid Opening

Bids will be opened at Corporate Office of Tata Power as per our standard Process. The bids shall be opened internally by Tata Power. Technical bid must not contain any cost information whatsoever.

First the envelope marked “EMD” will be opened. Bids without EMD 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 in E-Tender system.

4.3 Preliminary Examination of Bids/Responsiveness

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

Prior to the detailed evaluation, Tata Power 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 Tata Power and/or the Tata Power 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, Tata Power may, at its discretion, ask the Bidder for a clarification on its Bid for any deviations with respect to the Tata Power 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 Tata Power.

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4.5 Price Bid Opening

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 Tata Power without any further correspondence in this regard.

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.

4.6 Reverse Auction and Price Matching Option

Tata Power reserves the right to go for Reverse Auction (RA) for price negotiation and discover the most competitive price on ARIBA portal, Tata Power's official e-tendering platform. This will be decided after techno-commercial evaluation of the bids. Bidders need to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case Tata Power decides to go for RA.

Only those bidders who are techno-commercially qualified shall be eligible to participate further in RA process. However, the original H1 bidder (whose price bid is the highest post techno-commercial evaluation) shall not be allowed to participate in further RA process provided minimum three techno-commercially qualified bids are available.

For case where more than one bidder has to be awarded (including Rate Contract / Outline Agreement) Price Matching Option will be exercised. Volume of job allocated to original competitive bidder will be more than bidder who is chosen through Price Matching Option. Tata Power decision regarding work sharing shall be final and no explanation OR clarification shall be given regarding the same.

5.0 Award Decision

Tata Power 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 Priced Bid Format subject to any corrections required in line with Clause 4.3 above. The decision to place purchase order/Outline Agreement/ Rate Contact solely depends on Tata Power on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that Tata Power may deem relevant.

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

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

In case of award, the Purchase Order shall be issued digitally through Ariba Commerce Automation portal. In all such cases, further transaction such as Order Acceptance, SES / GRN preparation, Invoicing etc. shall be conducted in the Ariba Commerce Automation system.

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5.1 Rate Contract / Outline Agreement

Rate Contract / Outline Agreement does not guarantee any assured business volume in Rupees or Quantity. Quantities are only indicative and specified for the purpose of readiness as per the request from Purchaser. Supplies shall be only against Firm Purchase Orders placed as per the agreed terms and conditions of Rate Contract / Outline Agreement. Purchaser shall be entitled at its discretion to place firm order for such supplies on "As and When Required Basis" without minimum take-off guarantee.

Rate Contract / Outline Agreement will have list of Items with Unit Rate and applicable Taxes and Duties. There will be a cap on value for which order which can be placed against the Rate Contract / Outline Agreement. Actual quantity ordered for each line item may differ significantly from the tentative quantity indicated in the Tender Document. One / few / all items of Rate Contract / Outline Agreement can be ordered till the Cap Value is reached.

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. Outline Agreement/Purchase Order (with Commercial conditions)
2. Special Terms and conditions (if applicable)
3. General Terms and conditions
4. Technical Specifications

In case there is a discrepancy in the BOQ mentioned in tender (to the extent modified through subsequent Corrigendum, if any) and the bid submitted by any bidder, the description as mentioned in the tender (to the extent modified through subsequent Corrigendum, if any) shall prevail.

7.0 Ethics

Tata Power is an ethical organization and as a policy Tata Power 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.

Tata Power work practices are governed by the Tata Code of Conduct. Bidder is request to refer Tata Code of Conduct Clause in General Terms and Conditions.

8.0 General Condition of Contract and Special Condition of Contracts

Any condition not mentioned above shall be applicable as per General Terms and Conditions and Special Condition of Contracts attached along with this tender.

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Annexure – 1 Schedule of Items

Price Bid Format 4100073948/CC27ADO016 - Outline Agreement for 1 year for Supply of HT Smart Meters for Tata power Mumbai Distribution

Sr. No.	Description	UoM	Quantity	Unit Rate (Rs.)	Basic Total (Rs.)
1	HT SM WITH NIC 63V 5A DLMS 3P4W CL0.5	EA	250		
2	HT SM 3P4W, 63.5V, 5A, 0.2CL	EA	10		
3	HT SM 3P4W, 63.5 V, 1A, 0.2CL	EA	10		
	Total				
	GST				
	Total With GST				

Note	
	Please enter values in the Cells highlighted yellow only. Please donot edit any other cells.
	The bidders are advised to quote prices strictly in the above format and for all the line items as mentioned above. Failing to do so, bids are liable for rejection.
	Mentioning “extra/inclusive” in any of the column may lead for rejection of the price bid. Please do not edit any other cell in the sheet
	Outline Agreement does not guarantee any assured business volume in Rupees or Quantity terms.

Bidders Signature

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ANNEXURE II

TECHNICAL SPECIFICATIONS

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TECHNICAL SPECIFICATION

FOR

Three Phase, Four Wire

Class 0.2s, -/1 Amp,

HT TRI-VECTOR

Smart Meter

Tata Power Company Ltd.

Meter management Department

Dharavi Receiving Station,

Matunga,

Mumbai – 400 019

Document No.	TPC\MTL\HTCT\2023\01	Issue No.	01
		Issue Date	18.07.2023
Revision No.	03	Revision Date	10.07.2026
Description	Prepared By & Date	Reviewed By & Date	Approved By & Date
SPECIFICATION FOR 3 Phase HTCT SMART METER	Himali Patel	Rahul Ranadive & Devanjan Dey	B Karunakaran

Revision Summary

Revision No.	Revision Details	Revision Date	Reviewed & Approved By
01	Modified Meter guarantee as 60 months from 120 months, Load survey days as 35 days, Midnight energies as 35 days & parameters modified, NVM retention 15 years, parameters in BCS – import,export,net modified. Requirement of GPS tracking is removed.	15.12.2024	Rahul Ranadive/Devanjan Dey & S V Savarkar
02	TOD structure updated	05.05.2025	Rahul Ranadive/Devanjan Dey & S V Savarkar
03	Updated meter guarantee as 120 months from 60 months.	10.07.2026	Rahul Ranadive/Devanjan Dey & B Karunakaran

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1 Scope:

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site of Three phase four Wire, 3*63.5 V, -/1A current operated ac static meters of accuracy class 0.2S and a two way communication with Head End System(HES) (here after referred as meters) complete with all accessories for efficient and trouble free operation.

2 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 16444 Part-2 2017) : A.C. Static Transformer operated WH and VARH meters, class 0.2s, 0.5s & 1.0S.
b) IS 14697 (2021) :A.C. Static Transformer operated Watt hour and VAR-hour meters meter class 0.2S, 0.5S, & 1.0S
c) IS 15959(Part 3-2017) : Data exchange for electricity meter reading , tariff and load control
d) IEEE 802.15.4(2003) : Standard for local and metropolitan area networks
e) IS 9000 : Basic Environmental testing procedure for electrical and electronic items.
f) IS 12346 (1999) : Specification for testing equipment for A.C.Electrical energy meter.
g) IS11000 (1984) : Fire hazard testing
h) 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.
i) IEC 62053-22 (2003) : Electricity metering equipment (a.c.) - Particular Requirements - Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)
j) IS 15707 (2006) : Testing Evaluation installation and maintenance of AC Electricity Meters-Code of practice.
k) IEC 60068 : Environmental testing.
l) CBIP – TR No.325 : Specification for A.C.Static Electrical Energy Meters (latest amendment).
m) CEA Regulation (2006) : Installation and operation of meters Dtd: 17/03/2006.
n) IS 60529 : Degree of protection provided by enclosure
o) IEC62056-61 : Electricity metering- Object Identification system (OBIS)

3 Climatic Conditions of The Installation:

a) Max. Ambient Temperature : 50deg.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 : 1450 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 : 150 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 Technical Requirements:

S.No.	DESCRIPTION	Requirement
4.1	Type of the meter	Three phase Four wire , current operated static Watt-hour meter without application of any multiplication constant. It also Consists of measuring elements, TOU of register, Display and plug in type bi-directional communication module all integral within the meter housing. The meter design shall be such that no MF required for any parameter
4.2	Accuracy Class of the meter	0.2S
4.3	Basic Current (Ib) & rated Maximum current (Imax)	Ib= 1A; Imax= 2A
4.4	Reference Conditions for testing the performance of the meter	Vref = 63.5 V $\pm$ 1 % Frequency = 50hz $\pm$ 0.3% Temperature= 27 C$\pm$ 2 0C (if the tests are made at the temperature other than reference temperature the results shall be corrected by applying Mean Temperature Coefficient 0.05)
4.5	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 440V (for minimum 5 min).
4.6	Operating Frequency	50 Hz$\pm$ 5%.
4.7	Power Consumption	Voltage circuit: Maximum 5W and 15 VA Current Circuit : Maximum 1VA (The additional power requirement during data transmission shall not exceed 7W as mentioned in IS 16444 whichever is lower, per communication module)
4.8	Starting Current	5mA (0.1% of Ib)
4.9	Short time over current	200 A for 0.05 sec (30Imax for one half cycle 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 and then repeated with the other polarity.)
4.12	AC withstand voltage for 1 min	4 KV
4.13	Insulation resistance Between frame & current ,voltage circuits connected together:	5 M ohm 50 M ohm.

	Between each current (or voltage circuit) & each and every other circuit. :	
4.14	Mechanical requirements	Meter shall be in compliance with clause 12.3 of IS 14697 and IS16444 part 2
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 or better as per IS 12063/60529, but without suction in the meter. Meter shall comply with clause 6.9 and 12.5 of IS 14697. OEM who provides degree of protection higher than IP51 shall have first preference.
4.17	Resistance against Climatic influence.	Meter shall be in compliance with clause 2.6 of IS 14697.
4.18	Electromagnetic Compatibility (EMC)	Requirements shall be as per CBIP technical report no 325 (latest amendment)
4.19	Accuracy requirements	Meter shall be in compliance with clause 11 of IS 14697 & IS16444 part-2.
4.20	Power factor range	Zero lag to Zero lead.
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 (i) Real Time Clock and calendar (ii) RTC battery (iii) Non Volatile Memory (iv) LCD segment check (v) Communication Card
4.24	Initial startup of meter	Meter shall be fully functional within 5 sec after reference Voltage is applied to the meter terminals.
4.25	Alternate mode of supply to the meters	In case of power failure, reading/data shall be to downloaded with the help of battery of long life(minimum ten years) through Optical port in Battery mode.
4.26	Sleep Mode	Meter shall not go in sleep mode .Display should not be "OFF at any point of time when power up.
4.27	Internal diameter of the terminal holes Depth of the terminal holes	5 mm (minimum) 20 mm
4.28	Clearance between adjacent terminals	10 mm (minimum)
4.29	Display	Backlit LCD, Scrolling, 10 seconds for each parameter minimum 8 Digits LCD display. The back lit preferably in green color.

4.30	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication
4.31	Software and communication compatibility	The bidder shall supply software required for communication though local (CMRI and BCS software) and remote (AMI) connectivity free of cost and necessary training. For existing meter manufacturer, it should be ensured that all meters (existing non-smart & upcoming smart meters) can be read through one BCS only.
4.32	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 & timings, DIP (billing & load survey), MD reset, billing date change, Set metering mode (Import/Export), display setting, shall be reconfigure through BCS/CMRI and remotely over the air (OTA), and any other support will be provided without any additional cost to TATA power till the useful life of the meters. Change in display setting shall be done through firmware upgrade by means of BCS/CMRI/Mobile app and remotely over the air (OTA). Meter data will not get reset while firmware upgrade or any programming. Display sequence for Net meter is given in the document.
4.33	Usage Application	Indoor and Outdoor
4.34	Ultrasonic welding	Meter cover and body should be Ultrasonic/chemical welded. Opaque design shall have first preference.
4.35	Meter Dimension in MM	Is not more than 250L*200W*100H
4.36	Real Time clock	Accuracy of RTC Should be as per CBIP-325 report and shall not vary by ± 5 min per year. Meter RTC shall be corrected automatically by the system in synchronization to the network RTC. Meter shall support RTC sync request from HES also.
4.37	KVAH & KVA calculation	Meter shall be programed as Lag+ Lead configuration i.e. Leading PF shall not be considered as unity. The same shall be displayed in BCS.
4.38	NO display	Meter Should design such a way, if meter found no display then after meter data retrieved from optical port.
4.39	Communication module of meter for AMI	As per clause no 1.2 (b) of IS 16444. Meter should have provision of communication module compatible with both the variant mentioned in IS 16444 PART-1. The Communication Network Interface Card (NIC) shall be 4G LTE with fallback provision to 2G and support all the bands offered by TSP's in India. It should be plug-in type and field hot swappable with cellular technology NIC of all type of meters of same make.

		Support for upgrade to 5G should be there without replacing the meter. Meter should be able to provide required power supply to NIC card. There shall not be an interlock while removing NIC card module with opening meter terminal cover.
4.40	Communication Layer Protocol	Should be as per clause 9.3 of IS 16444
4.41	Key Management and Security Feature	Should be as per IS 15959
4.42	Harmonics recording	The meter should record the current and voltage THD. The meter should record harmonics up to min 20th harmonic. However harmonics recording upto 31st shall give first preference. Average THD of all phase for voltage THD and current THD. THD values shall have 15 minutes integration period in load survey. Accuracy of harmonics recording shall be as per meter accuracy class. The meter shall generate a flag/event log whenever the threshold (user configurable) of the 5% THD of the load current and voltage is breached
4.43	Meter Category	D3 - The same shall be displayed in BCS

In case of mobile app, bidder shall provide 10 nos. license with life time validity and arrange integration to existing HES.

Bidder shall supply 20 nos. magnetic optical communication USB cords with meter supply.

5 Immunity against external influencing signals:

5.1 Magnetic Field:

Meter shall be immune to magnetic field such that it shall not affect the normal overall functionality.

Meter shall comply test of effect due to influence quantities as per latest CBIP amendments.

Meter shall show “Magnet” or appropriate icon under display sequence in the display during magnet event.

The effect on the meter due to magnetic induction of external origin as obtained by the method detailed below shall be determined.

5.1.1 The continuous (DC) "Stray" magnetic induction of 67 m T ± 5% shall be obtained at a distance of 5 mm from the surface of the pole of the electromagnet according to Appendix E of CBIP 325 document, energized with a DC current. The magnetic field shall be applied successively to all the surfaces of the meter. The value of the magneto motive force to be applied shall be generally 1000 ampere-turns. However, considering the non-linearity of magnetization of the core, the ampere-turn might require slight adjustment to achieve the desired output.

5.1.2 The continuous (DC) "abnormal" magnetic induction of 0.2 Tesla ± 5% shall be obtained at a distance of 5 mm from the surface of the pole of the electromagnet according to Appendix E of CBIP

325 document, energized with a DC current. The magnetic field shall be applied successively to all the surfaces of the meter. The value of the magneto motive force to be applied shall be generally 10000 ampere-turn. However, considering the non-linearity of the magnetization of the core, the ampere-turns might require slight adjustment to achieve the desired output.

In the event of logging of presence of abnormal magnetic induction with date & time the positive variation of error may be beyond the limit of 4% but not exceeding a value (e) as given in Note 3.2 under Table 17 of CBIP 325 document, corresponding to nominal registration of the meter at reference voltage, 100% maximum current and Cos Ø = 1.

5.1.3 The alternating (a.c) "stray" magnetic induction of 0.5 mT ± 5% shall be obtained by placing the meter in the center of circular coil, 1 m in mean diameter, of square section of small radial thickness relative to the diameter, and having 400 ampere-turns.

5.1.4 The alternating (AC) "abnormal" magnetic induction of 10 milli Tesla shall be obtained by placing the meter at various orientations in the centre of a circular coil as specified in 6.1.2, but with 2800 ampere-turns produced by a current of the same frequency as that of the voltage applied to the meter and under the most unfavourable conditions of phase and direction.

In the event of logging of presence of abnormal magnetic induction with date & time the positive variation of error may be beyond the limit of 4% but not exceeding a value (e) as given in Note 3.2 under Table 17 of CBIP 325 document, corresponding to nominal registration of the meter at reference voltage, 100% maximum current and cos Ø=1.

Permanent Magnet: Immune up to 0.5T and Event logging >0.5T

Consumption during magnet tamper shall be recorded in defraud register also. Demand shall be recorded as per actual load only.

5.2 Electrostatic Discharge (ESD)

Meter along with NIC shall be immune up to 35 kV and shall record accurate energy as per IS-14697:2021. Meter shall log the event into memory as 'ESD' with date & time stamp for any ESD greater than 35 kV and shall show 'ESD' in the display and should log in suitable compartment (Abnormal Interference at BCS end).

The shielding around the meter shall be such that it does not get affected by high voltage, high and low energy impulse when comes in contact with meter from any side.
The meter should immune to high/ low frequency Jammer devices. Meter shall log event in its memory as jammer with date and time stamp along with snapshot.

5.3 Neutral Disturbance

The meter shall log in the memory as 'NEUTRAL DISTURBANCE' with date and time stamp and show 'ND' in the display for Frequency variation below 45 Hz and above 55 Hz with time delay of 1 min and for Pulsating DC and Chopped AC of any value with time delay of 1 min.

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 DC signal/ DC pulse

upto 330V and for any value beyond this, the meter shall log the event into memory as 'NEUTRAL DISTURBANCE' with date & time stamp and shall show 'ND '/ suitable information in the display after time delay of 1 min(occurrences and restoration time).

The meter shall record energy proportional to the current, V Ref (63.5V) and UPF when any of the tamper circuits enclosed as per annexure are used to tamper energy using a diode or a variable resistance or a variable capacitance energy saving device and meter should recorded ND in meter memory. The measurement by meter shall not get influenced by injection of AC Voltages/Chopped signal/DC signal/ DC pulse of low frequency and harmonics. The meter should be immune to such Neutral Disturbance. In case the meter accuracy is disturbed under Neutral Disturbance, it should be able to log the event.

5.4 Abnormal and Tamper conditions:

The meter shall record forward energy under any abnormal conditions.
All the tamper events i.e. shall be logged in the memory of the meter with date and time stamp of occurrence and restoration along with instantaneous electrical parameter (3ph. Voltage, 3ph. Current, Neutral Current, kWh, kVarh (Lag), kVarh (Lead), kVAh Energies, 3Ph. PF).

Meter shall store cumulative count and cumulative durations all the tamper event which have logged by meter from the date of energization till life of meter.
Tamper count shall be incremented only on the occurrence of the any tamper event with date and time.

Stamp on FIFO basis. The event which is not restored should not be removed from its meter memory and FIFO should not applicable for unrestored event.
The cover open tamper detection should be through heavy duty, sturdy micro switch such that it should not Operate on vibration or impact during handling or testing.
The meter shall register correctly if supply neutral is not available at the meter neutral terminal. The meter shall work in absence of two incoming wires. It shall keep recording correctly in case of unbalance system voltage.
The meter shall keep working accurately irrespective of the phase sequence of the supply.

The meter shall be able to differentiate between actual CT reversals and condition arising out of unbalanced / unhealthy capacitor bank.
Meter shall have neutral CT for tamper identification and analysis.

The size of compartments should be such that all above event are accommodated in the assigned event 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 per below table.

All Transactional/Programing related events to be logged in BCS/HES along with date/time stamping and instantaneous parameters.
Suitable nomenclature/icon shall be displayed on meter display for Magnet, HV ESD, Neutral Disturbance, Meter cover open related events.

There should be provision to provide separate transaction count for Transaction & Firmware upgrades on display, however, at BCS end cumulative programming count (Transaction + Firmware upgrades) should be provided.

Persistence time for occurrence and restoration for the events and compartment block size shall be as per table given below

Compartment size	
Voltage related events	100
Current related events	100
Power failure related events	30
Transaction related events	20
Other events	50
Non-rollover events	1

Sr. No.	**Tampers/ Failures**	**Phase wise**	**Compartment Size**	**Logic/ Condition other than standard**	**Persistence time**	
					Occ Time (min)	Rec Time (min)
1	Voltage Failure	YES	25	Occ: Voltage <57V: and current > 2% Ib. Res: Vph > 57V (Independent of current)	5	5
2	Voltage unbalance	YES	25	Occ : (Vmax-Vph)>5% Vn and Vphase : 57<Vphase< 69 Res : (Vmax-Vph)<=5% Vn and Vphase : 57<Vphase< 69	5	5
3	High Voltage	YES	25	Vph > 110% of Vref res : Vph < 110% of Vref	30	30
4	CT open	YES	25	Occ: Iph < 1%Ib, >5% Ib in any of the other two phases (Ex: if Rph <1% of Ib, Y or B should be > 5% Ib) Res: Iph > 1% Ib in tampered phase	30	30
5	Current unbalance	YES	25	Occ : Imax – Imin > 30% of Iavg and Res : Imax – Imin < 30% of Iavg	15	15

6	CT Bypass	YES	25	Occ: CT bypass >20% Ib and all Iph < 1%Ib and no current reversal in any phase Res: CT bypass <20% Ib	30	30
7	Current reversal	YES	25	**Occ:** 1. KW ph negative and (Net KW > 1% of Vref*Ib) **OR** 2. KW > 5% of Vref*Ib and PF > 0.2 **Res :** 1. KW ph positive or (Net KW < 1% of Vref*Ib) **AND** 2. KW < 5% of Vref*Ib or PF < 0.2	2	2
8	Magnet	NO	25	Whenever meter sense magnetic field it shall record Active and Apparent energy at Imax at UPF	Immediate	Immediate
9	Neutral Disturbance	NO	25	Occ: Vph > 150% Vref OR In case of external signal injection (Chopped DC, Chopped AC and DC injection through diode) Res: On removal of spurious signal injection in neutral of meter.	5	5
10	ESD/JAMMER / Abnormal Interference	NO	25	Occ: Application of ESD and Jammer device Res: Removal of ESD and Jammer Device	2	2
11	Low PF Tamper	YES	25	**Occ:** 1. KW ph negative and (Net KW < 1% of Vref*Ib) **AND** 2. KW < 5% of Vref*Ib or PF < 0.2 **Res :** 1. KW ph positive or (Net KW > 1% of Vref*Ib) **OR** 2. KW > 5% of Vref*Ib and PF > 0.2	5	5
12	Top Cover open	NO	1	When cover opens by more than 2 to 4 mm.	Immediate	NA
13	Invalid Phase Association	YES	5	IF invalid phase association	5	5
14	NIC card Removed	NO	25	OCC: On removal of card	Immediate	Immediate

	(Immediate)			RES: On Inserction card		
15	Power On/Off	NO	25	Occ: Actual voltage OFF Res: Actual voltage ON	5	5
16.	Temperature Rise	NO	25	Occ: T > 70˚C REC: T < 60˚C	2	2

Note:-

1) During Voltage Failure event, The meter shall record energy proportional to the actual current, V Ref (63.5V) and UPF. Smart PT feature can be seen in BCS for verification.
2) In case of Invalid phase association, appropriate indication on meter display and BCS end shall be available.
3) If any change in tamper logic is required, TPC shall inform to successful bidder during PO placement or before starting of manufacturing as per requirement. Successful bidder shall make necessary changes according to TPC requirement.

6 General Technical Requirements

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. Meter shall withstand Solar radiation.

The meters shall be designed and manufactured using SMT (Surface Mount Technology) components.
There should not be any connector or joint in CT secondary connection and shall be soldered directly on PCB.
The battery cell shall be button/coin type leak proof.

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 Purchaser:

S No	Component Function	Requirement	Makes and Origin
1.	Measurement/	The Measurement/ computing chips used in the meter should be with the	USA: Anolog Devices,

	computing chips	Surface mount type along with the ASICs	Cyrus Logic, Atmel, Phillips, freescale,NXP South Africa: SAMES Japan: NEC Singapore: Texas
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, Onsemi Japan: Hitachi or Oki Europe: SGS Thomson
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 Type) It should be trans-reflective STN type industrial grade with extended temperature range.	Taiwan: Holtek Singapore: Bonafied Technologies Korea: Advantek China:Xiamen/ Tianma
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, Everlight
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 Semiconductors, Atmel, Phillips, Texas Instruments, Rohm,Micron Japan:Hitachi, Oki, AVX or Ricoh Korea: Samsung

7.	Battery	Lithium with guaranteed life of 15 years	Varta / Tedirun /Sanyo / EVE / XENO, Mitsubishi or equivalent.
8.	RTC/Microcontroller	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.
Vendor shall submit list of components with makes to TPC during sample meter evaluation and FAT.

7 Meter Body:

Meter body shall be made of unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II)with FVo or better 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 better 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/chemical welding 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 damage evidences should be visible externally& should be traceable in such a way that attempts can be proved in court of law. 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 meter with opaque encapsulated design/integrated base and cover (single enclosure) would be highly preferred, thus nullifying the possibility of opening of meter case. The meter body shall be such that the liquid or chemical shall not reach the electronic part PCB, processor and display from meter terminal and push button. Optical port of meter shall be metallic to hold magnetic optical cord during data downloading locally.

8 Terminals, Terminal Block

Terminal block should be in single mould with meter body base(Not separate). After any attempts the terminal block should not be able to 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
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 LEXAN500Ror equivalent on prior approval from the Purchaser
The terminals shall be marked properly on the terminal block for making external connections.
The terminals and connections shall be suitable to carry up to 120 % of Imax continuously (Imax 6 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 shall be preferably of MS cage clamp type as per IS: 15707or of flat end screw with at least 9 mm dia of screw for better contact area.
The preferred arrangement of terminals shall be linear. Internal diameter of the terminal holes shall be minimum 5 mm; minimum clearance between adjacent terminals shall be 10 mm. Depth of the terminal holes shall be of 25 mm. Terminal screws shall be of Zinc plated MS bottle type. Minimum two number of terminal screw to be provide per terminal wires.
Meter terminal should have 11pin arrangement consisting of neutral and neutral S2 shorted inside the meter. All terminal should be in one row only.
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.
The preferred arrangement of terminals shall be linear. Minimum two number of terminal screws to be provided per terminal wire

8.1 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. Terminal Cover with C cut to enable smooth insertion of cable in the terminals.
The terminal cover shall be 50 mm length from bottom of terminal block in line with meter base.
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

8.2 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 number Polycarbonate seal left side and one number Hologram seal on right side shall be provided by the Bidder.

Additional Hologram seals will be provided by TPC to supplier for putting them on meter body as per requirement at Factory. Reconciliation of seals shall be provided by bidder after its usage.

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. 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.

Plug in type NIC card cover should have proper sealing arrangement and should be sealed with manufacturer's polycarbonate seal.

The bidder shall provide the soft record of polycarbonate seal, Manufacturers and TPC hologram seal serial number, NIC card serial number and box packing list used against each meter serial number along with its position in tabular form for every lot of meter.

9 TOD Feature:

The meter shall be capable of measuring Cumulative Energy (KWh), Kvah and MD (KW, KVA)with time of day (TOD) registers having 5 zones (no. of zones & time slot shall be programmable by BCS,CMRI, Mobile App, OTA with adequate security level).
TOD Slot Configuration shall be as follows-

Slot	Time Slots
TOD 1	00 to 06 Hrs
TOD 2	06 to 09 Hrs
TOD 3	09 to 17 Hrs
TOD 4	17 to 22 Hrs.
TOD 5	22 to 24 Hrs

10 MD Integration:

The MD integration period shall be 15 minutes (integration period-programmable by CMRI 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 functionality shall not be available. Last 12 MD values shall be stored in the memory. MD shall be recorded and displayed with minimum three digits before decimal and minimum three digits after decimal points. MD integration shall be Block Type Demand.

11 Parameters In BCS

All these parameters shall be downloaded locally or remotely. All the parameters shall be recorded in its NVM(Non Volatile Memory). NVM shall have minimum retention time of 15 Years. Below mention current, history billing data and at least 25 tamper event for each tamper shall be available In NVM.
NVM OK/Fail status or flag shall be made available at BCS end for better data analysis.
Preference shall be given to bidder who provides CAIDI profile, Max outage duration, time of max outage & its histories at BCS end.

Note: For Bidirectional meter, all BCS parameters should be available in both Import & Export mode.
In case unidirectional mode, forwarded energies shall be recorded.
In case bidirectional mode, separate import, export, net energies shall be recorded.

11.1 Billing Information

Current+ 12 Month History billing Date
Current + 12 Month History of Energy (KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Current + 12 Month History Consumption (KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Current + 12 Month History of Demand (KW,KVA, KVAR Lag, KVAR led) Along with date and time stamp
Current + 12 Month History of PF

11.2 TOD wise billing Information

Current + 12 Month History of Energy (KWH, KVAH)
Current + 12 Month History of Consumption (KWH, KVAH)
Current + 12 Month History of Demand (KW, KVA) along with date and time stamp
Current + 12 Month History of PF

11.3 Load survey:

The meter shall be capable of recording load profile of atleast 35 days for 15 min IP for ON days only for following parameters.

a. KWH
b. KVAH
c. KVARH Lag
d. KVARH Led
e. KW
f. KVA
g. KVAR Lag
h. KVAR Led
i. Phase wise PF
j. Average PF
k. Voltage for each Phase
l. Current for each Phase
m. Neutral current
n. THD Voltage phase wise
o. THD Current phase wise
p. Temperature
q. Meter health indicator
r. Phase wise min & max current
s. Phase wise min & max voltage

Note: Load survey can be configured for 5/15/30 min as per requirement. By default 15 min SIP is configured.

11.4 MID Night Energy:

Meter shall be capable of recording daily Midnight Energies 00:00 to 24:00 Hrs for min. 35 power ON days as parameters mentioned below –

Import : Cumulative KWH & its TOD, Cumulative KVAH and its TOD, Tariff wise MD kVA, KVARH Lag, KVARH Lead

Export : Cumulative KWH, Cumulative KVAH, KVARH Lag, KVARH Lead

11.5 Instantaneous Parameters:

Meter shall have capable following Instantaneous parameter In Memory and should be available in BCS
Meter Serial No
Meter Type
Meter date and Time
MRI date and time
Dump date and time
Voltage of each Phase
Line Current of each Phase
Active Current of each Phase
Actual Neutral current
Power factor of each Phase
Average Power Factor
Instantaneous Frequency
Instantaneous Load (KW, KVA, KVAR Lag, KVAR Led)
Present Cumulative energy(KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Cumulative Tamper count
Cumulative Billing Count
Cumulative Programming Count
Vector/Phasor diagram
THD current (Phase wise & average)
THD voltage (Phase wise & average)
THD power(Phase wise & average)
Separate Event count (voltage unbalance, overcurrent, CT open/By pass, low voltage etc.)
Metering mode
Postpaid/prepaid mode

11.6 General Information:-

Meter shall be capable for providing below mention general parameters in memory should be available in BCS
Meter serial No
Meter Type
Manufacture Name
Manufacture date
Meter Class
Meter constant
Meter voltage rating
Meter current rating
Firmware version of meter
DLMS Version of meter
Available TOD profile showing timing and seasons
Available Meter display sequence

11.7 Transactions:-

All energy & demand parameters alongwith date time stamping shall be available with status of Relay connect/disconnect.

12 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 degree and minimum temperature withstands 0degree 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.

Display shall have minimum 6 digits before decimal for energy register, 3 digits before & 3 digits after decimal place in the display for demand register, 2 digits before & 4 digits after decimal place in the display for High resolution energy registers, 3 digits before decimal & 3 digit after decimal for Voltage, 3 digits before decimal & 3 digit after decimal for Current, 1 digits before decimal & 3 digit after decimal for PF, 3 digits before decimal & 3 digit after decimal for Power, size of the digits shall be minimum 10mmx6mm. Cumulative energy (KWh) shall be displayed without decimal in auto 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 (MD1) 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 30 sec, if push button is not operated.

1. **Default Display sequence –**

Display1 Parameters (Auto Scroll Mode)

Display Check
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Cumulative Forward kWh (7+1)
TOD 1 Forward kWh
TOD 2 Forward kWh
TOD 3 Forward kWh
TOD 4 Forward kWh
TOD 5 Forward kWh
Cumulative Forward kVArh lag
Tariff wise MD Forward kVA Date & time
Cumulative Forward kVArh lead
Cumulative Forward kVAh

TOD 1 Forward kVAh
TOD 2 Forward kVAh
TOD 3 Forward kVAh
TOD 4 Forward kVAh
TOD 5 Forward kVAh
Average PF
Latest reset- Forward kWh
Latest reset-TOD 1 Forward kWh
Latest reset-TOD 2 Forward kWh
Latest reset-TOD 3 Forward kWh
Latest reset-TOD 4 Forward kWh
Latest reset-TOD 5 Forward kWh
Latest reset- Forward kVArh lag
Latest reset-Tariff wise MD Forward kVA Date & time
Latest reset- Forward kVArh lead
Latest reset- Forward kVAh
Latest reset-TOD 1 Forward kVAh
Latest reset-TOD 2 Forward kVAh
Latest reset-TOD 3 Forward kVAh
Latest reset-TOD 4 Forward kVAh
Latest reset-TOD 5 Forward kVAh
Latest reset- Average PF

Display2 Parameters (Manual Scroll Mode)
Display Check
Metering mode
Payment mode
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Instantaneous Phase wise Voltage
Instantaneous Phase wise Current
Instantaneous Neutral Current
Instantaneous Active power
Instantaneous Reactive power
Instantaneous Apparent power
Instantaneous Phase wise PF
Cumulative Forward kWh (7+1)
TOD 1 Forward kWh
TOD 2 Forward kWh
TOD 3 Forward kWh
TOD 4 Forward kWh
TOD 5 Forward kWh
Cumulative Forward kVArh lag

Tariff wise MD Forward kVA Date & time
Cumulative Forward kVArh lead
Cumulative Forward kVAh
TOD 1 Forward kVAh
TOD 2 Forward kVAh
TOD 3 Forward kVAh
TOD 4 Forward kVAh
TOD 5 Forward kVAh
Average PF
Latest reset- Forward kWh
Latest reset-TOD 1 Forward kWh
Latest reset-TOD 2 Forward kWh
Latest reset-TOD 3 Forward kWh
Latest reset-TOD 4 Forward kWh
Latest reset-TOD 5 Forward kWh
Latest reset- Forward kVArh lag
Latest reset-Tariff wise MD Forward kVA Date & time
Latest reset- Forward kVArh lead
Latest reset- Forward kVAh
Latest reset-TOD 1 Forward kVAh
Latest reset-TOD 2 Forward kVAh
Latest reset-TOD 3 Forward kVAh
Latest reset-TOD 4 Forward kVAh
Latest reset-TOD 5 Forward kVAh
Latest reset- Average PF
Rising Demand Forwared kVA
Connection Check
Voltage Phase sequence
Current Phase sequence
Previous reset- Forward kWh
Previous reset- Tariff wise Forward kWh
Previous reset - Forward Kvarh Lag
Previous reset- Tariff wise MD forward KVA Date & Time
Previous reset- Forward Kvarh Lead
Previous reset - Forward Kvah
Previous reset - Tariff wise Forward Kvah
Previous reset - Average PF
MD reset count
Defrauded Energy cumulative Kwh
Defrauded Energy cumulative Kvah
Cumulative Tamper count
History of last 3 tampers
Defraud Register Cumulative kWh during Magnetic Tamper (6+2)
Defraud Register Cumulative kWh during ND Tamper (6+2)

Latest Magnetic tamper occurrence date & time
Latest Magnetic tamper recovery date & time
Latest ND tamper occurrence Date & time
Latest ND tamper recovery Date & time
Cover Open tamper occurrence Date & time
Meter Version
DLMS Version
RTC Date Status
Battery Status
Non volatile memory status
NIC card status
RSSI Value
Error Code- Meter and NIC health indicator

Display3 Parameters (High Resiolution Mode)
Cumulative Forward kWh (2+5)
Cumulative Forward kVArh lag (2+5)
Cumulative Forward kVArh lead (2+5)
Cumulative Forward kVAh (2+5)
Battery mode will be as per display 1, 2 and 3 sequentially.

Meter shall be unidirectional by default unless specified. However it can be programmed through BCS, HHU, Mobile App and OTA.

2. **Display sequence for Net meter (programmable through firmware upgrade) –**

Display1 Parameters (Auto Scroll Mode)
Display Check
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Cumulative kWh (7+1) - Import
TOD 1 kWh - Import
TOD 2 kWh - Import
TOD 3 kWh - Import
TOD 4 kWh - Import
TOD 5 kWh - Import
Cumulative kVArh lag - Import
Tariff wise MD kVA Date & time - Import
Cumulative kVArh lead - Import
Cumulative kVAh - Import
TOD 1 kVAh - Import
TOD 2 kVAh - Import
TOD 3 kVAh - Import
TOD 4 kVAh - Import

TOD 5 kVAh - Import
Cumulative kWh (7+1) - Export
TOD 1 kWh - Export
TOD 2 kWh - Export
TOD 3 kWh - Export
TOD 4 kWh - Export
TOD 5 kWh - Export
Cumulative kVArh lag - Export
Tariff wise MD kVA Date & time - Export
Cumulative kVArh lead - Export
Cumulative kVAh - Export
TOD 1 kVAh - Export
TOD 2 kVAh - Export
TOD 3 kVAh - Export
TOD 4 kVAh - Export
TOD 5 kVAh - Export
Average PF
KVA Rising demand

Display2 Parameters (Manual Scroll Mode)
Display Check
Metering mode
Payment mode
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Instantaneous Phase wise Voltage
Instantaneous Phase wise Current
Instantaneous Neutral Current
Instantaneous Active power
Instantaneous Reactive power
Instantaneous Apparent power
Instantaneous Phase wise PF
Net Average PF
Rising Demand Forwared kVA
Latest reset- Cumulative kWh (7+1) - Import
Latest reset- TOD 1 kWh - Import
Latest reset- TOD 2 kWh - Import
Latest reset- TOD 3 kWh - Import
Latest reset- TOD 4 kWh - Import
Latest reset- TOD 5 kWh - Import
Latest reset- Cumulative kVArh lag - Import
Latest reset- Tariff wise MD kVA Date & time - Import
Latest reset- Cumulative kVArh lead - Import
Latest reset- Cumulative kVAh - Import

Latest reset- TOD 1 kVAh - Import
Latest reset- TOD 2 kVAh - Import
Latest reset- TOD 3 kVAh - Import
Latest reset- TOD 4 kVAh - Import
Latest reset- TOD 5 kVAh - Import
Latest reset- Cumulative kWh (7+1) - Export
Latest reset- TOD 1 kWh - Export
Latest reset- TOD 2 kWh - Export
Latest reset- TOD 3 kWh - Export
Latest reset- TOD 4 kWh - Export
Latest reset- TOD 5 kWh - Export
Latest reset- Cumulative kVArh lag - Export
Latest reset- Tariff wise MD kVA Date & time - Export
Latest reset- Cumulative kVArh lead - Export
Latest reset- Cumulative kVAh - Export
Latest reset- TOD 1 kVAh - Export
Latest reset- TOD 2 kVAh - Export
Latest reset- TOD 3 kVAh - Export
Latest reset- TOD 4 kVAh - Export
Latest reset- TOD 5 kVAh - Export
Latest reset Average PF
Previous reset- Cumulative kWh (7+1) - Import
Previous reset- TOD 1 kWh - Import
Previous reset- TOD 2 kWh - Import
Previous reset- TOD 3 kWh - Import
Previous reset- TOD 4 kWh - Import
Previous reset- TOD 5 kWh - Import
Previous reset- Cumulative kVArh lag - Import
Previous reset- Tariff wise MD kVA Date & time - Import
Previous reset- Cumulative kVArh lead - Import
Previous reset- Cumulative kVAh - Import
Previous reset- TOD 1 kVAh - Import
Previous reset- TOD 2 kVAh - Import
Previous reset- TOD 3 kVAh - Import
Previous reset- TOD 4 kVAh - Import
Previous reset- TOD 5 kVAh - Import
Previous reset- Cumulative kWh (7+1) - Export
Previous reset- TOD 1 kWh - Export
Previous reset- TOD 2 kWh - Export
Previous reset- TOD 3 kWh - Export
Previous reset- TOD 4 kWh - Export
Previous reset- TOD 5 kWh - Export
Previous reset- Cumulative kVArh lag - Export
Previous reset- Tariff wise MD kVA Date & time - Export
Previous reset- Cumulative kVArh lead - Export

Previous reset- Cumulative kVAh - Export
Previous reset- TOD 1 kVAh - Export
Previous reset- TOD 2 kVAh - Export
Previous reset- TOD 3 kVAh - Export
Previous reset- TOD 4 kVAh - Export
Previous reset- TOD 5 kVAh - Export
Previous reset Average PF
Connection Check
Voltage Phase sequence
Current Phase sequence
MD reset count
Defrauded Energy cummulative Kwh
Defrauded Energy cummulative Kvah
Cummulative Tamper count
History of last 3 tampers
Defraud Register Cumulative kWh during Magnetic Tamper (6+2)
Defraud Register Cumulative kWh during ND Tamper (6+2)
Latest Magnetic tamper occurrence date & time
Latest Magnetic tamper recovery date & time
Latest ND tamper occurrence Date & time
Latest ND tamper recovery Date & time
Cover Open tamper occurrence Date & time
Meter Version
DLMS Version
RTC Date Status
Battery Status
Non volatile memory status
NIC card status
Error Code- Meter and NIC health indicator

Display3 Parameters (High Resiolution Mode)
Cumulative Forward kWh (2+5) - Import
Cumulative Forward kVArh lag (2+5) - Import
Cumulative Forward kVArh lead (2+5) - Import
Cumulative Forward kVAh (2+5) - Import
Cumulative Forward kWh (2+5) - Export
Cumulative Forward kVArh lag (2+5) - Export
Cumulative Forward kVArh lead (2+5) - Export
Cumulative Forward kVAh (2+5) - Export

Battery mode will be as per display 1,2 and 3 sequentially.

For Net meter mode, Both Import and export energy recording shall be applicable in this mode of metering and relevant registers like Billing, LS, tamper logics etc shall be updated and shall be available in BCS also

Note: Latest reset is History 1 & Previous reset is History 2

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 10 years.

Error code – Meter and NIC health indicator shall be displayed as following or any better provision-

SR No.	Error Code to be Displayed	Description
1	Err 00	All Good
2	Err 01	Meter NIC Communication failure
3	Err 02	Modem Initialization Failure
4	Err 03	SIM Not Detected
5	Err 04	SIM Invalid
6	Err 05	No GSM Network Coverage
7	Err 06	GPRS Network Registration failure
8	Err 07	GPRS Registration Denied
9	Err 08	No APN Configured
10	Err 09	GPRS Connection Not Established
11	Err 10	HES IP/Port not configured
12	Err 11	HES Port Not Open
13	Err 12	Any key Mismatch Between Meter and NIC

13 Output Device:

13.1 Pulse rate

The meters shall have a suitable test output device. Red color blinking LED (marked as imp/kWh) shall be provided in the front. This device shall be suitable for using with sensing probe used with test benches or reference standard meters. The test output device shall have constant pulse rate of Imp / kWh and Imp/Kvarh. Meter constant shall be indelibly printed on the name plate as imp/kwh and Imp/Kvarh

Meter constant shall be as actual without multiplying factor.

13.2 Communication LCD indicator

The meter shall be provided with suitable LCD/LED indication for communication in progress.

Meter shall display Communication status indications on LCD/LED without affecting normal display parameters.

14 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. No sticker to be used to avoid loss of data in event of fire. The base color of Name plate shall be white indelibly and distinctly marked with all essential particulars as per relevant standards along with the following. The Serial no. series applicable for the meters shall be provided by Tata Power.

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. Serial number along with barcode
vi. Month and Year of manufacture
vii. Unit of measurement
viii. Reference voltage ,frequency
ix. Ref. temperature
x. Rated basic and maximum Current
xi. Meter constant (imp/kWh)
xii. 'BIS' Mark
xiii. Class index of meter
xiv. "Property of Tata Power Co. Ltd
xv. Purchase Order No. & date
xvi. Guarantee period.
xvii. Sign of double square
xviii. Country of manufacture.
xix. Firmware version of meter
xx. Meter category
xxi. NIC serial NO (Shall be visible from Communication Module Slot) along with barcode/ QR code
xxii. Compatibility of NIC Card.

Bidder should ensure that NIC provided in meters are having Sr. No., MFG date, Property of TATA POWER' marked, PO date and no. (same as that of meter PO)

15 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.

15.1 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

15.2 Acceptance test:

i. AC High Voltage test
ii. Insulation test
iii. Test on limits of error as per IS load points
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.
ix. Test for Immunity against external influencing signal as per the Purchaser specification
x. Test for Immunity against DC Immunity as per the Purchaser specification
xi. Test for Immunity against Tamper conditions as per the Purchaser specification
xii. Error measurements with abnormal condition
xiii. Test to Influence of Harmonics
xiv. Supply voltage and frequency variation test
xv. Testing of self-diagnostic features
xvi. All tamper test, count increment and logging with date and time
xvii. All tests as defined in IS 15959(Part-3)
xviii. Functionality of communication module is 16444 part2
xix. smart meter communicability as per provision of 28 IS 15959 (part-3)
xx. Physical check of NIC and replaceable ease of the NIC module in meter

15.3 Type test:

i. All tests as defined in IS 14697:2021 with Latest editions.
ii. Test against abnormal magnetic influence as per CBIP TR 325 with Latest editions.
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 with Latest editions.
v. IP Test with Latest editions.

vi. Smart meter communicability as per 15959 part-3
vii. Meter shall be type tested as per BIS16444 part-2

Note:- Bidder must mention IS 13779:1999 with latest edition in factory test report.

15.4 Special test:

i. 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 TPC.
ii. Temperature rise of terminal block at 120% of Imax for 6 Hours

16 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/ any NABL accredited lab 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 TPC.

17 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 TPC's representatives at all times when the work is in progress. Inspection by the TPC 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 DC (Dispatch Clearance) is issued by TPC.

Following documents shall be sent along with material

a) Test reports
b) MDCC issued by TPC
c) Invoice in duplicate
d) Packing list
e) Drawings & catalogue
f) Guarantee / Warrantee card
g) Delivery Challan
h) Other Documents (as applicable)
i) Compatible BCS software
j) Meter user manual covering Technical Parameters, display, tamper logics, meter dimensions, etc

18 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. The

successful bidder shall submit two extra boxes (unpaid) per lot delivered (lot size shall be 2,000 numbers or as defined in the order)

19 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 **120** months from the date of last supplies, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame not more than 1 month, and to the entire satisfaction of Tata Power, failing which Tata Power 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.

Bidder to collect all defective meters from stores for repairs as per defined timeframe and send those meters immediately after repairs.
Bidders to submit CAPA report of each defective meter and submit the same to Lab/Store representative along with dispatch of repaired meters.
Format of CAPA report-

S. No	Type	Meter No	Defects from Tata Power	Observations at OEM	Root-Cause by OEM	Corrective Actions taken by OEM	Preventive Actions taken by OEM

Meters to be designed in such a way that cases of No display/ Display faulty will be bare minimum or else Tata Power will liable to reject entire lot of meters.

Bidder shall further be responsible for 'free replacement/repairs" of entire lot of meters for any 'Latent Defects '(design issue due to faulty lot component) if noticed and reported by the purchaser within guarantee period.

Manufacture shall collect disputed meter from meter stores and provide testing report of disputed meter refer by TPC within 15 days period irrespective of guarantee period.

Bidder has to provide meter guarantee for 120 months.

20 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.

21 Tender Sample:

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

Following accessories to be submitted along with sample

1. Test Reports of 3 sample meters (Type test, Acceptance test **)**
2. Detailed User Manual along with dimension
3. Guaranteed Technical Particulars
4. Tamper logic sheet
5. Display parameter sequence
6. BCS, MRI and Mobile App software for reading, programming
7. Optical communication cords
8. Internal connection diagram
9. List and make of all electronics component used
10. Clause by clause compliance sheet of Technical Specification
11. Bidder shall be responsible for integration of Meters with NIC and TPC HES.

22 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 beare 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.

23 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 or better.

24 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.

25 Drawings:

Following drawings & Documents shall be prepared based on TPC 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.

26 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 connectedtogether: b) Between each current(or voltage circuit) & eachand every other circuit.	M ohm	
13	Mechanical requirement as per IS 14697 and IS 16444 part 2		

14	Resistance to heat and fire (As per specification)		
15	Degree of protection		
16	Resistance against climatic influence (as per IS 14697 and IS 16444 part-2)		
17	Electromagnetic Compatibility (EMC) as per CBIP Technical report no 88(latest amendment		
18	Accuracy requirements (As per IS 14697 and IS 16444 part-2		
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		
26	Immunity against abnormal Magnetic influence,		
27	Immunity against HV ESD		

28	DC Immunity as defined in		
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 IS 15959 part3	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	
45	Tamper thresholds	Yes/No	

46	Ultrasonic Welding of cover and Base	Yes/No	
47	Fire retardant category of meter Body And terminal block		
48	Supply of jig for retrieval of Damaged/ burnt meter.		
49	Meter shall be programed for like RTC, TOD		
50	Dimension of meters L*B*H		
51	KVAH & KVA calculation		
52	Meter data retrieved if meter found no display	Yes/No	
53	RJ 11 Pin configuration as per TPC	Yes/No	
54	Make of Disconnector Switch		
55	Output Device (LEDs) As per Cl 14		
56	NIC module with cover & sealing Arrangement		
57	Harmonics Recording- The recordi of harmonics up to 20th harmonic Average THD of all phase for volta THD and current THD.		
58	Accuracy of harmonics recording		
59	Flag in BCS for high THD in any phase V or I		
60	Measuring element used		
61	Meter Category		

62	Calibration (programming)		
63	Usage application	Indoor/ Outdoor	
64	Ultrasonic welding/ Chemical welc		
65	GPS Tracking Device		

Electronics parts

Sr NO	**Component Fundtion**	**Requirement**	**Makes and Origin (to be provide by Bidder)**
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	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	
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 Type) 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.	
5	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm and Conformal coating required to protect from Environment like moisture	
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 with guaranteed life of 15 years	
8.	RTC / Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	

27 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

FOR

Three Phase, Four Wire

Class 0.2s, -/5 Amp,

HT TRI-VECTOR

Smart Meter

Tata Power Company Ltd.

Meter management Department

Dharavi Receiving Station,

Matunga,

Mumbai – 400 019

Document No.	TPC\MTL\HTCT\2023\01	Issue No.	01
		Issue Date	18.07.2023
Revision No.	03	Revision Date	10.07.2026
Description	Prepared By & Date	Reviewed By & Date	Approved By & Date
SPECIFICATION FOR 3 Phase HTCT SMART METER	Himali Patel	Rahul Ranadive & Devanjan Dey	B Karunakaran

Revision Summary

Revision No.	Revision Details	Revision Date	Reviewed & Approved By
01	Modified Meter guarantee as 60 months from 120 months, Load survey days as 35 days, Midnight energies as 35 days & parameters modified, NVM retention 15 years, parameters in BCS – import,export,net modified. Requirement of GPS tracking is removed.	15.12.2024	Rahul Ranadive/Devanjan Dey & S V Savarkar
02	TOD structure updated	05.05.2025	Rahul Ranadive/Devanjan Dey & S V Savarkar
03	Updated meter guarantee as 120 months from 60 months.	10.07.2026	Rahul Ranadive/Devanjan Dey & B Karunakaran

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1 Scope:

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site of Three phase four Wire, 3*63.5 V, -/5A current operated ac static meters of accuracy class 0.2S and a two way communication with Head End System(HES) (here after referred as meters) complete with all accessories for efficient and trouble free operation.

2 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 16444 Part-2 2017) : A.C. Static Transformer operated WH and VARH meters, class 0.2s, 0.5s & 1.0S.
b) IS 14697 (2021) :A.C. Static Transformer operated Watt hour and VAR-hour meters meter class 0.2S, 0.5S, & 1.0S
c) IS 15959(Part 3-2017) : Data exchange for electricity meter reading , tariff and load control
d) IEEE 802.15.4(2003) : Standard for local and metropolitan area networks
e) IS 9000 : Basic Environmental testing procedure for electrical and electronic items.
f) IS 12346 (1999) : Specification for testing equipment for A.C.Electrical energy meter.
g) IS11000 (1984) : Fire hazard testing
h) 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.
i) IEC 62053-22 (2003) : Electricity metering equipment (a.c.) - Particular Requirements - Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)
j) IS 15707 (2006) : Testing Evaluation installation and maintenance of AC Electricity Meters-Code of practice.
k) IEC 60068 : Environmental testing.
l) CBIP – TR No.325 : Specification for A.C.Static Electrical Energy Meters (latest amendment).
m) CEA Regulation (2006) : Installation and operation of meters Dtd: 17/03/2006.
n) IS 60529 : Degree of protection provided by enclosure
o) IEC62056-61 : Electricity metering- Object Identification system (OBIS)

3 Climatic Conditions of The Installation:

a) Max. Ambient Temperature : 50deg.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 : 1450 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 : 150 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 Technical Requirements:

S.No.	DESCRIPTION	Requirement
4.1	Type of the meter	Three phase Four wire , current operated static Watt-hour meter without application of any multiplication constant. It also Consists of measuring elements, TOU of register, Display and plug in type bi-directional communication module all integral within the meter housing. The meter design shall be such that no MF required for any parameter
4.2	Accuracy Class of the meter	0.2S
4.3	Basic Current (Ib) & rated Maximum current (Imax)	Ib= 5A; Imax= 10 Amps
4.4	Reference Conditions for testing the performance of the meter	Vref = 63.5 V $\pm$ 1 % Frequency = 50hz $\pm$ 0.3% Temperature= 27 C$\pm$ 2 0C (if the tests are made at the temperature other than reference temperature the results shall be corrected by applying Mean Temperature Coefficient 0.05)
4.5	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 440V (for minimum 5 min).
4.6	Operating Frequency	50 Hz$\pm$ 5%.
4.7	Power Consumption	Voltage circuit: Maximum 5W and 15 VA Current Circuit : Maximum 1VA (The additional power requirement during data transmission shall not exceed 7W as mentioned in IS 16444 whichever is lower, per communication module)
4.8	Starting Current	5mA (0.1% of Ib)
4.9	Short time over current	200 A for 0.05 sec (30Imax for one half cycle 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 and then repeated with the other polarity.)
4.12	AC withstand voltage for 1 min	4 KV
4.13	Insulation resistance Between frame & current ,voltage circuits connected together:	5 M ohm 50 M ohm.

	Between each current (or voltage circuit) & each and every other circuit. :	
4.14	Mechanical requirements	Meter shall be in compliance with clause 12.3 of IS 14697 and IS16444 part 2
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 or better as per IS 12063/60529, but without suction in the meter. Meter shall comply with clause 6.9 and 12.5 of IS 14697. OEM who provides degree of protection higher than IP51 shall have first preference.
4.17	Resistance against Climatic influence.	Meter shall be in compliance with clause 2.6 of IS 14697.
4.18	Electromagnetic Compatibility (EMC)	Requirements shall be as per CBIP technical report no 325 (latest amendment)
4.19	Accuracy requirements	Meter shall be in compliance with clause 11 of IS 14697 & IS16444 part-2.
4.20	Power factor range	Zero lag to Zero lead.
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 (i) Real Time Clock and calendar (ii) RTC battery (iii) Non Volatile Memory (iv) LCD segment check (v) Communication Card
4.24	Initial startup of meter	Meter shall be fully functional within 5 sec after reference Voltage is applied to the meter terminals.
4.25	Alternate mode of supply to the meters	In case of power failure, reading/data shall be to downloaded with the help of battery of long life(minimum ten years) through Optical port in Battery mode.
4.26	Sleep Mode	Meter shall not go in sleep mode .Display should not be "OFF at any point of time when power up.
4.27	Internal diameter of the terminal holes Depth of the terminal holes	5 mm (minimum) 20 mm
4.28	Clearance between adjacent terminals	10 mm (minimum)
4.29	Display	Backlit LCD, Scrolling, 10 seconds for each parameter minimum 8 Digits LCD display. The back lit preferably in green color.

4.30	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication
4.31	Software and communication compatibility	The bidder shall supply software required for communication though local (CMRI and BCS software) and remote (AMI) connectivity free of cost and necessary training. For existing meter manufacturer, it should be ensured that all meters (existing non-smart & upcoming smart meters) can be read through one BCS only.
4.32	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 & timings, DIP (billing & load survey), MD reset, billing date change, Set metering mode (Import/Export), display setting, shall be reconfigure through BCS/CMRI and remotely over the air (OTA), and any other support will be provided without any additional cost to TATA power till the useful life of the meters. Change in display setting shall be done through firmware upgrade by means of BCS/CMRI/Mobile app and remotely over the air (OTA). Meter data will not get reset while firmware upgrade or any programming. Display sequence for Net meter is given in the document.
4.33	Usage Application	Indoor and Outdoor
4.34	Ultrasonic welding	Meter cover and body should be Ultrasonic/chemical welded. Opaque design shall have first preference.
4.35	Meter Dimension in MM	Is not more than 250L*200W*100H
4.36	Real Time clock	Accuracy of RTC Should be as per CBIP-325 report and shall not vary by ± 5 min per year. Meter RTC shall be corrected automatically by the system in synchronization to the network RTC. Meter shall support RTC sync request from HES also.
4.37	KVAH & KVA calculation	Meter shall be programed as Lag+ Lead configuration i.e. Leading PF shall not be considered as unity. The same shall be displayed in BCS.
4.38	NO display	Meter Should design such a way, if meter found no display then after meter data retrieved from optical port.
4.39	Communication module of meter for AMI	As per clause no 1.2 (b) of IS 16444. Meter should have provision of communication module compatible with both the variant mentioned in IS 16444 PART-1. The Communication Network Interface Card (NIC) shall be 4G LTE with fallback provision to 2G and support all the bands offered by TSP's in India. It should be plug-in type and field hot swappable with cellular technology NIC of all type of meters of same make.

		Support for upgrade to 5G should be there without replacing the meter. Meter should be able to provide required power supply to NIC card. There shall not be an interlock while removing NIC card module with opening meter terminal cover.
4.40	Communication Layer Protocol	Should be as per clause 9.3 of IS 16444
4.41	Key Management and Security Feature	Should be as per IS 15959
4.42	Harmonics recording	The meter should record the current and voltage THD. The meter should record harmonics up to min 20th harmonic. However harmonics recording upto 31st shall give first preference. Average THD of all phase for voltage THD and current THD. THD values shall have 15 minutes integration period in load survey. Accuracy of harmonics recording shall be as per meter accuracy class. The meter shall generate a flag/event log whenever the threshold (user configurable) of the 5% THD of the load current and voltage is breached
4.43	Meter Category	D3 - The same shall be displayed in BCS

In case of mobile app, bidder shall provide 10 nos. license with life time validity and arrange integration to existing HES.

Bidder shall supply 20 nos. magnetic optical communication USB cords with meter supply.

5 Immunity against external influencing signals:

5.1 Magnetic Field:

Meter shall be immune to magnetic field such that it shall not affect the normal overall functionality.

Meter shall comply test of effect due to influence quantities as per latest CBIP amendments.

Meter shall show “Magnet” or appropriate icon under display sequence in the display during magnet event.

The effect on the meter due to magnetic induction of external origin as obtained by the method detailed below shall be determined.

5.1.1 The continuous (DC) "Stray" magnetic induction of 67 m T ± 5% shall be obtained at a distance of 5 mm from the surface of the pole of the electromagnet according to Appendix E of CBIP 325 document, energized with a DC current. The magnetic field shall be applied successively to all the surfaces of the meter. The value of the magneto motive force to be applied shall be generally 1000 ampere-turns. However, considering the non-linearity of magnetization of the core, the ampere-turn might require slight adjustment to achieve the desired output.

5.1.2 The continuous (DC) "abnormal" magnetic induction of 0.2 Tesla ± 5% shall be obtained at a distance of 5 mm from the surface of the pole of the electromagnet according to Appendix E of CBIP

325 document, energized with a DC current. The magnetic field shall be applied successively to all the surfaces of the meter. The value of the magneto motive force to be applied shall be generally 10000 ampere-turn. However, considering the non-linearity of the magnetization of the core, the ampere-turns might require slight adjustment to achieve the desired output.

In the event of logging of presence of abnormal magnetic induction with date & time the positive variation of error may be beyond the limit of 4% but not exceeding a value (e) as given in Note 3.2 under Table 17 of CBIP 325 document, corresponding to nominal registration of the meter at reference voltage, 100% maximum current and Cos Ø = 1.

5.1.3 The alternating (a.c) "stray" magnetic induction of 0.5 mT ± 5% shall be obtained by placing the meter in the center of circular coil, 1 m in mean diameter, of square section of small radial thickness relative to the diameter, and having 400 ampere-turns.

5.1.4 The alternating (AC) "abnormal" magnetic induction of 10 milli Tesla shall be obtained by placing the meter at various orientations in the centre of a circular coil as specified in 6.1.2, but with 2800 ampere-turns produced by a current of the same frequency as that of the voltage applied to the meter and under the most unfavourable conditions of phase and direction.

In the event of logging of presence of abnormal magnetic induction with date & time the positive variation of error may be beyond the limit of 4% but not exceeding a value (e) as given in Note 3.2 under Table 17 of CBIP 325 document, corresponding to nominal registration of the meter at reference voltage, 100% maximum current and cos Ø=1.

Permanent Magnet: Immune up to 0.5T and Event logging >0.5T

Consumption during magnet tamper shall be recorded in defraud register also. Demand shall be recorded as per actual load only.

5.2 Electrostatic Discharge (ESD)

Meter along with NIC shall be immune up to 35 kV and shall record accurate energy as per IS-14697:2021. Meter shall log the event into memory as 'ESD' with date & time stamp for any ESD greater than 35 kV and shall show 'ESD' in the display and should log in suitable compartment (Abnormal Interference at BCS end).

The shielding around the meter shall be such that it does not get affected by high voltage, high and low energy impulse when comes in contact with meter from any side.
The meter should immune to high/ low frequency Jammer devices. Meter shall log event in its memory as jammer with date and time stamp along with snapshot.

5.3 Neutral Disturbance

The meter shall log in the memory as 'NEUTRAL DISTURBANCE' with date and time stamp and show 'ND' in the display for Frequency variation below 45 Hz and above 55 Hz with time delay of 1 min and for Pulsating DC and Chopped AC of any value with time delay of 1 min.

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 DC signal/ DC pulse

upto 330V and for any value beyond this, the meter shall log the event into memory as 'NEUTRAL DISTURBANCE' with date & time stamp and shall show 'ND '/ suitable information in the display after time delay of 1 min(occurrences and restoration time).

The meter shall record energy proportional to the current, V Ref (63.5V) and UPF when any of the tamper circuits enclosed as per annexure are used to tamper energy using a diode or a variable resistance or a variable capacitance energy saving device and meter should recorded ND in meter memory. The measurement by meter shall not get influenced by injection of AC Voltages/Chopped signal/DC signal/ DC pulse of low frequency and harmonics. The meter should be immune to such Neutral Disturbance. In case the meter accuracy is disturbed under Neutral Disturbance, it should be able to log the event.

5.4 Abnormal and Tamper conditions:

The meter shall record forward energy under any abnormal conditions.
All the tamper events i.e. shall be logged in the memory of the meter with date and time stamp of occurrence and restoration along with instantaneous electrical parameter (3ph. Voltage, 3ph. Current, Neutral Current, kWh, kVarh (Lag), kVarh (Lead), kVAh Energies, 3Ph. PF).

Meter shall store cumulative count and cumulative durations all the tamper event which have logged by meter from the date of energization till life of meter.
Tamper count shall be incremented only on the occurrence of the any tamper event with date and time.

Stamp on FIFO basis. The event which is not restored should not be removed from its meter memory and FIFO should not applicable for unrestored event.
The cover open tamper detection should be through heavy duty, sturdy micro switch such that it should not Operate on vibration or impact during handling or testing.
The meter shall register correctly if supply neutral is not available at the meter neutral terminal. The meter shall work in absence of two incoming wires. It shall keep recording correctly in case of unbalance system voltage.
The meter shall keep working accurately irrespective of the phase sequence of the supply.

The meter shall be able to differentiate between actual CT reversals and condition arising out of unbalanced / unhealthy capacitor bank.
Meter shall have neutral CT for tamper identification and analysis.

The size of compartments should be such that all above event are accommodated in the assigned event 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 per below table.

All Transactional/Programing related events to be logged in BCS/HES along with date/time stamping and instantaneous parameters.
Suitable nomenclature/icon shall be displayed on meter display for Magnet, HV ESD, Neutral Disturbance, Meter cover open related events.

There should be provision to provide separate transaction count for Transaction & Firmware upgrades on display, however, at BCS end cumulative programming count (Transaction + Firmware upgrades) should be provided.

Persistence time for occurrence and restoration for the events and compartment block size shall be as per table given below

Compartment size	
Voltage related events	100
Current related events	100
Power failure related events	30
Transaction related events	20
Other events	50
Non-rollover events	1

Sr. No.	**Tampers/ Failures**	**Phase wise**	**Compartment Size**	**Logic/ Condition other than standard**	**Persistence time**	
					Occ Time (min)	Rec Time (min)
1	Voltage Failure	YES	25	Occ: Voltage <57V: and current > 2% Ib. Res: Vph > 57V (Independent of current)	5	5
2	Voltage unbalance	YES	25	Occ : (Vmax-Vph)>5% Vn and Vphase : 57<Vphase< 69 Res : (Vmax-Vph)<=5% Vn and Vphase : 57<Vphase< 69	5	5
3	High Voltage	YES	25	Vph > 110% of Vref res : Vph < 110% of Vref	30	30
4	CT open	YES	25	Occ: Iph < 1%Ib, >5% Ib in any of the other two phases (Ex: if Rph <1% of Ib, Y or B should be > 5% Ib) Res: Iph > 1% Ib in tampered phase	30	30
5	Current unbalance	YES	25	Occ : Imax – Imin > 30% of Iavg and Res : Imax – Imin < 30% of Iavg	15	15

6	CT Bypass	YES	25	Occ: CT bypass >20% Ib and all Iph < 1%Ib and no current reversal in any phase Res: CT bypass <20% Ib	30	30
7	Current reversal	YES	25	**Occ:** 1. KW ph negative and (Net KW > 1% of Vref*Ib) **OR** 2. KW > 5% of Vref*Ib and PF > 0.2 **Res :** 1. KW ph positive or (Net KW < 1% of Vref*Ib) **AND** 2. KW < 5% of Vref*Ib or PF < 0.2	2	2
8	Magnet	NO	25	Whenever meter sense magnetic field it shall record Active and Apparent energy at Imax at UPF	Immediate	Immediate
9	Neutral Disturbance	NO	25	Occ: Vph > 150% Vref OR In case of external signal injection (Chopped DC, Chopped AC and DC injection through diode) Res: On removal of spurious signal injection in neutral of meter.	5	5
10	ESD/JAMMER / Abnormal Interference	NO	25	Occ: Application of ESD and Jammer device Res: Removal of ESD and Jammer Device	2	2
11	Low PF Tamper	YES	25	**Occ:** 1. KW ph negative and (Net KW < 1% of Vref*Ib) **AND** 2. KW < 5% of Vref*Ib or PF < 0.2 **Res :** 1. KW ph positive or (Net KW > 1% of Vref*Ib) **OR** 2. KW > 5% of Vref*Ib and PF > 0.2	5	5
12	Top Cover open	NO	1	When cover opens by more than 2 to 4 mm.	Immediate	NA
13	Invalid Phase Association	YES	5	IF invalid phase association	5	5
14	NIC card Removed	NO	25	OCC: On removal of card	Immediate	Immediate

	(Immediate)			RES: On Inserction card		
15	Power On/Off	NO	25	Occ: Actual voltage OFF Res: Actual voltage ON	5	5
16.	Temperature Rise	NO	25	Occ: T > 70˚C REC: T < 60˚C	2	2

Note:-

1) During Voltage Failure event, The meter shall record energy proportional to the actual current, V Ref (63.5V) and UPF. Smart PT feature can be seen in BCS for verification.
2) In case of Invalid phase association, appropriate indication on meter display and BCS end shall be available.
3) If any change in tamper logic is required, TPC shall inform to successful bidder during PO placement or before starting of manufacturing as per requirement. Successful bidder shall make necessary changes according to TPC requirement.

6 General Technical Requirements

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. Meter shall withstand Solar radiation.

The meters shall be designed and manufactured using SMT (Surface Mount Technology) components.
There should not be any connector or joint in CT secondary connection and shall be soldered directly on PCB.
The battery cell shall be button/coin type leak proof.

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 Purchaser:

S No	Component Function	Requirement	Makes and Origin
1.	Measurement/	The Measurement/ computing chips used in the meter should be with the	USA: Anolog Devices,

	computing chips	Surface mount type along with the ASICs	Cyrus Logic, Atmel, Phillips, freescale,NXP South Africa: SAMES Japan: NEC Singapore: Texas
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, Onsemi Japan: Hitachi or Oki Europe: SGS Thomson
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 Type) It should be trans-reflective STN type industrial grade with extended temperature range.	Taiwan: Holtek Singapore: Bonafied Technologies Korea: Advantek China:Xiamen/ Tianma
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, Everlight
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 Semiconductors, Atmel, Phillips, Texas Instruments, Rohm,Micron Japan:Hitachi, Oki, AVX or Ricoh Korea: Samsung

7.	Battery	Lithium with guaranteed life of 15 years	Varta / Tedirun /Sanyo / EVE / XENO, Mitsubishi or equivalent.
8.	RTC/Microcontroller	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.
Vendor shall submit list of components with makes to TPC during sample meter evaluation and FAT.

7 Meter Body:

Meter body shall be made of unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II)with FVo or better 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 better 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/chemical welding 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 damage evidences should be visible externally& should be traceable in such a way that attempts can be proved in court of law. 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 meter with opaque encapsulated design/integrated base and cover (single enclosure) would be highly preferred, thus nullifying the possibility of opening of meter case. The meter body shall be such that the liquid or chemical shall not reach the electronic part PCB, processor and display from meter terminal and push button. Optical port of meter shall be metallic to hold magnetic optical cord during data downloading locally.

8 Terminals, Terminal Block

Terminal block should be in single mould with meter body base(Not separate). After any attempts the terminal block should not be able to 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
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 LEXAN500Ror equivalent on prior approval from the Purchaser
The terminals shall be marked properly on the terminal block for making external connections.
The terminals and connections shall be suitable to carry up to 120 % of Imax continuously (Imax 6 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 shall be preferably of MS cage clamp type as per IS: 15707or of flat end screw with at least 9 mm dia of screw for better contact area.
The preferred arrangement of terminals shall be linear. Internal diameter of the terminal holes shall be minimum 5 mm; minimum clearance between adjacent terminals shall be 10 mm. Depth of the terminal holes shall be of 25 mm. Terminal screws shall be of Zinc plated MS bottle type. Minimum two number of terminal screw to be provide per terminal wires.
Meter terminal should have 11pin arrangement consisting of neutral and neutral S2 shorted inside the meter. All terminal should be in one row only.
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.
The preferred arrangement of terminals shall be linear. Minimum two number of terminal screws to be provided per terminal wire

8.1 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. Terminal Cover with C cut to enable smooth insertion of cable in the terminals.
The terminal cover shall be 50 mm length from bottom of terminal block in line with meter base.
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

8.2 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 number Polycarbonate seal left side and one number Hologram seal on right side shall be provided by the Bidder.

Additional Hologram seals will be provided by TPC to supplier for putting them on meter body as per requirement at Factory. Reconciliation of seals shall be provided by bidder after its usage.

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. 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.

Plug in type NIC card cover should have proper sealing arrangement and should be sealed with manufacturer's polycarbonate seal.

The bidder shall provide the soft record of polycarbonate seal, Manufacturers and TPC hologram seal serial number, NIC card serial number and box packing list used against each meter serial number along with its position in tabular form for every lot of meter.

9 TOD Feature:

The meter shall be capable of measuring Cumulative Energy (KWh), Kvah and MD (KW, KVA)with time of day (TOD) registers having 5 zones (no. of zones & time slot shall be programmable by BCS,CMRI, Mobile App, OTA with adequate security level).
TOD Slot Configuration shall be as follows-

Slot	Time Slots
TOD 1	00 to 06 Hrs
TOD 2	06 to 09 Hrs
TOD 3	09 to 17 Hrs
TOD 4	17 to 22 Hrs.
TOD 5	22 to 24 Hrs

10 MD Integration:

The MD integration period shall be 15 minutes (integration period-programmable by CMRI 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 functionality shall not be available. Last 12 MD values shall be stored in the memory. MD shall be recorded and displayed with minimum three digits before decimal and minimum three digits after decimal points. MD integration shall be Block Type Demand.

11 Parameters In BCS

All these parameters shall be downloaded locally or remotely. All the parameters shall be recorded in its NVM(Non Volatile Memory). NVM shall have minimum retention time of 15 Years. Below mention current, history billing data and at least 25 tamper event for each tamper shall be available In NVM.
NVM OK/Fail status or flag shall be made available at BCS end for better data analysis.
Preference shall be given to bidder who provides CAIDI profile, Max outage duration, time of max outage & its histories at BCS end.

Note: For Bidirectional meter, all BCS parameters should be available in both Import & Export mode.
In case unidirectional mode, forwarded energies shall be recorded.
In case bidirectional mode, separate import, export, net energies shall be recorded.

11.1 Billing Information

Current+ 12 Month History billing Date
Current + 12 Month History of Energy (KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Current + 12 Month History Consumption (KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Current + 12 Month History of Demand (KW,KVA, KVAR Lag, KVAR led) Along with date and time stamp
Current + 12 Month History of PF

11.2 TOD wise billing Information

Current + 12 Month History of Energy (KWH, KVAH)
Current + 12 Month History of Consumption (KWH, KVAH)
Current + 12 Month History of Demand (KW, KVA) along with date and time stamp
Current + 12 Month History of PF

11.3 Load survey:

The meter shall be capable of recording load profile of atleast 35 days for 15 min IP for ON days only for following parameters.

a. KWH
b. KVAH
c. KVARH Lag
d. KVARH Led
e. KW
f. KVA
g. KVAR Lag
h. KVAR Led
i. Phase wise PF
j. Average PF
k. Voltage for each Phase
l. Current for each Phase
m. Neutral current
n. THD Voltage phase wise
o. THD Current phase wise
p. Temperature
q. Meter health indicator
r. Phase wise min & max current
s. Phase wise min & max voltage

Note: Load survey can be configured for 5/15/30 min as per requirement. By default 15 min SIP is configured.

11.4 MID Night Energy:

Meter shall be capable of recording daily Midnight Energies 00:00 to 24:00 Hrs for min. 35 power ON days as parameters mentioned below –

Import : Cumulative KWH & its TOD, Cumulative KVAH and its TOD, Tariff wise MD kVA, KVARH Lag, KVARH Lead

Export : Cumulative KWH, Cumulative KVAH, KVARH Lag, KVARH Lead

11.5 Instantaneous Parameters:

Meter shall have capable following Instantaneous parameter In Memory and should be available in BCS
Meter Serial No
Meter Type
Meter date and Time
MRI date and time
Dump date and time
Voltage of each Phase
Line Current of each Phase
Active Current of each Phase
Actual Neutral current
Power factor of each Phase
Average Power Factor
Instantaneous Frequency
Instantaneous Load (KW, KVA, KVAR Lag, KVAR Led)
Present Cumulative energy(KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Cumulative Tamper count
Cumulative Billing Count
Cumulative Programming Count
Vector/Phasor diagram
THD current (Phase wise & average)
THD voltage (Phase wise & average)
THD power(Phase wise & average)
Separate Event count (voltage unbalance, overcurrent, CT open/By pass, low voltage etc.)
Metering mode
Postpaid/prepaid mode

11.6 General Information:-

Meter shall be capable for providing below mention general parameters in memory should be available in BCS
Meter serial No
Meter Type
Manufacture Name
Manufacture date
Meter Class
Meter constant
Meter voltage rating
Meter current rating
Firmware version of meter
DLMS Version of meter
Available TOD profile showing timing and seasons
Available Meter display sequence

11.7 Transactions:-

All energy & demand parameters alongwith date time stamping shall be available with status of Relay connect/disconnect.

12 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 degree and minimum temperature withstands 0degree 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.

Display shall have minimum 6 digits before decimal for energy register, 3 digits before & 3 digits after decimal place in the display for demand register, 2 digits before & 4 digits after decimal place in the display for High resolution energy registers, 3 digits before decimal & 3 digit after decimal for Voltage, 3 digits before decimal & 3 digit after decimal for Current, 1 digits before decimal & 3 digit after decimal for PF, 3 digits before decimal & 3 digit after decimal for Power, size of the digits shall be minimum 10mmx6mm. Cumulative energy (KWh) shall be displayed without decimal in auto 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 (MD1) 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 30 sec, if push button is not operated.

1. **Default Display sequence –**

Display1 Parameters (Auto Scroll Mode)

Display Check
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Cumulative Forward kWh (7+1)
TOD 1 Forward kWh
TOD 2 Forward kWh
TOD 3 Forward kWh
TOD 4 Forward kWh
TOD 5 Forward kWh
Cumulative Forward kVArh lag
Tariff wise MD Forward kVA Date & time
Cumulative Forward kVArh lead
Cumulative Forward kVAh

TOD 1 Forward kVAh
TOD 2 Forward kVAh
TOD 3 Forward kVAh
TOD 4 Forward kVAh
TOD 5 Forward kVAh
Average PF
Latest reset- Forward kWh
Latest reset-TOD 1 Forward kWh
Latest reset-TOD 2 Forward kWh
Latest reset-TOD 3 Forward kWh
Latest reset-TOD 4 Forward kWh
Latest reset-TOD 5 Forward kWh
Latest reset- Forward kVArh lag
Latest reset-Tariff wise MD Forward kVA Date & time
Latest reset- Forward kVArh lead
Latest reset- Forward kVAh
Latest reset-TOD 1 Forward kVAh
Latest reset-TOD 2 Forward kVAh
Latest reset-TOD 3 Forward kVAh
Latest reset-TOD 4 Forward kVAh
Latest reset-TOD 5 Forward kVAh
Latest reset- Average PF

Display2 Parameters (Manual Scroll Mode)
Display Check
Metering mode
Payment mode
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Instantaneous Phase wise Voltage
Instantaneous Phase wise Current
Instantaneous Neutral Current
Instantaneous Active power
Instantaneous Reactive power
Instantaneous Apparent power
Instantaneous Phase wise PF
Cumulative Forward kWh (7+1)
TOD 1 Forward kWh
TOD 2 Forward kWh
TOD 3 Forward kWh
TOD 4 Forward kWh
TOD 5 Forward kWh
Cumulative Forward kVArh lag

Tariff wise MD Forward kVA Date & time
Cumulative Forward kVArh lead
Cumulative Forward kVAh
TOD 1 Forward kVAh
TOD 2 Forward kVAh
TOD 3 Forward kVAh
TOD 4 Forward kVAh
TOD 5 Forward kVAh
Average PF
Latest reset- Forward kWh
Latest reset-TOD 1 Forward kWh
Latest reset-TOD 2 Forward kWh
Latest reset-TOD 3 Forward kWh
Latest reset-TOD 4 Forward kWh
Latest reset-TOD 5 Forward kWh
Latest reset- Forward kVArh lag
Latest reset-Tariff wise MD Forward kVA Date & time
Latest reset- Forward kVArh lead
Latest reset- Forward kVAh
Latest reset-TOD 1 Forward kVAh
Latest reset-TOD 2 Forward kVAh
Latest reset-TOD 3 Forward kVAh
Latest reset-TOD 4 Forward kVAh
Latest reset-TOD 5 Forward kVAh
Latest reset- Average PF
Rising Demand Forwared kVA
Connection Check
Voltage Phase sequence
Current Phase sequence
Previous reset- Forward kWh
Previous reset- Tariff wise Forward kWh
Previous reset - Forward Kvarh Lag
Previous reset- Tariff wise MD forward KVA Date & Time
Previous reset- Forward Kvarh Lead
Previous reset - Forward Kvah
Previous reset - Tariff wise Forward Kvah
Previous reset - Average PF
MD reset count
Defrauded Energy cumulative Kwh
Defrauded Energy cumulative Kvah
Cumulative Tamper count
History of last 3 tampers
Defraud Register Cumulative kWh during Magnetic Tamper (6+2)
Defraud Register Cumulative kWh during ND Tamper (6+2)

Latest Magnetic tamper occurrence date & time
Latest Magnetic tamper recovery date & time
Latest ND tamper occurrence Date & time
Latest ND tamper recovery Date & time
Cover Open tamper occurrence Date & time
Meter Version
DLMS Version
RTC Date Status
Battery Status
Non volatile memory status
NIC card status
RSSI Value
Error Code- Meter and NIC health indicator

Display3 Parameters (High Resiolution Mode)
Cumulative Forward kWh (2+5)
Cumulative Forward kVArh lag (2+5)
Cumulative Forward kVArh lead (2+5)
Cumulative Forward kVAh (2+5)
Battery mode will be as per display 1, 2 and 3 sequentially.

Meter shall be unidirectional by default unless specified. However it can be programmed through BCS, HHU, Mobile App and OTA.

2. **Display sequence for Net meter (programmable through firmware upgrade) –**

Display1 Parameters (Auto Scroll Mode)
Display Check
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Cumulative kWh (7+1) - Import
TOD 1 kWh - Import
TOD 2 kWh - Import
TOD 3 kWh - Import
TOD 4 kWh - Import
TOD 5 kWh - Import
Cumulative kVArh lag - Import
Tariff wise MD kVA Date & time - Import
Cumulative kVArh lead - Import
Cumulative kVAh - Import
TOD 1 kVAh - Import
TOD 2 kVAh - Import
TOD 3 kVAh - Import
TOD 4 kVAh - Import

TOD 5 kVAh - Import
Cumulative kWh (7+1) - Export
TOD 1 kWh - Export
TOD 2 kWh - Export
TOD 3 kWh - Export
TOD 4 kWh - Export
TOD 5 kWh - Export
Cumulative kVArh lag - Export
Tariff wise MD kVA Date & time - Export
Cumulative kVArh lead - Export
Cumulative kVAh - Export
TOD 1 kVAh - Export
TOD 2 kVAh - Export
TOD 3 kVAh - Export
TOD 4 kVAh - Export
TOD 5 kVAh - Export
Average PF
KVA Rising demand

Display2 Parameters (Manual Scroll Mode)
Display Check
Metering mode
Payment mode
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Instantaneous Phase wise Voltage
Instantaneous Phase wise Current
Instantaneous Neutral Current
Instantaneous Active power
Instantaneous Reactive power
Instantaneous Apparent power
Instantaneous Phase wise PF
Net Average PF
Rising Demand Forwared kVA
Latest reset- Cumulative kWh (7+1) - Import
Latest reset- TOD 1 kWh - Import
Latest reset- TOD 2 kWh - Import
Latest reset- TOD 3 kWh - Import
Latest reset- TOD 4 kWh - Import
Latest reset- TOD 5 kWh - Import
Latest reset- Cumulative kVArh lag - Import
Latest reset- Tariff wise MD kVA Date & time - Import
Latest reset- Cumulative kVArh lead - Import
Latest reset- Cumulative kVAh - Import

Latest reset- TOD 1 kVAh - Import
Latest reset- TOD 2 kVAh - Import
Latest reset- TOD 3 kVAh - Import
Latest reset- TOD 4 kVAh - Import
Latest reset- TOD 5 kVAh - Import
Latest reset- Cumulative kWh (7+1) - Export
Latest reset- TOD 1 kWh - Export
Latest reset- TOD 2 kWh - Export
Latest reset- TOD 3 kWh - Export
Latest reset- TOD 4 kWh - Export
Latest reset- TOD 5 kWh - Export
Latest reset- Cumulative kVArh lag - Export
Latest reset- Tariff wise MD kVA Date & time - Export
Latest reset- Cumulative kVArh lead - Export
Latest reset- Cumulative kVAh - Export
Latest reset- TOD 1 kVAh - Export
Latest reset- TOD 2 kVAh - Export
Latest reset- TOD 3 kVAh - Export
Latest reset- TOD 4 kVAh - Export
Latest reset- TOD 5 kVAh - Export
Latest reset Average PF
Previous reset- Cumulative kWh (7+1) - Import
Previous reset- TOD 1 kWh - Import
Previous reset- TOD 2 kWh - Import
Previous reset- TOD 3 kWh - Import
Previous reset- TOD 4 kWh - Import
Previous reset- TOD 5 kWh - Import
Previous reset- Cumulative kVArh lag - Import
Previous reset- Tariff wise MD kVA Date & time - Import
Previous reset- Cumulative kVArh lead - Import
Previous reset- Cumulative kVAh - Import
Previous reset- TOD 1 kVAh - Import
Previous reset- TOD 2 kVAh - Import
Previous reset- TOD 3 kVAh - Import
Previous reset- TOD 4 kVAh - Import
Previous reset- TOD 5 kVAh - Import
Previous reset- Cumulative kWh (7+1) - Export
Previous reset- TOD 1 kWh - Export
Previous reset- TOD 2 kWh - Export
Previous reset- TOD 3 kWh - Export
Previous reset- TOD 4 kWh - Export
Previous reset- TOD 5 kWh - Export
Previous reset- Cumulative kVArh lag - Export
Previous reset- Tariff wise MD kVA Date & time - Export
Previous reset- Cumulative kVArh lead - Export

Previous reset- Cumulative kVAh - Export
Previous reset- TOD 1 kVAh - Export
Previous reset- TOD 2 kVAh - Export
Previous reset- TOD 3 kVAh - Export
Previous reset- TOD 4 kVAh - Export
Previous reset- TOD 5 kVAh - Export
Previous reset Average PF
Connection Check
Voltage Phase sequence
Current Phase sequence
MD reset count
Defrauded Energy cummulative Kwh
Defrauded Energy cummulative Kvah
Cummulative Tamper count
History of last 3 tampers
Defraud Register Cumulative kWh during Magnetic Tamper (6+2)
Defraud Register Cumulative kWh during ND Tamper (6+2)
Latest Magnetic tamper occurrence date & time
Latest Magnetic tamper recovery date & time
Latest ND tamper occurrence Date & time
Latest ND tamper recovery Date & time
Cover Open tamper occurrence Date & time
Meter Version
DLMS Version
RTC Date Status
Battery Status
Non volatile memory status
NIC card status
Error Code- Meter and NIC health indicator

Display3 Parameters (High Resiolution Mode)
Cumulative Forward kWh (2+5) - Import
Cumulative Forward kVArh lag (2+5) - Import
Cumulative Forward kVArh lead (2+5) - Import
Cumulative Forward kVAh (2+5) - Import
Cumulative Forward kWh (2+5) - Export
Cumulative Forward kVArh lag (2+5) - Export
Cumulative Forward kVArh lead (2+5) - Export
Cumulative Forward kVAh (2+5) - Export

Battery mode will be as per display 1,2 and 3 sequentially.

For Net meter mode, Both Import and export energy recording shall be applicable in this mode of metering and relevant registers like Billing, LS, tamper logics etc shall be updated and shall be available in BCS also

Note: Latest reset is History 1 & Previous reset is History 2

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 10 years.

Error code – Meter and NIC health indicator shall be displayed as following or any better provision-

SR No.	Error Code to be Displayed	Description
1	Err 00	All Good
2	Err 01	Meter NIC Communication failure
3	Err 02	Modem Initialization Failure
4	Err 03	SIM Not Detected
5	Err 04	SIM Invalid
6	Err 05	No GSM Network Coverage
7	Err 06	GPRS Network Registration failure
8	Err 07	GPRS Registration Denied
9	Err 08	No APN Configured
10	Err 09	GPRS Connection Not Established
11	Err 10	HES IP/Port not configured
12	Err 11	HES Port Not Open
13	Err 12	Any key Mismatch Between Meter and NIC

13 Output Device:

13.1 Pulse rate

The meters shall have a suitable test output device. Red color blinking LED (marked as imp/kWh) shall be provided in the front. This device shall be suitable for using with sensing probe used with test benches or reference standard meters. The test output device shall have constant pulse rate of Imp / kWh and Imp/Kvarh. Meter constant shall be indelibly printed on the name plate as imp/kwh and Imp/Kvarh

Meter constant shall be as actual without multiplying factor.

13.2 Communication LCD indicator

The meter shall be provided with suitable LCD/LED indication for communication in progress.

Meter shall display Communication status indications on LCD/LED without affecting normal display parameters.

14 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. No sticker to be used to avoid loss of data in event of fire. The base color of Name plate shall be white indelibly and distinctly marked with all essential particulars as per relevant standards along with the following. The Serial no. series applicable for the meters shall be provided by Tata Power.

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. Serial number along with barcode
vi. Month and Year of manufacture
vii. Unit of measurement
viii. Reference voltage ,frequency
ix. Ref. temperature
x. Rated basic and maximum Current
xi. Meter constant (imp/kWh)
xii. 'BIS' Mark
xiii. Class index of meter
xiv. "Property of Tata Power Co. Ltd
xv. Purchase Order No. & date
xvi. Guarantee period.
xvii. Sign of double square
xviii. Country of manufacture.
xix. Firmware version of meter
xx. Meter category
xxi. NIC serial NO (Shall be visible from Communication Module Slot) along with barcode/ QR code
xxii. Compatibility of NIC Card.

Bidder should ensure that NIC provided in meters are having Sr. No., MFG date, Property of TATA POWER' marked, PO date and no. (same as that of meter PO)

15 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.

15.1 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

15.2 Acceptance test:

i. AC High Voltage test
ii. Insulation test
iii. Test on limits of error as per IS load points
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.
ix. Test for Immunity against external influencing signal as per the Purchaser specification
x. Test for Immunity against DC Immunity as per the Purchaser specification
xi. Test for Immunity against Tamper conditions as per the Purchaser specification
xii. Error measurements with abnormal condition
xiii. Test to Influence of Harmonics
xiv. Supply voltage and frequency variation test
xv. Testing of self-diagnostic features
xvi. All tamper test, count increment and logging with date and time
xvii. All tests as defined in IS 15959(Part-3)
xviii. Functionality of communication module is 16444 part2
xix. smart meter communicability as per provision of 28 IS 15959 (part-3)
xx. Physical check of NIC and replaceable ease of the NIC module in meter

15.3 Type test:

i. All tests as defined in IS 14697:2021 with Latest editions.
ii. Test against abnormal magnetic influence as per CBIP TR 325 with Latest editions.
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 with Latest editions.
v. IP Test with Latest editions.

vi. Smart meter communicability as per 15959 part-3
vii. Meter shall be type tested as per BIS16444 part-2

Note:- Bidder must mention IS 13779:1999 with latest edition in factory test report.

15.4 Special test:

i. 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 TPC.
ii. Temperature rise of terminal block at 120% of Imax for 6 Hours

16 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/ any NABL accredited lab 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 TPC.

17 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 TPC's representatives at all times when the work is in progress. Inspection by the TPC 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 DC (Dispatch Clearance) is issued by TPC.

Following documents shall be sent along with material

a) Test reports
b) MDCC issued by TPC
c) Invoice in duplicate
d) Packing list
e) Drawings & catalogue
f) Guarantee / Warrantee card
g) Delivery Challan
h) Other Documents (as applicable)
i) Compatible BCS software
j) Meter user manual covering Technical Parameters, display, tamper logics, meter dimensions, etc

18 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. The

successful bidder shall submit two extra boxes (unpaid) per lot delivered (lot size shall be 2,000 numbers or as defined in the order)

19 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 **120** months from the date of last supplies, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame not more than 1 month, and to the entire satisfaction of Tata Power, failing which Tata Power 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.

Bidder to collect all defective meters from stores for repairs as per defined timeframe and send those meters immediately after repairs.
Bidders to submit CAPA report of each defective meter and submit the same to Lab/Store representative along with dispatch of repaired meters.
Format of CAPA report-

S. No	Type	Meter No	Defects from Tata Power	Observations at OEM	Root-Cause by OEM	Corrective Actions taken by OEM	Preventive Actions taken by OEM

Meters to be designed in such a way that cases of No display/ Display faulty will be bare minimum or else Tata Power will liable to reject entire lot of meters.

Bidder shall further be responsible for 'free replacement/repairs" of entire lot of meters for any 'Latent Defects '(design issue due to faulty lot component) if noticed and reported by the purchaser within guarantee period.

Manufacture shall collect disputed meter from meter stores and provide testing report of disputed meter refer by TPC within 15 days period irrespective of guarantee period.

Bidder has to provide meter guarantee for 120 months.

20 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.

21 Tender Sample:

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

Following accessories to be submitted along with sample

1. Test Reports of 3 sample meters (Type test, Acceptance test **)**
2. Detailed User Manual along with dimension
3. Guaranteed Technical Particulars
4. Tamper logic sheet
5. Display parameter sequence
6. BCS, MRI and Mobile App software for reading, programming
7. Optical communication cords
8. Internal connection diagram
9. List and make of all electronics component used
10. Clause by clause compliance sheet of Technical Specification
11. Bidder shall be responsible for integration of Meters with NIC and TPC HES.

22 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 beare 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.

23 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 or better.

24 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.

25 Drawings:

Following drawings & Documents shall be prepared based on TPC 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.

26 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 connectedtogether: b) Between each current(or voltage circuit) & eachand every other circuit.	M ohm	
13	Mechanical requirement as per IS 14697 and IS 16444 part 2		

14	Resistance to heat and fire (As per specification)		
15	Degree of protection		
16	Resistance against climatic influence (as per IS 14697 and IS 16444 part-2)		
17	Electromagnetic Compatibility (EMC) as per CBIP Technical report no 88(latest amendment		
18	Accuracy requirements (As per IS 14697 and IS 16444 part-2		
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		
26	Immunity against abnormal Magnetic influence,		
27	Immunity against HV ESD		

28	DC Immunity as defined in		
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 IS 15959 part3	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	
45	Tamper thresholds	Yes/No	

46	Ultrasonic Welding of cover and Base	Yes/No	
47	Fire retardant category of meter Body And terminal block		
48	Supply of jig for retrieval of Damaged/ burnt meter.		
49	Meter shall be programed for like RTC, TOD		
50	Dimension of meters L*B*H		
51	KVAH & KVA calculation		
52	Meter data retrieved if meter found no display	Yes/No	
53	RJ 11 Pin configuration as per TPC	Yes/No	
54	Make of Disconnector Switch		
55	Output Device (LEDs) As per Cl 14		
56	NIC module with cover & sealing Arrangement		
57	Harmonics Recording- The recordi of harmonics up to 20th harmonic Average THD of all phase for volta THD and current THD.		
58	Accuracy of harmonics recording		
59	Flag in BCS for high THD in any phase V or I		
60	Measuring element used		
61	Meter Category		

62	Calibration (programming)		
63	Usage application	Indoor/ Outdoor	
64	Ultrasonic welding/ Chemical welc		
65	GPS Tracking Device		

Electronics parts

Sr NO	**Component Fundtion**	**Requirement**	**Makes and Origin (to be provide by Bidder)**
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	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	
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 Type) 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.	
5	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm and Conformal coating required to protect from Environment like moisture	
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 with guaranteed life of 15 years	
8.	RTC / Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	

27 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

FOR

Three Phase, Four Wire

Class 0.5s, -/5 Amp,

HT TRI-VECTOR

Smart Meter

Tata Power Company Ltd.

Meter management Department

Dharavi Receiving Station,

Matunga,

Mumbai – 400 019

Document No.	TPC\MTL\HTCT\2023\01	Issue No.	01
		Issue Date	18.07.2023
Revision No.	03	Revision Date	10.07.2026
Description	Prepared By & Date	Reviewed By & Date	Approved By & Date
SPECIFICATION FOR 3 Phase HTCT SMART METER	Himali Patel	Rahul Ranadive & Devanjan Dey	B Karunakaran

Revision Summary

Revision No.	Revision Details	Revision Date	Reviewed & Approved By
01	Modified Meter guarantee as 60 months from 120 months, Load survey days as 35 days, Midnight energies as 35 days & parameters modified, NVM retention 15 years, parameters in BCS – import,export,net modified. Requirement of GPS tracking is removed.	15.12.2024	Rahul Ranadive/Devanjan Dey & S V Savarkar
02	TOD structure updated	05.05.2025	Rahul Ranadive/Devanjan Dey & S V Savarkar
03	Updated meter guarantee as 120 months from 60 months.	10.07.2026	Rahul Ranadive/Devanjan Dey & B Karunakaran

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1 Scope:

This specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading at store/site of Three phase four Wire, 3*63.5 V, -/5A current operated ac static meters of accuracy class 0.5S and a two way communication with Head End System(HES) (here after referred as meters) complete with all accessories for efficient and trouble free operation.

2 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 16444 Part-2 2017) : A.C. Static Transformer operated WH and VARH meters, class 0.2s, 0.5s & 1.0S.
b) IS 14697 (2021) :A.C. Static Transformer operated Watt hour and VAR-hour meters meter class 0.2S, 0.5S, & 1.0S
c) IS 15959(Part 3-2017) : Data exchange for electricity meter reading , tariff and load control
d) IEEE 802.15.4(2003) : Standard for local and metropolitan area networks
e) IS 9000 : Basic Environmental testing procedure for electrical and electronic items.
f) IS 12346 (1999) : Specification for testing equipment for A.C.Electrical energy meter.
g) IS11000 (1984) : Fire hazard testing
h) 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.
i) IEC 62053-22 (2003) : Electricity metering equipment (a.c.) - Particular Requirements - Part 22: Static meters for active energy (classes 0,2 S and 0,5 S)
j) IS 15707 (2006) : Testing Evaluation installation and maintenance of AC Electricity Meters-Code of practice.
k) IEC 60068 : Environmental testing.
l) CBIP – TR No.325 : Specification for A.C.Static Electrical Energy Meters (latest amendment).
m) CEA Regulation (2006) : Installation and operation of meters Dtd: 17/03/2006.
n) IS 60529 : Degree of protection provided by enclosure
o) IEC62056-61 : Electricity metering- Object Identification system (OBIS)

3 Climatic Conditions of The Installation:

a) Max. Ambient Temperature : 50deg.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 : 1450 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 : 150 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 Technical Requirements:

S.No.	DESCRIPTION	Requirement
4.1	Type of the meter	Three phase Four wire , current operated static Watt-hour meter without application of any multiplication constant. It also Consists of measuring elements, TOU of register, Display and plug in type bi-directional communication module all integral within the meter housing. The meter design shall be such that no MF required for any parameter
4.2	Accuracy Class of the meter	0.5S
4.3	Basic Current (Ib) & rated Maximum current (Imax)	Ib= 5A; Imax= 10 Amps
4.4	Reference Conditions for testing the performance of the meter	Vref = 63.5 V $\pm$ 1 % Frequency = 50hz $\pm$ 0.3% Temperature= 27 C$\pm$ 2 0C (if the tests are made at the temperature other than reference temperature the results shall be corrected by applying Mean Temperature Coefficient 0.05)
4.5	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 440V (for minimum 5 min).
4.6	Operating Frequency	50 Hz$\pm$ 5%.
4.7	Power Consumption	Voltage circuit: Maximum 5W and 15 VA Current Circuit : Maximum 1VA (The additional power requirement during data transmission shall not exceed 7W as mentioned in IS 16444 whichever is lower, per communication module)
4.8	Starting Current	5mA (0.1% of Ib)
4.9	Short time over current	200 A for 0.05 sec (30Imax for one half cycle 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 and then repeated with the other polarity.)
4.12	AC withstand voltage for 1 min	4 KV
4.13	Insulation resistance Between frame & current ,voltage circuits connected together:	5 M ohm 50 M ohm.

	Between each current (or voltage circuit) & each and every other circuit. :	
4.14	Mechanical requirements	Meter shall be in compliance with clause 12.3 of IS 14697 and IS16444 part 2
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 or better as per IS 12063/60529, but without suction in the meter. Meter shall comply with clause 6.9 and 12.5 of IS 14697. OEM who provides degree of protection higher than IP51 shall have first preference.
4.17	Resistance against Climatic influence.	Meter shall be in compliance with clause 2.6 of IS 14697.
4.18	Electromagnetic Compatibility (EMC)	Requirements shall be as per CBIP technical report no 325 (latest amendment)
4.19	Accuracy requirements	Meter shall be in compliance with clause 11 of IS 14697 & IS16444 part-2.
4.20	Power factor range	Zero lag to Zero lead.
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 (i) Real Time Clock and calendar (ii) RTC battery (iii) Non Volatile Memory (iv) LCD segment check (v) Communication Card
4.24	Initial startup of meter	Meter shall be fully functional within 5 sec after reference Voltage is applied to the meter terminals.
4.25	Alternate mode of supply to the meters	In case of power failure, reading/data shall be to downloaded with the help of battery of long life(minimum ten years) through Optical port in Battery mode.
4.26	Sleep Mode	Meter shall not go in sleep mode .Display should not be "OFF at any point of time when power up.
4.27	Internal diameter of the terminal holes Depth of the terminal holes	5 mm (minimum) 20 mm
4.28	Clearance between adjacent terminals	10 mm (minimum)
4.29	Display	Backlit LCD, Scrolling, 10 seconds for each parameter minimum 8 Digits LCD display. The back lit preferably in green color.

4.30	Security feature	Programmable facility to restrict the access to the information recorded at different security level such as read communication, write communication
4.31	Software and communication compatibility	The bidder shall supply software required for communication though local (CMRI and BCS software) and remote (AMI) connectivity free of cost and necessary training. For existing meter manufacturer, it should be ensured that all meters (existing non-smart & upcoming smart meters) can be read through one BCS only.
4.32	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 & timings, DIP (billing & load survey), MD reset, billing date change, Set metering mode (Import/Export), display setting, shall be reconfigure through BCS/CMRI and remotely over the air (OTA), and any other support will be provided without any additional cost to TATA power till the useful life of the meters. Change in display setting shall be done through firmware upgrade by means of BCS/CMRI/Mobile app and remotely over the air (OTA). Meter data will not get reset while firmware upgrade or any programming. Display sequence for Net meter is given in the document.
4.33	Usage Application	Indoor and Outdoor
4.34	Ultrasonic welding	Meter cover and body should be Ultrasonic/chemical welded. Opaque design shall have first preference.
4.35	Meter Dimension in MM	Is not more than 250L*200W*100H
4.36	Real Time clock	Accuracy of RTC Should be as per CBIP-325 report and shall not vary by ± 5 min per year. Meter RTC shall be corrected automatically by the system in synchronization to the network RTC. Meter shall support RTC sync request from HES also.
4.37	KVAH & KVA calculation	Meter shall be programed as Lag+ Lead configuration i.e. Leading PF shall not be considered as unity. The same shall be displayed in BCS.
4.38	NO display	Meter Should design such a way, if meter found no display then after meter data retrieved from optical port.
4.39	Communication module of meter for AMI	As per clause no 1.2 (b) of IS 16444. Meter should have provision of communication module compatible with both the variant mentioned in IS 16444 PART-1. The Communication Network Interface Card (NIC) shall be 4G LTE with fallback provision to 2G and support all the bands offered by TSP's in India. It should be plug-in type and field hot swappable with cellular technology NIC of all type of meters of same make.

		Support for upgrade to 5G should be there without replacing the meter. Meter should be able to provide required power supply to NIC card. There shall not be an interlock while removing NIC card module with opening meter terminal cover.
4.40	Communication Layer Protocol	Should be as per clause 9.3 of IS 16444
4.41	Key Management and Security Feature	Should be as per IS 15959
4.42	Harmonics recording	The meter should record the current and voltage THD. The meter should record harmonics up to min 20th harmonic. However harmonics recording upto 31st shall give first preference. Average THD of all phase for voltage THD and current THD. THD values shall have 15 minutes integration period in load survey. Accuracy of harmonics recording shall be as per meter accuracy class. The meter shall generate a flag/event log whenever the threshold (user configurable) of the 5% THD of the load current and voltage is breached
4.43	Meter Category	D3 - The same shall be displayed in BCS

In case of mobile app, bidder shall provide 10 nos. license with life time validity and arrange integration to existing HES.

Bidder shall supply 20 nos. magnetic optical communication USB cords with meter supply.

5 Immunity against external influencing signals:

5.1 Magnetic Field:

Meter shall be immune to magnetic field such that it shall not affect the normal overall functionality.

Meter shall comply test of effect due to influence quantities as per latest CBIP amendments.

Meter shall show “Magnet” or appropriate icon under display sequence in the display during magnet event.

The effect on the meter due to magnetic induction of external origin as obtained by the method detailed below shall be determined.

5.1.1 The continuous (DC) "Stray" magnetic induction of 67 m T ± 5% shall be obtained at a distance of 5 mm from the surface of the pole of the electromagnet according to Appendix E of CBIP 325 document, energized with a DC current. The magnetic field shall be applied successively to all the surfaces of the meter. The value of the magneto motive force to be applied shall be generally 1000 ampere-turns. However, considering the non-linearity of magnetization of the core, the ampere-turn might require slight adjustment to achieve the desired output.

5.1.2 The continuous (DC) "abnormal" magnetic induction of 0.2 Tesla ± 5% shall be obtained at a distance of 5 mm from the surface of the pole of the electromagnet according to Appendix E of CBIP

325 document, energized with a DC current. The magnetic field shall be applied successively to all the surfaces of the meter. The value of the magneto motive force to be applied shall be generally 10000 ampere-turn. However, considering the non-linearity of the magnetization of the core, the ampere-turns might require slight adjustment to achieve the desired output.

In the event of logging of presence of abnormal magnetic induction with date & time the positive variation of error may be beyond the limit of 4% but not exceeding a value (e) as given in Note 3.2 under Table 17 of CBIP 325 document, corresponding to nominal registration of the meter at reference voltage, 100% maximum current and Cos Ø = 1.

5.1.3 The alternating (a.c) "stray" magnetic induction of 0.5 mT ± 5% shall be obtained by placing the meter in the center of circular coil, 1 m in mean diameter, of square section of small radial thickness relative to the diameter, and having 400 ampere-turns.

5.1.4 The alternating (AC) "abnormal" magnetic induction of 10 milli Tesla shall be obtained by placing the meter at various orientations in the centre of a circular coil as specified in 6.1.2, but with 2800 ampere-turns produced by a current of the same frequency as that of the voltage applied to the meter and under the most unfavourable conditions of phase and direction.

In the event of logging of presence of abnormal magnetic induction with date & time the positive variation of error may be beyond the limit of 4% but not exceeding a value (e) as given in Note 3.2 under Table 17 of CBIP 325 document, corresponding to nominal registration of the meter at reference voltage, 100% maximum current and cos Ø=1.

Permanent Magnet: Immune up to 0.5T and Event logging >0.5T

Consumption during magnet tamper shall be recorded in defraud register also. Demand shall be recorded as per actual load only.

5.2 Electrostatic Discharge (ESD)

Meter along with NIC shall be immune up to 35 kV and shall record accurate energy as per IS-14697:2021. Meter shall log the event into memory as 'ESD' with date & time stamp for any ESD greater than 35 kV and shall show 'ESD' in the display and should log in suitable compartment (Abnormal Interference at BCS end).

The shielding around the meter shall be such that it does not get affected by high voltage, high and low energy impulse when comes in contact with meter from any side.
The meter should immune to high/ low frequency Jammer devices. Meter shall log event in its memory as jammer with date and time stamp along with snapshot.

5.3 Neutral Disturbance

The meter shall log in the memory as 'NEUTRAL DISTURBANCE' with date and time stamp and show 'ND' in the display for Frequency variation below 45 Hz and above 55 Hz with time delay of 1 min and for Pulsating DC and Chopped AC of any value with time delay of 1 min.

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 DC signal/ DC pulse

upto 330V and for any value beyond this, the meter shall log the event into memory as 'NEUTRAL DISTURBANCE' with date & time stamp and shall show 'ND '/ suitable information in the display after time delay of 1 min(occurrences and restoration time).

The meter shall record energy proportional to the current, V Ref (63.5V) and UPF when any of the tamper circuits enclosed as per annexure are used to tamper energy using a diode or a variable resistance or a variable capacitance energy saving device and meter should recorded ND in meter memory. The measurement by meter shall not get influenced by injection of AC Voltages/Chopped signal/DC signal/ DC pulse of low frequency and harmonics. The meter should be immune to such Neutral Disturbance. In case the meter accuracy is disturbed under Neutral Disturbance, it should be able to log the event.

5.4 Abnormal and Tamper conditions:

The meter shall record forward energy under any abnormal conditions.
All the tamper events i.e. shall be logged in the memory of the meter with date and time stamp of occurrence and restoration along with instantaneous electrical parameter (3ph. Voltage, 3ph. Current, Neutral Current, kWh, kVarh (Lag), kVarh (Lead), kVAh Energies, 3Ph. PF).

Meter shall store cumulative count and cumulative durations all the tamper event which have logged by meter from the date of energization till life of meter.
Tamper count shall be incremented only on the occurrence of the any tamper event with date and time.

Stamp on FIFO basis. The event which is not restored should not be removed from its meter memory and FIFO should not applicable for unrestored event.
The cover open tamper detection should be through heavy duty, sturdy micro switch such that it should not Operate on vibration or impact during handling or testing.
The meter shall register correctly if supply neutral is not available at the meter neutral terminal. The meter shall work in absence of two incoming wires. It shall keep recording correctly in case of unbalance system voltage.
The meter shall keep working accurately irrespective of the phase sequence of the supply.

The meter shall be able to differentiate between actual CT reversals and condition arising out of unbalanced / unhealthy capacitor bank.
Meter shall have neutral CT for tamper identification and analysis.

The size of compartments should be such that all above event are accommodated in the assigned event 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 per below table.

All Transactional/Programing related events to be logged in BCS/HES along with date/time stamping and instantaneous parameters.
Suitable nomenclature/icon shall be displayed on meter display for Magnet, HV ESD, Neutral Disturbance, Meter cover open related events.

There should be provision to provide separate transaction count for Transaction & Firmware upgrades on display, however, at BCS end cumulative programming count (Transaction + Firmware upgrades) should be provided.

Persistence time for occurrence and restoration for the events and compartment block size shall be as per table given below

Compartment size	
Voltage related events	100
Current related events	100
Power failure related events	30
Transaction related events	20
Other events	50
Non-rollover events	1

Sr. No.	**Tampers/ Failures**	**Phase wise**	**Compartment Size**	**Logic/ Condition other than standard**	**Persistence time**	
					Occ Time (min)	Rec Time (min)
1	Voltage Failure	YES	25	Occ: Voltage <57V: and current > 2% Ib. Res: Vph > 57V (Independent of current)	5	5
2	Voltage unbalance	YES	25	Occ : (Vmax-Vph)>5% Vn and Vphase : 57<Vphase< 69 Res : (Vmax-Vph)<=5% Vn and Vphase : 57<Vphase< 69	5	5
3	High Voltage	YES	25	Vph > 110% of Vref res : Vph < 110% of Vref	30	30
4	CT open	YES	25	Occ: Iph < 1%Ib, >5% Ib in any of the other two phases (Ex: if Rph <1% of Ib, Y or B should be > 5% Ib) Res: Iph > 1% Ib in tampered phase	30	30
5	Current unbalance	YES	25	Occ : Imax – Imin > 30% of Iavg and Res : Imax – Imin < 30% of Iavg	15	15

6	CT Bypass	YES	25	Occ: CT bypass >20% Ib and all Iph < 1%Ib and no current reversal in any phase Res: CT bypass <20% Ib	30	30
7	Current reversal	YES	25	**Occ:** 1. KW ph negative and (Net KW > 1% of Vref*Ib) **OR** 2. KW > 5% of Vref*Ib and PF > 0.2 **Res :** 1. KW ph positive or (Net KW < 1% of Vref*Ib) **AND** 2. KW < 5% of Vref*Ib or PF < 0.2	2	2
8	Magnet	NO	25	Whenever meter sense magnetic field it shall record Active and Apparent energy at Imax at UPF	Immediate	Immediate
9	Neutral Disturbance	NO	25	Occ: Vph > 150% Vref OR In case of external signal injection (Chopped DC, Chopped AC and DC injection through diode) Res: On removal of spurious signal injection in neutral of meter.	5	5
10	ESD/JAMMER / Abnormal Interference	NO	25	Occ: Application of ESD and Jammer device Res: Removal of ESD and Jammer Device	2	2
11	Low PF Tamper	YES	25	**Occ:** 1. KW ph negative and (Net KW < 1% of Vref*Ib) **AND** 2. KW < 5% of Vref*Ib or PF < 0.2 **Res :** 1. KW ph positive or (Net KW > 1% of Vref*Ib) **OR** 2. KW > 5% of Vref*Ib and PF > 0.2	5	5
12	Top Cover open	NO	1	When cover opens by more than 2 to 4 mm.	Immediate	NA
13	Invalid Phase Association	YES	5	IF invalid phase association	5	5
14	NIC card Removed	NO	25	OCC: On removal of card	Immediate	Immediate

	(Immediate)			RES: On Inserction card		
15	Power On/Off	NO	25	Occ: Actual voltage OFF Res: Actual voltage ON	5	5
16.	Temperature Rise	NO	25	Occ: T > 70˚C REC: T < 60˚C	2	2

Note:-

1) During Voltage Failure event, The meter shall record energy proportional to the actual current, V Ref (63.5V) and UPF. Smart PT feature can be seen in BCS for verification.
2) In case of Invalid phase association, appropriate indication on meter display and BCS end shall be available.
3) If any change in tamper logic is required, TPC shall inform to successful bidder during PO placement or before starting of manufacturing as per requirement. Successful bidder shall make necessary changes according to TPC requirement.

6 General Technical Requirements

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. Meter shall withstand Solar radiation.

The meters shall be designed and manufactured using SMT (Surface Mount Technology) components.
There should not be any connector or joint in CT secondary connection and shall be soldered directly on PCB.
The battery cell shall be button/coin type leak proof.

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 Purchaser:

S No	Component Function	Requirement	Makes and Origin
1.	Measurement/	The Measurement/ computing chips used in the meter should be with the	USA: Anolog Devices,

	computing chips	Surface mount type along with the ASICs	Cyrus Logic, Atmel, Phillips, freescale,NXP South Africa: SAMES Japan: NEC Singapore: Texas
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, Onsemi Japan: Hitachi or Oki Europe: SGS Thomson
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 Type) It should be trans-reflective STN type industrial grade with extended temperature range.	Taiwan: Holtek Singapore: Bonafied Technologies Korea: Advantek China:Xiamen/ Tianma
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, Everlight
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 Semiconductors, Atmel, Phillips, Texas Instruments, Rohm,Micron Japan:Hitachi, Oki, AVX or Ricoh Korea: Samsung

7.	Battery	Lithium with guaranteed life of 15 years	Varta / Tedirun /Sanyo / EVE / XENO, Mitsubishi or equivalent.
8.	RTC/Microcontroller	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.
Vendor shall submit list of components with makes to TPC during sample meter evaluation and FAT.

7 Meter Body:

Meter body shall be made of unbreakable, high grade, fire retardant reinforced Insulating material (protective Class II)with FVo or better 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 better 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/chemical welding 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 damage evidences should be visible externally& should be traceable in such a way that attempts can be proved in court of law. 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 meter with opaque encapsulated design/integrated base and cover (single enclosure) would be highly preferred, thus nullifying the possibility of opening of meter case. The meter body shall be such that the liquid or chemical shall not reach the electronic part PCB, processor and display from meter terminal and push button. Optical port of meter shall be metallic to hold magnetic optical cord during data downloading locally.

8 Terminals, Terminal Block

Terminal block should be in single mould with meter body base(Not separate). After any attempts the terminal block should not be able to 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
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 LEXAN500Ror equivalent on prior approval from the Purchaser
The terminals shall be marked properly on the terminal block for making external connections.
The terminals and connections shall be suitable to carry up to 120 % of Imax continuously (Imax 6 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 shall be preferably of MS cage clamp type as per IS: 15707or of flat end screw with at least 9 mm dia of screw for better contact area.
The preferred arrangement of terminals shall be linear. Internal diameter of the terminal holes shall be minimum 5 mm; minimum clearance between adjacent terminals shall be 10 mm. Depth of the terminal holes shall be of 25 mm. Terminal screws shall be of Zinc plated MS bottle type. Minimum two number of terminal screw to be provide per terminal wires.
Meter terminal should have 11pin arrangement consisting of neutral and neutral S2 shorted inside the meter. All terminal should be in one row only.
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.
The preferred arrangement of terminals shall be linear. Minimum two number of terminal screws to be provided per terminal wire

8.1 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. Terminal Cover with C cut to enable smooth insertion of cable in the terminals.
The terminal cover shall be 50 mm length from bottom of terminal block in line with meter base.
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

8.2 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 number Polycarbonate seal left side and one number Hologram seal on right side shall be provided by the Bidder.

Additional Hologram seals will be provided by TPC to supplier for putting them on meter body as per requirement at Factory. Reconciliation of seals shall be provided by bidder after its usage.

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. 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.

Plug in type NIC card cover should have proper sealing arrangement and should be sealed with manufacturer's polycarbonate seal.

The bidder shall provide the soft record of polycarbonate seal, Manufacturers and TPC hologram seal serial number, NIC card serial number and box packing list used against each meter serial number along with its position in tabular form for every lot of meter.

9 TOD Feature:

The meter shall be capable of measuring Cumulative Energy (KWh), Kvah and MD (KW, KVA)with time of day (TOD) registers having 5 zones (no. of zones & time slot shall be programmable by BCS,CMRI, Mobile App, OTA with adequate security level).
TOD Slot Configuration shall be as follows-

Slot	Time Slots
TOD 1	00 to 06 Hrs
TOD 2	06 to 09 Hrs
TOD 3	09 to 17 Hrs
TOD 4	17 to 22 Hrs.
TOD 5	22 to 24 Hrs

10 MD Integration:

The MD integration period shall be 15 minutes (integration period-programmable by CMRI 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 functionality shall not be available. Last 12 MD values shall be stored in the memory. MD shall be recorded and displayed with minimum three digits before decimal and minimum three digits after decimal points. MD integration shall be Block Type Demand.

11 Parameters In BCS

All these parameters shall be downloaded locally or remotely. All the parameters shall be recorded in its NVM(Non Volatile Memory). NVM shall have minimum retention time of 15 Years. Below mention current, history billing data and at least 25 tamper event for each tamper shall be available In NVM.
NVM OK/Fail status or flag shall be made available at BCS end for better data analysis.
Preference shall be given to bidder who provides CAIDI profile, Max outage duration, time of max outage & its histories at BCS end.

Note: For Bidirectional meter, all BCS parameters should be available in both Import & Export mode.
In case unidirectional mode, forwarded energies shall be recorded.
In case bidirectional mode, separate import, export, net energies shall be recorded.

11.1 Billing Information

Current+ 12 Month History billing Date
Current + 12 Month History of Energy (KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Current + 12 Month History Consumption (KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Current + 12 Month History of Demand (KW,KVA, KVAR Lag, KVAR led) Along with date and time stamp
Current + 12 Month History of PF

11.2 TOD wise billing Information

Current + 12 Month History of Energy (KWH, KVAH)
Current + 12 Month History of Consumption (KWH, KVAH)
Current + 12 Month History of Demand (KW, KVA) along with date and time stamp
Current + 12 Month History of PF

11.3 Load survey:

The meter shall be capable of recording load profile of atleast 35 days for 15 min IP for ON days only for following parameters.

a. KWH
b. KVAH
c. KVARH Lag
d. KVARH Led
e. KW
f. KVA
g. KVAR Lag
h. KVAR Led
i. Phase wise PF
j. Average PF
k. Voltage for each Phase
l. Current for each Phase
m. Neutral current
n. THD Voltage phase wise
o. THD Current phase wise
p. Temperature
q. Meter health indicator
r. Phase wise min & max current
s. Phase wise min & max voltage

Note: Load survey can be configured for 5/15/30 min as per requirement. By default 15 min SIP is configured.

11.4 MID Night Energy:

Meter shall be capable of recording daily Midnight Energies 00:00 to 24:00 Hrs for min. 35 power ON days as parameters mentioned below –

Import : Cumulative KWH & its TOD, Cumulative KVAH and its TOD, Tariff wise MD kVA, KVARH Lag, KVARH Lead

Export : Cumulative KWH, Cumulative KVAH, KVARH Lag, KVARH Lead

11.5 Instantaneous Parameters:

Meter shall have capable following Instantaneous parameter In Memory and should be available in BCS
Meter Serial No
Meter Type
Meter date and Time
MRI date and time
Dump date and time
Voltage of each Phase
Line Current of each Phase
Active Current of each Phase
Actual Neutral current
Power factor of each Phase
Average Power Factor
Instantaneous Frequency
Instantaneous Load (KW, KVA, KVAR Lag, KVAR Led)
Present Cumulative energy(KWH, KVAH, KVARH Lag, KVARH Led, Def KWH, Def KVAH)
Cumulative Tamper count
Cumulative Billing Count
Cumulative Programming Count
Vector/Phasor diagram
THD current (Phase wise & average)
THD voltage (Phase wise & average)
THD power(Phase wise & average)
Separate Event count (voltage unbalance, overcurrent, CT open/By pass, low voltage etc.)
Metering mode
Postpaid/prepaid mode

11.6 General Information:-

Meter shall be capable for providing below mention general parameters in memory should be available in BCS
Meter serial No
Meter Type
Manufacture Name
Manufacture date
Meter Class
Meter constant
Meter voltage rating
Meter current rating
Firmware version of meter
DLMS Version of meter
Available TOD profile showing timing and seasons
Available Meter display sequence

11.7 Transactions:-

All energy & demand parameters alongwith date time stamping shall be available with status of Relay connect/disconnect.

12 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 degree and minimum temperature withstands 0degree 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.

Display shall have minimum 6 digits before decimal for energy register, 3 digits before & 3 digits after decimal place in the display for demand register, 2 digits before & 4 digits after decimal place in the display for High resolution energy registers, 3 digits before decimal & 3 digit after decimal for Voltage, 3 digits before decimal & 3 digit after decimal for Current, 1 digits before decimal & 3 digit after decimal for PF, 3 digits before decimal & 3 digit after decimal for Power, size of the digits shall be minimum 10mmx6mm. Cumulative energy (KWh) shall be displayed without decimal in auto 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 (MD1) 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 30 sec, if push button is not operated.

1. **Default Display sequence –**

Display1 Parameters (Auto Scroll Mode)

Display Check
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Cumulative Forward kWh (7+1)
TOD 1 Forward kWh
TOD 2 Forward kWh
TOD 3 Forward kWh
TOD 4 Forward kWh
TOD 5 Forward kWh
Cumulative Forward kVArh lag
Tariff wise MD Forward kVA Date & time
Cumulative Forward kVArh lead
Cumulative Forward kVAh

TOD 1 Forward kVAh
TOD 2 Forward kVAh
TOD 3 Forward kVAh
TOD 4 Forward kVAh
TOD 5 Forward kVAh
Average PF
Latest reset- Forward kWh
Latest reset-TOD 1 Forward kWh
Latest reset-TOD 2 Forward kWh
Latest reset-TOD 3 Forward kWh
Latest reset-TOD 4 Forward kWh
Latest reset-TOD 5 Forward kWh
Latest reset- Forward kVArh lag
Latest reset-Tariff wise MD Forward kVA Date & time
Latest reset- Forward kVArh lead
Latest reset- Forward kVAh
Latest reset-TOD 1 Forward kVAh
Latest reset-TOD 2 Forward kVAh
Latest reset-TOD 3 Forward kVAh
Latest reset-TOD 4 Forward kVAh
Latest reset-TOD 5 Forward kVAh
Latest reset- Average PF

Display2 Parameters (Manual Scroll Mode)
Display Check
Metering mode
Payment mode
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Instantaneous Phase wise Voltage
Instantaneous Phase wise Current
Instantaneous Neutral Current
Instantaneous Active power
Instantaneous Reactive power
Instantaneous Apparent power
Instantaneous Phase wise PF
Cumulative Forward kWh (7+1)
TOD 1 Forward kWh
TOD 2 Forward kWh
TOD 3 Forward kWh
TOD 4 Forward kWh
TOD 5 Forward kWh
Cumulative Forward kVArh lag

Tariff wise MD Forward kVA Date & time
Cumulative Forward kVArh lead
Cumulative Forward kVAh
TOD 1 Forward kVAh
TOD 2 Forward kVAh
TOD 3 Forward kVAh
TOD 4 Forward kVAh
TOD 5 Forward kVAh
Average PF
Latest reset- Forward kWh
Latest reset-TOD 1 Forward kWh
Latest reset-TOD 2 Forward kWh
Latest reset-TOD 3 Forward kWh
Latest reset-TOD 4 Forward kWh
Latest reset-TOD 5 Forward kWh
Latest reset- Forward kVArh lag
Latest reset-Tariff wise MD Forward kVA Date & time
Latest reset- Forward kVArh lead
Latest reset- Forward kVAh
Latest reset-TOD 1 Forward kVAh
Latest reset-TOD 2 Forward kVAh
Latest reset-TOD 3 Forward kVAh
Latest reset-TOD 4 Forward kVAh
Latest reset-TOD 5 Forward kVAh
Latest reset- Average PF
Rising Demand Forwared kVA
Connection Check
Voltage Phase sequence
Current Phase sequence
Previous reset- Forward kWh
Previous reset- Tariff wise Forward kWh
Previous reset - Forward Kvarh Lag
Previous reset- Tariff wise MD forward KVA Date & Time
Previous reset- Forward Kvarh Lead
Previous reset - Forward Kvah
Previous reset - Tariff wise Forward Kvah
Previous reset - Average PF
MD reset count
Defrauded Energy cumulative Kwh
Defrauded Energy cumulative Kvah
Cumulative Tamper count
History of last 3 tampers
Defraud Register Cumulative kWh during Magnetic Tamper (6+2)
Defraud Register Cumulative kWh during ND Tamper (6+2)

Latest Magnetic tamper occurrence date & time
Latest Magnetic tamper recovery date & time
Latest ND tamper occurrence Date & time
Latest ND tamper recovery Date & time
Cover Open tamper occurrence Date & time
Meter Version
DLMS Version
RTC Date Status
Battery Status
Non volatile memory status
NIC card status
RSSI Value
Error Code- Meter and NIC health indicator

Display3 Parameters (High Resiolution Mode)
Cumulative Forward kWh (2+5)
Cumulative Forward kVArh lag (2+5)
Cumulative Forward kVArh lead (2+5)
Cumulative Forward kVAh (2+5)
Battery mode will be as per display 1, 2 and 3 sequentially.

Meter shall be unidirectional by default unless specified. However it can be programmed through BCS, HHU, Mobile App and OTA.

2. **Display sequence for Net meter (programmable through firmware upgrade) –**

Display1 Parameters (Auto Scroll Mode)
Display Check
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Cumulative kWh (7+1) - Import
TOD 1 kWh - Import
TOD 2 kWh - Import
TOD 3 kWh - Import
TOD 4 kWh - Import
TOD 5 kWh - Import
Cumulative kVArh lag - Import
Tariff wise MD kVA Date & time - Import
Cumulative kVArh lead - Import
Cumulative kVAh - Import
TOD 1 kVAh - Import
TOD 2 kVAh - Import
TOD 3 kVAh - Import
TOD 4 kVAh - Import

TOD 5 kVAh - Import
Cumulative kWh (7+1) - Export
TOD 1 kWh - Export
TOD 2 kWh - Export
TOD 3 kWh - Export
TOD 4 kWh - Export
TOD 5 kWh - Export
Cumulative kVArh lag - Export
Tariff wise MD kVA Date & time - Export
Cumulative kVArh lead - Export
Cumulative kVAh - Export
TOD 1 kVAh - Export
TOD 2 kVAh - Export
TOD 3 kVAh - Export
TOD 4 kVAh - Export
TOD 5 kVAh - Export
Average PF
KVA Rising demand

Display2 Parameters (Manual Scroll Mode)
Display Check
Metering mode
Payment mode
Meter Serial Number
RTC- Date (DD.MM.YY)
RTC- Time (HH:MM:SS)
Instantaneous Phase wise Voltage
Instantaneous Phase wise Current
Instantaneous Neutral Current
Instantaneous Active power
Instantaneous Reactive power
Instantaneous Apparent power
Instantaneous Phase wise PF
Net Average PF
Rising Demand Forwared kVA
Latest reset- Cumulative kWh (7+1) - Import
Latest reset- TOD 1 kWh - Import
Latest reset- TOD 2 kWh - Import
Latest reset- TOD 3 kWh - Import
Latest reset- TOD 4 kWh - Import
Latest reset- TOD 5 kWh - Import
Latest reset- Cumulative kVArh lag - Import
Latest reset- Tariff wise MD kVA Date & time - Import
Latest reset- Cumulative kVArh lead - Import
Latest reset- Cumulative kVAh - Import

Latest reset- TOD 1 kVAh - Import
Latest reset- TOD 2 kVAh - Import
Latest reset- TOD 3 kVAh - Import
Latest reset- TOD 4 kVAh - Import
Latest reset- TOD 5 kVAh - Import
Latest reset- Cumulative kWh (7+1) - Export
Latest reset- TOD 1 kWh - Export
Latest reset- TOD 2 kWh - Export
Latest reset- TOD 3 kWh - Export
Latest reset- TOD 4 kWh - Export
Latest reset- TOD 5 kWh - Export
Latest reset- Cumulative kVArh lag - Export
Latest reset- Tariff wise MD kVA Date & time - Export
Latest reset- Cumulative kVArh lead - Export
Latest reset- Cumulative kVAh - Export
Latest reset- TOD 1 kVAh - Export
Latest reset- TOD 2 kVAh - Export
Latest reset- TOD 3 kVAh - Export
Latest reset- TOD 4 kVAh - Export
Latest reset- TOD 5 kVAh - Export
Latest reset Average PF
Previous reset- Cumulative kWh (7+1) - Import
Previous reset- TOD 1 kWh - Import
Previous reset- TOD 2 kWh - Import
Previous reset- TOD 3 kWh - Import
Previous reset- TOD 4 kWh - Import
Previous reset- TOD 5 kWh - Import
Previous reset- Cumulative kVArh lag - Import
Previous reset- Tariff wise MD kVA Date & time - Import
Previous reset- Cumulative kVArh lead - Import
Previous reset- Cumulative kVAh - Import
Previous reset- TOD 1 kVAh - Import
Previous reset- TOD 2 kVAh - Import
Previous reset- TOD 3 kVAh - Import
Previous reset- TOD 4 kVAh - Import
Previous reset- TOD 5 kVAh - Import
Previous reset- Cumulative kWh (7+1) - Export
Previous reset- TOD 1 kWh - Export
Previous reset- TOD 2 kWh - Export
Previous reset- TOD 3 kWh - Export
Previous reset- TOD 4 kWh - Export
Previous reset- TOD 5 kWh - Export
Previous reset- Cumulative kVArh lag - Export
Previous reset- Tariff wise MD kVA Date & time - Export
Previous reset- Cumulative kVArh lead - Export

Previous reset- Cumulative kVAh - Export
Previous reset- TOD 1 kVAh - Export
Previous reset- TOD 2 kVAh - Export
Previous reset- TOD 3 kVAh - Export
Previous reset- TOD 4 kVAh - Export
Previous reset- TOD 5 kVAh - Export
Previous reset Average PF
Connection Check
Voltage Phase sequence
Current Phase sequence
MD reset count
Defrauded Energy cummulative Kwh
Defrauded Energy cummulative Kvah
Cummulative Tamper count
History of last 3 tampers
Defraud Register Cumulative kWh during Magnetic Tamper (6+2)
Defraud Register Cumulative kWh during ND Tamper (6+2)
Latest Magnetic tamper occurrence date & time
Latest Magnetic tamper recovery date & time
Latest ND tamper occurrence Date & time
Latest ND tamper recovery Date & time
Cover Open tamper occurrence Date & time
Meter Version
DLMS Version
RTC Date Status
Battery Status
Non volatile memory status
NIC card status
Error Code- Meter and NIC health indicator

Display3 Parameters (High Resiolution Mode)
Cumulative Forward kWh (2+5) - Import
Cumulative Forward kVArh lag (2+5) - Import
Cumulative Forward kVArh lead (2+5) - Import
Cumulative Forward kVAh (2+5) - Import
Cumulative Forward kWh (2+5) - Export
Cumulative Forward kVArh lag (2+5) - Export
Cumulative Forward kVArh lead (2+5) - Export
Cumulative Forward kVAh (2+5) - Export

Battery mode will be as per display 1,2 and 3 sequentially.

For Net meter mode, Both Import and export energy recording shall be applicable in this mode of metering and relevant registers like Billing, LS, tamper logics etc shall be updated and shall be available in BCS also

Note: Latest reset is History 1 & Previous reset is History 2

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 10 years.

Error code – Meter and NIC health indicator shall be displayed as following or any better provision-

SR No.	Error Code to be Displayed	Description
1	Err 00	All Good
2	Err 01	Meter NIC Communication failure
3	Err 02	Modem Initialization Failure
4	Err 03	SIM Not Detected
5	Err 04	SIM Invalid
6	Err 05	No GSM Network Coverage
7	Err 06	GPRS Network Registration failure
8	Err 07	GPRS Registration Denied
9	Err 08	No APN Configured
10	Err 09	GPRS Connection Not Established
11	Err 10	HES IP/Port not configured
12	Err 11	HES Port Not Open
13	Err 12	Any key Mismatch Between Meter and NIC

13 Output Device:

13.1 Pulse rate

The meters shall have a suitable test output device. Red color blinking LED (marked as imp/kWh) shall be provided in the front. This device shall be suitable for using with sensing probe used with test benches or reference standard meters. The test output device shall have constant pulse rate of Imp / kWh and Imp/Kvarh. Meter constant shall be indelibly printed on the name plate as imp/kwh and Imp/Kvarh

Meter constant shall be as actual without multiplying factor.

13.2 Communication LCD indicator

The meter shall be provided with suitable LCD/LED indication for communication in progress.

Meter shall display Communication status indications on LCD/LED without affecting normal display parameters.

14 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. No sticker to be used to avoid loss of data in event of fire. The base color of Name plate shall be white indelibly and distinctly marked with all essential particulars as per relevant standards along with the following. The Serial no. series applicable for the meters shall be provided by Tata Power.

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. Serial number along with barcode
vi. Month and Year of manufacture
vii. Unit of measurement
viii. Reference voltage ,frequency
ix. Ref. temperature
x. Rated basic and maximum Current
xi. Meter constant (imp/kWh)
xii. 'BIS' Mark
xiii. Class index of meter
xiv. "Property of Tata Power Co. Ltd
xv. Purchase Order No. & date
xvi. Guarantee period.
xvii. Sign of double square
xviii. Country of manufacture.
xix. Firmware version of meter
xx. Meter category
xxi. NIC serial NO (Shall be visible from Communication Module Slot) along with barcode/ QR code
xxii. Compatibility of NIC Card.

Bidder should ensure that NIC provided in meters are having Sr. No., MFG date, Property of TATA POWER' marked, PO date and no. (same as that of meter PO)

15 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.

15.1 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

15.2 Acceptance test:

i. AC High Voltage test
ii. Insulation test
iii. Test on limits of error as per IS load points
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.
ix. Test for Immunity against external influencing signal as per the Purchaser specification
x. Test for Immunity against DC Immunity as per the Purchaser specification
xi. Test for Immunity against Tamper conditions as per the Purchaser specification
xii. Error measurements with abnormal condition
xiii. Test to Influence of Harmonics
xiv. Supply voltage and frequency variation test
xv. Testing of self-diagnostic features
xvi. All tamper test, count increment and logging with date and time
xvii. All tests as defined in IS 15959(Part-3)
xviii. Functionality of communication module is 16444 part2
xix. smart meter communicability as per provision of 28 IS 15959 (part-3)
xx. Physical check of NIC and replaceable ease of the NIC module in meter

15.3 Type test:

i. All tests as defined in IS 14697:2021 with Latest editions.
ii. Test against abnormal magnetic influence as per CBIP TR 325 with Latest editions.
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 with Latest editions.
v. IP Test with Latest editions.

vi. Smart meter communicability as per 15959 part-3
vii. Meter shall be type tested as per BIS16444 part-2

Note:- Bidder must mention IS 13779:1999 with latest edition in factory test report.

15.4 Special test:

i. 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 TPC.
ii. Temperature rise of terminal block at 120% of Imax for 6 Hours

16 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/ any NABL accredited lab 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 TPC.

17 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 TPC's representatives at all times when the work is in progress. Inspection by the TPC 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 DC (Dispatch Clearance) is issued by TPC.

Following documents shall be sent along with material

a) Test reports
b) MDCC issued by TPC
c) Invoice in duplicate
d) Packing list
e) Drawings & catalogue
f) Guarantee / Warrantee card
g) Delivery Challan
h) Other Documents (as applicable)
i) Compatible BCS software
j) Meter user manual covering Technical Parameters, display, tamper logics, meter dimensions, etc

18 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. The

successful bidder shall submit two extra boxes (unpaid) per lot delivered (lot size shall be 2,000 numbers or as defined in the order)

19 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 **120** months from the date of last supplies, Bidder shall be liable to undertake to replace/rectify such defects at its own costs, within mutually agreed time frame not more than 1 month, and to the entire satisfaction of Tata Power, failing which Tata Power 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.

Bidder to collect all defective meters from stores for repairs as per defined timeframe and send those meters immediately after repairs.
Bidders to submit CAPA report of each defective meter and submit the same to Lab/Store representative along with dispatch of repaired meters.
Format of CAPA report-

S. No	Type	Meter No	Defects from Tata Power	Observations at OEM	Root-Cause by OEM	Corrective Actions taken by OEM	Preventive Actions taken by OEM

Meters to be designed in such a way that cases of No display/ Display faulty will be bare minimum or else Tata Power will liable to reject entire lot of meters.

Bidder shall further be responsible for 'free replacement/repairs" of entire lot of meters for any 'Latent Defects '(design issue due to faulty lot component) if noticed and reported by the purchaser within guarantee period.

Manufacture shall collect disputed meter from meter stores and provide testing report of disputed meter refer by TPC within 15 days period irrespective of guarantee period.

Bidder has to provide meter guarantee for 120 months.

20 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.

21 Tender Sample:

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

Following accessories to be submitted along with sample

1. Test Reports of 3 sample meters (Type test, Acceptance test **)**
2. Detailed User Manual along with dimension
3. Guaranteed Technical Particulars
4. Tamper logic sheet
5. Display parameter sequence
6. BCS, MRI and Mobile App software for reading, programming
7. Optical communication cords
8. Internal connection diagram
9. List and make of all electronics component used
10. Clause by clause compliance sheet of Technical Specification
11. Bidder shall be responsible for integration of Meters with NIC and TPC HES.

22 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 beare 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.

23 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 or better.

24 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.

25 Drawings:

Following drawings & Documents shall be prepared based on TPC 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.

26 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 connectedtogether: b) Between each current(or voltage circuit) & eachand every other circuit.	M ohm	
13	Mechanical requirement as per IS 14697 and IS 16444 part 2		

14	Resistance to heat and fire (As per specification)		
15	Degree of protection		
16	Resistance against climatic influence (as per IS 14697 and IS 16444 part-2)		
17	Electromagnetic Compatibility (EMC) as per CBIP Technical report no 88(latest amendment		
18	Accuracy requirements (As per IS 14697 and IS 16444 part-2		
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		
26	Immunity against abnormal Magnetic influence,		
27	Immunity against HV ESD		

28	DC Immunity as defined in		
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 IS 15959 part3	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	
45	Tamper thresholds	Yes/No	

46	Ultrasonic Welding of cover and Base	Yes/No	
47	Fire retardant category of meter Body And terminal block		
48	Supply of jig for retrieval of Damaged/ burnt meter.		
49	Meter shall be programed for like RTC, TOD		
50	Dimension of meters L*B*H		
51	KVAH & KVA calculation		
52	Meter data retrieved if meter found no display	Yes/No	
53	RJ 11 Pin configuration as per TPC	Yes/No	
54	Make of Disconnector Switch		
55	Output Device (LEDs) As per Cl 14		
56	NIC module with cover & sealing Arrangement		
57	Harmonics Recording- The recordi of harmonics up to 20th harmonic Average THD of all phase for volta THD and current THD.		
58	Accuracy of harmonics recording		
59	Flag in BCS for high THD in any phase V or I		
60	Measuring element used		
61	Meter Category		

62	Calibration (programming)		
63	Usage application	Indoor/ Outdoor	
64	Ultrasonic welding/ Chemical welc		
65	GPS Tracking Device		

Electronics parts

Sr NO	**Component Fundtion**	**Requirement**	**Makes and Origin (to be provide by Bidder)**
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	The memory chips should not be affected by the external parameters like sparking, high voltage spikes or electrostatic discharges.	
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 Type) 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.	
5	P.C.B.	Glass Epoxy, fire resistance grade FR4, with minimum thickness 1.6 mm and Conformal coating required to protect from Environment like moisture	
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 with guaranteed life of 15 years	
8.	RTC / Micro controller	The accuracy of RTC shall be as per relevant IEC / IS standards	

27 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

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 TPC's specifications:

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:

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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	--------- %
1c.	Inclusive of Excise Duty	Yes / No (If Yes, indicate % rate)
1d.	Sales tax applicable at concessional rate	Yes / No (If Yes, indicate % rate)
1e.	Octroi payable extra	Yes / No (If Yes, indicate % rate)
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.)

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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	

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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, TPC 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. TPC 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. TPC will make every effort to make the bid process transparent. However, the award decision by TPC would be final and binding on the supplier.
3. The bidder agrees to non-disclosure of trade information regarding the purchase, identity of TPC, 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 TPC.
6. In case of intranet medium, TPC shall provide the infrastructure to bidders. Further, TPC 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 TPC.
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 TPC 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 TPC.
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

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Annexure VII

Inspection Test Plan

Not Applicable

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Annexure VIII

General Conditions of Contract

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The Tata Power Company Limited is hereunder referred to as the "Purchaser" or "Company". The person, firm or company selling the goods, the subject of this purchase order is referred to as "Vendor" or "Contractor". The subject of this purchase order is hereinafter referred to as the "Material(s)"or "Goods".

The Contract shall mean the contract as derived from the following:

1. Purchase Order (with 'Commercial Notes' and Annexures to the Purchase Order referred thereon)
2. Technical Specifications.
3. General Terms & Conditions

The documents including all reference document (s) and Annexures forming the Contract are to be read together as a whole and are to be taken as mutually explanatory.

1. Price:

Unless otherwise specifically stipulated, the price shall be firm and shall not be subject to escalation for any reason till the validity of this Contract.

Unless otherwise specifically stipulated, the price shall be inclusive of road/ rail worthy water-proof packing & forwarding charges up to effecting delivery at FOT/ FOR despatch point, GST and shall also be inclusive of inland freight, terminal taxes and entry taxes as leviable on the transportation or entry of goods into any local area limits pursuant to the Contact.

2. Taxes and Duties:

2.1 The Contract Price shall be inclusive of all taxes, duties, including but not limited to GST or any local taxes, levies imposed by State/Central/Local governments

2.2 Taxes as mentioned in the Contract Price or Price Schedule shall be paid to the contractor subject to the Contractor complying with all the statutory requirements and furnishing the relevant documents including error free invoices containing detailed break-up of the taxes

2.3 However the payment of GST or local levies shall be restricted to the total amount as indicated in the price schedule.

2.4 Any duties, levies or taxes not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) shall be deemed to be included in the Contract price and shall be to the account of the Contractor.

2.5 Any statutory variation in duties, levies or taxes if applicable and specified in this Contract till the scheduled date for supply of Goods and limited to direct invoices of the Contractor shall be to the account of Purchaser. The Contractor shall have the obligation to provide the necessary documentary evidence / supporting by way of gazetted notifications etc. to prove the change in such levies or taxes between the due date of submission of the Bid and the scheduled date of supply of goods to claim the difference.

2.6 The Contractor shall pass on to the Purchaser all the benefits of either reduction in tax rates, exemptions, concessions, rebate, set off, credits etc. or introduction of new tax rates exemptions, concessions, rebate, set off, credits etc. pertaining to all taxes, duties, imposts, fees and levies in respect of the supplies of Goods or performance of obligations under the contract. This would specifically include reduction of tax rates as a result of statutory changes or judicial rulings.

2.7 Any other taxes, levies and duties not mentioned in Contract Price or Price Schedule but applicable as per any statute (s) or introduction (omission) of new taxes, levies and duties shall be deemed to be included in the Contract Price and shall be to the account of the Contractor.

2.8 For facilitating availment of a credit, set-off, rebate, drawback or like benefit available to the Purchaser, the Contractor will facilitate the Purchaser by providing the necessary documentary and/or procedural support. In any process of assessment or re-assessment, of taxes payable by the Purchaser. Wherever expressly agreed the purchaser would provide the statutory form 'C' to the seller for availing the concessional rate of Central sales tax.

2.9 The Contractor shall bear and pay all the costs, liabilities, levies, interest, penalties in respect of non-compliances of any legal requirements as per various statutory provisions. The contractor shall keep the owner indemnified at all times from any tax liability, interest, penalties or assessments that may be imposed by the statutory authorities for non-compliances or non-observation of any statutory requirements by the Contractor.

2.10 Purchaser shall pay the invoices to the Vendor after necessary deductions as prescribed under the applicable law, income – tax or other

deductions under the State Tax laws as may be applicable to the Contract.

3 Packing details:

Packing details: The material must be packed in suitable packing to suit the mode of transport and to ensure its safe receipt at point of delivery. Any damage to material noticed at the time of delivery at site, due to improper packing or any other reason whatsoever shall be the responsibility of the Vendor. Such damaged goods shall be replaced within 14 days from intimation from the Purchaser.

4 Transportation and Unloading at Site:

The Vendor shall deliver the Material(s) at site/ Stores as per the delivery address specified in the Purchase order. The unloading at delivery shall be organised by the Purchaser unless otherwise specified. The receipt of the material/ equipment is subject to inspection and rejection if Material(s) is found unsatisfactory or any of the clauses under this purchase order are violated.

5 Insurance:

Unless otherwise specified, Purchaser will be responsible to obtain transit insurance for the Material(s). The Vendor shall intimate the Order Manager (as mentioned in the Purchase Order) along with Invoice, packing list, the Railway Receipt/Truck or Lorry Receipt etc. immediately after the consignment is booked, at the e-mail id mentioned in the Purchase order.

6 Payment Terms:

100% payment shall be made within 60 days from the receipt and acceptance of the material at the Consignee Stores/ Site/ Location as per the Contractual terms and conditions herein.

7 Bills and invoice:

The tax invoices should contain the details to comply with the GST Law. The supplier shall:

i) Furnish (electronically) and communicate to the Owner, the details of Goods or Services supplied by the 10th of the month succeeding the said tax period,
ii) Upon discovery of any discrepancy, rectify it and shall pay the tax and interest thereof,
iii) Furnish the returns (electronically), for the inward and outward supplies of Goods and/or Services, before the specified dates as per the GST Law,
iv) Communicate the tax paid, credits etc. as and when credited.
v) The Invoice should clearly state the description of the goods, quantity, sale price, tax %, and tax amount;
vi) The Invoice should be signed by an Authorized Signatory.

Bills/Invoices in the name of The Tata Power Company Ltd. with packing lists in triplicate shall be forwarded along with the equipment.

Contractor to furnish GST Registration no. in all invoices as well as Purchaser's (Tata Power's) GST no.

8 Transfer of Title and risk:

The transfer of property and risk of Material(s) shall be deemed to take place as follows:

a. For delivery F.O.R. or F.O.T. despatch point: Transfer of property on handing over the Material(s) to the carrier against receipt of clean Railway Receipt/Truck or Lorry Receipt and such receipt having been handed over to Purchaser. However, the risk of loss shall pass to the Purchaser on delivery of goods at the specified destination.

b. In case the Material(s) are procured by the Vendor from sub-vendors on receipt of duly endorsed documents of title to the goods.

9 Contract Performance Bank Guarantee (In case applicable):

9.1 The Vendor shall within 15 days of issue of this Purchase Order furnish an unconditional irrevocable bank guarantee duly stamped and strictly as per the prescribed format of the Purchaser from any nationalized bank or any scheduled bank having a branch in Mumbai and approved by the Purchaser for a sum equivalent to 10% of the Total value of Order valid for a period not less than 6 months from the expiry of the Warranty period.

9.2 Irrespective of the performance demonstrated as part of the Factory Acceptance Tests Take-over tests / Performance Tests etc, the Purchaser may call for re-validation of performance of the system during the performance guarantee period by conducting fresh performance tests if in its opinion, the

system is not able to deliver the designed performances based on its operational performance results. If the equipment fails to prove the performance during such performance tests, the Purchaser may allow the Vendor to either rectify the system by addition / modification of equipment etc at the Vendor's costs & risk to restore the performance levels. Failure to rectify the system to achieve the designed performance levels may result in imposition of penalties including revocation of the Performance Bank Guarantee and forfeiture of the entire amount under the Performance Guarantee.

9.3 In case the Vendor fails to furnish the requisite Bank Guarantee as stipulated above, then the Company shall have the option to terminate the contract besides other contractual remedies.

10 Price reduction:

10.1 The Vendor agrees that time of supply of Material(s) is of prime importance.
If the Vendor fails to supply Material(s) before the respective scheduled / fixed date for supply. Company may without prejudice to any other right or remedy available to the Company: -

10.1.1 Recover from the Vendor ascertained and agreed, genuine pre-estimate liquidated damages, and not by way of penalty, a sum equivalent to 1% (of total value of order) per week or part thereof for each week's delay, beyond the scheduled supply date each subject to maximum of 10% of the total order value, even though the Company may accept delay in supply after the expiry of the scheduled supply date. The Company may, at its discretion, set off the aforesaid amounts from any other amounts owed by the Company to the Vendor or recover such amounts in other manner as may be permissible under applicable laws.

10.1.2 Arrange to get supply from elsewhere on account and at the sole risk of the Vendor, such decision of the Company being final and binding on the Vendor; or

10.1.3 Terminate the contract or a portion of supply of the supply work thereof, and if so desired, arrange for the supply in default by the Vendor to be attained from elsewhere at the sole risks and costs of the Vendor.

10.2 Liquidated damages for performance shortfall (if applicable) shall be specified in the Technical Specifications.

10.3 The Liquidated Damages referred in this clause 10 may be recovered by the Company from the Vendor as set off against any monies owed by the Company to the Vendor or in any other manner permissible under applicable laws.

11 Warranties:

11.1 Materials and Workmanship: Vendor shall fully warrant that all the stores, equipment and component supplied under the order shall be new and of first class quality according to the specifications and shall be free from defects (even concealed fault, deficiency in design, materials and workmanship).

11.2 Should any defects be noticed in design, material and/or workmanship within 12 months after the Material(s) or any portion thereof as the case may be have been commissioned or for 24 months from the date of delivery, whichever period concludes earlier. Purchaser shall inform Vendor and Vendor shall immediately on receipt of such intimation, depute their personnel within 7 days to investigate the causes of defects and arrange rectification/ replacement/modification of the defective equipment at site, without any cost to Purchaser within a reasonable period. If the Vendor fails to take proper corrective action to repair/replace defects satisfactorily within a reasonable period, Purchaser shall be free to take such corrective action as may be deemed necessary at Vendor's risk and cost after giving notice to the Vendor, including arranging supply of the Goods from elsewhere at the sole risk and cost of the Vendor.

11.3 In case defects are of such nature that equipment shall have to be taken to Vendor's work for rectification etc., Vendor shall take the equipment at his costs after giving necessary undertaking or security as may be required by Purchaser. After repair Vendor shall deliver the equipment at site on freight paid basis. Any taxes applicable in relation to this repair shall be to the Vendor's account. All risks in transit to and fro shall be borne by the Vendor.

11.4 Equipment or spare parts thereof replaced shall have further warranty for a period of 12 months from the date of acceptance.

12 Quality, Testing, inspection, installation:

12.1 All Material(s) supplied under this Contract shall be new and unused.

12.2 Wherever a specific Quality Assurance Plan is provided with the Request for Quotation (RFQ) or agreed as part of the commercial/ technical discussions, the same shall be binding on the Vendor.

12.3 The material shall be inspected

a. At consignee end by Purchaser.

b. At factory premise of the Vendor/ sub-vendor by Purchaser or third party duly nominated by Purchaser. The Vendor shall extend all necessary co-operation to Purchaser/ third party inspector carrying out the inspection. The Inspector(s) shall have the right to carry out the inspection or testing, which will include inspection and testing of the raw materials at manufacturers shop, at fabricators shop and at the time of actual despatch before and/or after completion of packing.

12.4 The Vendor will inform Purchaser at least eight (8) days in advance of the exact place, date and time of tendering the Material(s) for required inspection and provide free access to the Inspector(s) during normal working hours at Vendor's or his/ its sub-Suppliers works, and place at the disposal of the Inspector(s) all useful means for undertaking the Inspection, checking the results of tests performed, marking the Material(s), getting additional tests conducted and final stamping of the Material(s).

12.5 Even if the inspection and tests are fully carried out, the Vendor shall not be absolved from its responsibilities to ensure that the Material(s), raw materials, components and other inputs are supplied strictly to conform and comply with all the requirements of the Contract at all stages, whether during manufacture and fabrication, or at the time of Delivery as on arrival at site and after its erection or start up or consumption, and during the defect liability period. The inspections and tests are merely intended to prima facie satisfy Purchaser that the Material(s) and the parts and components comply with the requirements of the Contract.

12.6 *All costs associated with the inspection shall be included in cost of Material(s).*

12.7 Original material test certificate/ performance test certificate/ fitment certificate/ test reports etc. relevant/ applicable as per the specifications/ standards shall be dispatched along with the material supply failing which the material may be rejected.

13 Rejection:

13.1 Rejected goods shall be removed and replaced within 14 days of the date of communication of rejection.

13.2 Claim in respect of breakage/shortages in any cases shall be referred on the Vendor within ninety (90) days from the date of receipt of Goods by the Purchaser which shall be replaced/made good by the Vendor at his own cost. All risk of loss or damage to the material shall be upon the Vendor till it is delivered to the purchaser/consignee.

14 **General Indemnity:**

The Vendor shall indemnify and keep the Purchaser indemnified from and against any and all claims, costs, liabilities (financial), litigations, compensations, judgments, expenses or damages (including attorney's fees and other related expenses) arising out of any breach or alleged breach of any of the conditions of this Contract, performance of the obligations hereunder, or any representation or misrepresentation made by the Vendor or any third party with regard to the subject of this Contract.

15 **Indemnity against IPR:**

The equipment, system, drawings, and other materials that shall be supplied against the order will become the Purchaser's property. Without limitation of any liability of whatsoever nature, the Purchaser shall be indemnified and kept indemnified against any claim for infringement or breach of any of the statues, rules & regulations by the use of or sale of any article or material supplied by the Vendor. The indemnity shall include any infringement of patent, trade mark, design, copyright or other property rights whether in Country of Origin, or elsewhere resulting from the Vendor's design, manufacture, use, supply or re-supply & would also cover use or sale of any article or material supplied by the Vendor to the Purchaser under the Purchase Order. The Indemnity shall cover any claim/action taken by a third party either directly against the Purchaser or any claim/action made against the Vendor & where under the Purchaser is made liable. The

Indemnity shall be for losses, damages, and costs including litigation costs, attorney fees etc incurred by the Purchaser in relation to the Purchase Order.

16 Latent Defects Liability period (if applicable):

Notwithstanding the inspections, acceptance tests, quality checks etc carried out by the Vendor and witnessed/accepted by the Purchaser, the Vendor shall further warrant the equipment for any latent defects in its design, material or workmanship against the specifications set forth and shall make good any such defects by way of repair or replacement of the part or whole of the defective product at its own cost & risks as and when such latent defects are observed and intimated by the Purchaser and intimated to the Vendor within 36 months of completion of warranty period.

17 Force Majeure:

17.1 In the event of either party being rendered unable by force majeure to perform any obligation required to be performed by it under this Contract the relative obligation of the party affected by such force majeure shall, after notice under this articles be suspended for the period during which such cause lasts. The term 'Force Majeure' as employed herein shall mean acts of God, wars (declared or undeclared), riots or civil commotion, fire, floods, and acts and regulations of the Government of India or State Government or any of the statutory agencies. Both the party shall pay to the other party, the amount payable upon the date of the occurrence of such force majeure.

17.2 Upon the occurrence of such cause and upon its termination, the party alleging that it has been rendered unable as aforesaid, thereby shall notify the other party in writing immediately but not later than twenty four (24) hours of the alleged beginning and ending thereof giving full particulars and satisfactory evidence in support of the claims.

17.3 During the period, the obligations of the parties are suspended by force majeure, the contractor shall not be entitled to payment of any rate.

17.4 In the event of the force majeure conditions continuing or reasonably expected to continue for a period more than thirty (30) days, Purchaser shall have the option of terminating the contract by giving seven (7) days notice thereof to the contractor.

18 Variation:

Except for any provisions in this Purchase Order, any change /modification to the terms and conditions of this Order can be issued only by Purchaser or with the prior written approval from Purchaser.

19 Termination

19.1 The Contract shall be deemed to be terminated on completion of delivery of Material(s)

19.2 Termination of Default by Vendor:
Purchaser may terminate the contract at any time if the Vendor fails to carry out any of his obligations including timely delivery under this Contract. Prior to termination, the Vendor shall be advised in writing of the causes of unsatisfactory performance to be improved upon 15 days of the receipt of notice. In case, if the Vendor fails to bring about the improvement to the satisfaction of the Purchaser, then the order shall be terminated.

19.3 Without prejudice to the rights and remedies available to Purchaser, Purchaser may terminate the Contract or part thereof with immediate effect with written notice to the Vendor if,:

19.3.1 The Vendor becomes bankrupt or goes into liquidation.

19.3.2 The Vendor makes a general assignment for the benefit of creditors.

19.3.3 A receiver is appointed for any substantial property owned by the Vendor.

19.3.4 The Vendor has misrepresented to Purchaser, acting on which misrepresentation Purchaser has placed the Purchase Order on the Vendor.

The Vendor/ Contractor shall not be entitled to any further payment under the Contract if the Contract is terminated. If the order is terminated under clause 19.2 and 19.3, the Vendor shall not be entitled to any further payment, except that, if Purchaser completes the supply of Material(s) and the costs of completion are less than the Total Order value, the Purchaser shall pay Vendor an amount properly allocable to supply of Material(s) fully performed by Vendor prior to termination for which payment was not made to Vendor. In case, the cost of completion of Material(s) exceed the total Order value, the additional cost incurred by Purchaser for such completion shall be paid by the Vendor.

19.4 Purchaser shall be entitled to terminate the Contract at it's convenience, at any time by giving thirty (30) Days prior notice to the Contractor. Such notice of termination shall specify that termination is for Companies convenience and the date upon which such termination becomes effective. Upon receipt of such notice, the Contractor shall proceed as follows:

19.4.1 cease all further work, except for such work as may be necessary and instructed by the Company/ Company's representative for the purpose of protecting those parts of the supplies already manufactured;

19.4.2 stop all further sub-contracting or purchasing activity, and terminate Sub-contracts;

19.4.3 handover all Documents, equipment, materials and spares relating to the supply of goods prepared by the Contractor or procured from other sources up to the date of termination for which the Contractor has received payment equivalent to the value thereof; and

19.4.4 handover those parts of the supplies manufactured by the Contractor up to the date of termination.

Upon termination pursuant to clause 19.4, the Vendor shall be entitled to be paid the full value on the Material(s) delivered in accordance with the Contract.

19.5 The Contractor shall not be released from any of his obligations or liabilities accrued under the Contract on termination. For the avoidance of doubt, the termination of the Contract in accordance with this clause shall neither relieve the Contractor of his accrued obligations for Warranty or his accrued liability to pay (liquidated) damages for Delay nor shall entitle him to reduce the value of Performance Security.

20 Sub letting and assignment:

The contractor shall not without prior consent in writing of the Purchaser, sublet, transfer or assign the contract or any part thereof or interest therein or benefit or advantage thereof in any manner whatsoever, provided nevertheless that any such consent shall not relieve the contractor from any obligation, duty or responsibility under the contract.

21 **Dispute Resolution**:

Dispute or differences arising out or relating to this Order shall be resolved amicably by the parties. Failing such amicable resolution of dispute / differences either party may refer the matter to arbitration of a Sole Arbitrator to be appointed jointly by both the parties. The award of the Arbitrator shall be final, binding and conclusive on the parties. The venue for arbitration shall be Mumbai. The Arbitration proceedings will be governed and regulated by the provisions of Indian Arbitration and Conciliation Act, 1996 as amended from time to time and the rules framed there under.

22 Governing laws

This Contract shall be construed in accordance with and governed by the Laws of India without giving effect to any principle of conflict of law.

23 Jurisdiction

This Contract and the transaction contemplated herein shall be subject to the exclusive jurisdiction of the competent Courts in Mumbai only.

24 Limitation of Liability

Notwithstanding anything contained in the Contract, the Contractor's aggregate liability under this Contract shall be limited 100% of the Total order value. This shall however, exclude liability arising pursuant to clause 2.8- tax indemnity, clause 14- General Indemnity, clause 15- Indemnity against IPR, clause 25 – Confidentiality and liabilities arising due to wilful misconduct, gross negligence, third party claims and corrupt acts attributable to the Vendor.

25 Confidentiality:

The Vendor shall use the Confidential Information of the Purchaser only in furtherance of this Contract and shall not transfer or otherwise disclose the Confidential Information to any third party. The Vendor shall (i) give access to such Confidential Information solely to those employees with a need to have access thereto; and (ii) take the same security precautions to protect against disclosure or unauthorized use of such Confidential Information that the party takes with its own confidential information but, in no

event, shall a party apply less than a reasonable standard of care to prevent such disclosure or unauthorized use.

26 Consequential Damages:

Unless otherwise specified, neither Party shall be responsible for and nor shall be liable to the other Party for indirect/consequential losses and damages suffered by such Party including for loss of use, loss of profit whether such liability or claims are based upon any negligence on the part of the other Party or its employees in connection with the performance of the Purchase Order.

27 New Legislation (The Micro, Small and Medium Enterprise Development Act 2006)

a. This Act has been enacted and made effective from 2nd October 2006. The Interest on Delayed Payments to Small Scale and Ancillary Industrial Undertaking Act, 1993 is repealed.

b. Vendor is requested to inform the purchaser if vendor fall under The Micro, Small and Medium Enterprises Development Act, 2006 legislation and provide the purchaser, registration number and date to enable purchaser to take necessary care. The vendors are also requested to mention the same on their invoice / bill.

28 Relation between parties:

The Purchase Order shall be entered into on a principal-to-principal basis only. The Purchase order shall not be construed as a partnership or an association of persons. There is no agent and principal relationship between the parties. Each party shall be responsible for its own conduct. The Vendor shall ensure at all times that all the work carried out under this contract either by its own person or through any of its sub-Vendors shall be always done under its own direct supervision.

29 Environment / ISO 14001 Certification:

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 environmental management and local statutes. The Vendor shall ensure that all the wastes are disposed in environmental friendly way with strict compliance to applicable laws including adherence to MoEF guidelines with respect to 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 be responsible to collect and recycle all the e-waste generated at the end of the product life cycle at its own costs and risks as per the MoEF guidelines/ orders.

30 Tata Code of Conduct

The Purchaser abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Purchaser and the Vendor for dealings under this Purchase Order. A copy of the Tata Code of Conduct is available at our website: http://www.tatapower.com/aboutus/code-of-conduct.aspx. The Vendor is requested to bring any concerns regarding this to the notice of our Chief Ethics Officer on the e-mail ID: cecounsellor@tatapower.com.

31 Responsible Supply Chain Management:

The Purchaser is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy. The Vendor is required to comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations. The Purchaser encourages its Vendors/ Contractors/ Business partners to pay more attention to green design, green supply, green production, green logistics and green packaging in performing their business obligations.

The Vendor is required to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy.

A copy of the Responsible Supply Chain Management Policy along with Environment policy, Energy Conservation policy, Sustainability policy, Health & Safety policy and Human Rights policy is available at website: http://www.tatapower.com/sustainability/policies.aspx.

Vendor/Bidder is required to completely fill the attached "Supplier Sustainability Questionnaire" in support of their Green Supply Chain Management initiatives and submit the same with their offer.

The Owner recognizes that diversity in the workplace positively impacts business. The Owner is committed to help people from SC/ST background either by helping them to become entrepreneurs or by engaging workforce from SC/ST community under the contracts agreed herein. To encourage engaging SC/ST community, the owner may consider on the merit to incentivize the Contractor by paying additional 1% of the service contract portion if the number of SC/ST workforce engaged in the contract exceeds 30% of the total deployed strength and 2%, if the strength goes beyond 50%. While the Contractor will assist the workforce so engaged to become self-reliant in meeting the work expectation, the Owner may also volunteer its training resources to the extent possible to improve their employability. The Contractor shall maintain the proper documentation of such category of the workforce engaged and the owner may consider to pay the incentive after its verification.

The Owner may also consider extending price preference of 5% in the bid evaluation for an order value up to Rs.50 Lacs, provided the company is owned by a person from SC/ST community having minimum 50% holding in the company.

32 Vendor rating

You are requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Your performance with respect to the said factors will be taken into consideration for future business.

33 Vendor Feedback:

33.1 In this dealing Vendors feedback is important for the purchaser to improve its processes. If vendor have to report any grievance, problem or require any clarification, information, vendor is requested to contact purchaser at email ID: CC_CUSTOMERFEEDBACK@tatapower.com

33.2 Vendor is requested to ensure compliance to the terms of the individual orders with regards to timely delivery, provision of all applicable documents / challans / test certificate, quality of the material etc. Vendor performance with respect to the said factors will be taken into consideration for future business.

34 Non-Waiver:

Failure of Purchaser or its representatives to insist upon adherence to any of the terms or conditions incorporated in the Contract or failure or delay to exercise any right or remedies herein or by law accruing, or failure to promptly notify the Vendor in the event of breach or the acceptance of or the payment of any Material(s) hereunder or approval of any design or Material(s) shall not release the Vendor and shall not be deemed a waiver of any right of Purchaser to insist upon the strict performance thereof or of any of its rights or remedies as to any such Material(s) regardless of when the Material(s) are shipped, received or accepted not shall any purported oral modification or revisions of the Contract by Purchaser or its representative(s) act as waiver of the terms hereof.

35 **Repeat Order**:

Purchaser may place the repeat order for 100% of ordered quantities within a span of 6 months from the date of issue of this Purchase Order & Vendor shall execute it at same rates, terms and conditions.

36 Severability

If any provision of this Contract is invalid, unenforceable or prohibited by law, this Contract shall be considered divisible as to such provision and such provision shall be inoperative and shall not be part of the consideration moving from any Party hereto to the others, and the remainder of this Contract shall be valid, binding and of like effect as though such provision was not included herein.

ESG FRAMEWORK FOR BUSINESS ASSOCIATES

Tata Power's Sustainability philosophy sits at the core of its Business Strategy. Tata Power Sustainability Model has an overarching objective of 'Leadership with care' with key elements of 'Care for the Environment'; 'Care for the Community'; 'Care for our Customers / Partners' and 'Care for our People'. These sustainability objectives encompass the Environmental, Social and Governance objectives driven as integrated elements.

Tata Power, together with its stakeholders is determined to achieve sustainable growth while creating shared value for all.
As a part of future ready roadmap, Tata Power has targeted following as our Environment, Social and Governance priorities:

- Being Carbon Net Zero before 2045
- Growing Clean capacity (80% by 2030)
- Customer centricity
- Becoming water neutral before 2030
- Achieving zero waste to landfill before 2030
- No net loss of biodiversity before 2030
- Positively impacting 80 million lives by 2027

In order to create a sustainable business ecosystem, Tata Power expects that all its Business Associates (BA) which includes its suppliers, vendors, consultants and service providers to align to its ESG and sustainability commitments.

Tata Power encourages improved efficiencies and scaling up of green initiatives through technology and innovation taking us farther on the journey of reducing carbon emissions and preparing the entire eco-system towards products and services that would have net positive impact on the environment and communities that we operate in.

The Vendors/ bidders wishing to associate with Tata Power are expected to share their own sustainability and ESG journey. We at Tata Power promote all Business Associates to have a sustainable procurement policy for their supplier and service providers to contribute to our integrated approach in achieving a sustainable supply chain. The BA is encouraged to carry out the assessment of their sub-contractors and sub-vendors on sustainability readiness so that they are aware of the expectation/ business requirement.

The Vendor/ Bidder shall fill-in the 'Environment, Social and Governance Compliance Screening Questionnaire for Business Associates' attached at Annexure-I and submit the same along with the Bid in Ariba online platform.

Responsible Supply Chain Management:

Tata Power is committed for a cleaner environment and respect of Human rights through its Responsible Supply Chain Management policy.
Tata Power Business Associate (BA) shall comply with all the environment & Human rights related laws, including emission norms, Labour and environmental regulations.

Tata Power encourages its BA to focus on green design, green supply, green production, green logistics and green packaging in performing their business obligations. The BA is expected to abide by the Tata Power Corporate Environment policy, Energy Conservation and Corporate Sustainability Policy (enclosed with this document as Annexure-II).

The BA is expected to:

- Strive towards Conservation of Energy, Water, Resources and optimize transportation of Men & Materials to minimize environmental impact and reduce carbon footprint.
- Carry out the assessment of materials used for construction, operation & maintenance, consumables and accordingly phase out those materials which are environmentally hazardous.
- Be cognizant that diversity in the workplace positively impacts business.
- Promote affirmative action by supporting people from SC/ ST background by engaging workforce from SC/ ST community under the contracts agreed herein.
- Share the commitment of 'No child labour', 'No forced labour', Non-discrimination on the basis of caste, colour, religion, gender, disability, maternity or pregnancy or any other factor unrelated to the requirements of the job
- Pay the wages or remuneration to the workforce, personnel deployed in compliance to all applicable laws and regulations.
- Provide its employees/ deployed labor with an employment environment that is free of physical or psychological harassment.
- Carry out the assessment of their Sub-contractors on their Sustainability Readiness so that they are aware of the above expectation/ standards
- To ensure usage of suitable package material which is more environmentally sustainable. Further the packing material shall be recycled to the extent possible. The material used for packing is expected to suit the mode of transport and to ensure its safe receipt at point of delivery.

Waste Disposal:

The BA is expected to follow best practices for disposal of waste, few of which are listed below:

- Have a detailed project plan that includes the waste management, segregation of all designated waste material (Recyclable/ Non-Recyclable), collecting, storing, disposing and transferring the same to pre-arranged facility/ destination in timely and safe manner as per environmental legislations. The project plan shall also include the innovative construction practice to eliminate or minimize waste, protect surface/ground water, control dust and other emissions to air and control noise.

- Have purchase policy to encourage the procurement of material with recycled and minimum packaging of goods during delivery and appropriate means for site-to-site transportation of materials to avoid damage and litter generation.

- Ensure that the residents living near the site are kept informed about proposed working schedule and timings/ duration of any abnormal noise full activity that is likely to happen.

- Ensure the regular maintenance and monitoring of vehicles and equipment for efficient fuel use so that emissions and noise are within acceptable limits to avoid air pollution.

Water Management:

The BA is expected to follow best practices for water management, few of which include a management and monitoring system for water withdrawals and consumption, procedures to reduce water usage or reuse/recycle water, and pretreatment of wastewater before disposal.

Compliance to Law:
The BA shall adhere to responsible business practices and comply with the provision of all the Statutory Acts Applicable. Special attention of the BA is drawn towards the compliance of provision of the following statues: (along with the latest amendments/additions, as applicable):

- The Child Labour (Prohibition and Regulation) ACT, 1986.
- The Contract Labour (Regulation and Abolition) ACT, 1970.
- The Employee's Pension Scheme, 1995.
- The Employee's Provident Funds and miscellaneous provisions Act, 1952.
- The Employees State Insurance Act, 1948.
- The Equal Remuneration Act, 1976.
- The Industrial Disputes Act, 1947.
- The Maternity Benefit Act, 1961.
- The Minimum Wages Act, 1948.
- The Payment of Bonus Act, 1965
- The Payment of Gratuity Act, 1972.
- The Payment of Wages Act, 1936.
- The Shops & Establishment Act, 1954.
- The Workmen's Compensation Act, 1923.
- The Employer's Liability Act, 1938.
- and any other applicable statutory act

Social Accountability (SA 8000):

Tata Power expects its BAs to follow guidelines of SA 8000:2014 on the following aspects

- Child Labour
- Forced or Compulsory Labour
- Health & Safety
- Freedom of Association & Right to Collective Bargaining
- Discrimination
- Disciplinary Practices
- Working Hours
- Remuneration
- Management System

Health and Safety

The BA is expected to ensure the health and safety of his and his Sub-contractor’s staff and labour. The BA shall, in collaboration with and according to the requirements of the local health authorities, ensure that medical staff, first aid facilities, sick bay and ambulance service are available at the accommodation and on the Site at all times, and that suitable arrangements are made for all necessary welfare and hygiene requirements and for the prevention of epidemics. The BA shall maintain records and make reports concerning health, safety and welfare of persons deployed, and damage to property, as the Owner’s Representative may reasonably require. The BA shall be responsible for the medical treatment / hospitalization of his and his Sub-contractor’s staff/ labour.

The BA shall appoint a qualified Safety officer at the Site to be responsible for maintaining the safety, and protection against accidents, of all personnel on the Site. Such Safety officer shall have the authority to issue instructions and take protective measures to prevent accidents.

The BA shall comply in toto with the Tata Power's Contractor Safety Terms & Conditions, Health Safety & Environment Manual while working on Tata Power Site/ Services/ Contracts.

Grievance Mechanism

The BA is expected to have grievance procedures that allow stakeholders to anonymously bring environmental and/or work-related violations and/or concerns to the attention of management. In addition, the BA is expected to have procedures for examining reports of environmental and/or work-related violations or concerns and/or privacy complaints.

Data Protection

The BA is expected to have a formal process to address data security or privacy issues.

ANNEXURE-I

TATA

TATA POWER

Sr. No.	Question Description	Response (Y/N)	Remarks
Organization			
1	Does your Company have Sustainability Policy at Organization Level? If Yes, Please attach		
2	Do you have sustainable procurement policy in place for your own suppliers? If Yes, Please attach		
3	Does your company do regular assessment of its suppliers on ESG parameters?		
4	Are there ESG risks, or negative impacts identified in your supply chain		
Governance			
1	Is diversity taken into consideration when appointing board members/ senior management? Do you have an independent director/s?		
2	Has your company taken initiatives to ensure ethical practices at workplace? Please share the details, Policies etc.		
3	Does your company have a formal process to address data security or privacy issues? Please share the details, Policies etc.		
4	Does your company have grievance mechanism for stakeholder issues and track resolution?		
Environment/ Planet			
1	Does your company have Environmental Policy? If Yes, Please attach		
2	Do you have a formal process for waste management including solid wastes, liquid wastes and hazardous waste?		
3	Does your company track greenhouse gas emission? Also, what percentage of own consumption comes from the renewable energy?		
4	Does your company have a formal process for water management including monitoring of water consumption and withdrawals, and if applicable, pretreatment of wastewater?		
Green Technology/ Innovation			
1	Are your facility/ Product/ Services provided by you is based on green design, green production, green packaging or green logistics considerations? Please elaborate.		
2	Do your products or services have any environmental or social features or benefits (e.g. environmental/energy certification, ecolabels, fair trade certification, etc.)?		
Social/ People			
1	Does you facility/ Company have written personnel policies in place Are you an equal opportunity employer?		
2	Please describe any formal programme / campaign in place to promote company involvement with the community (volunteering, etc.). What is the percentage of profit spend on community activities?		
3	Does your company have a written Health & Safety Policy or Program? If Yes, Please attach		
Certifications: Does your company have following certifications (valid till date-please mention validity)			
1	ISO9001 accreditation		
2	SA8000 or equivalent		
3	ISO 14001 certification		
4	ISO 18001/45001 or equivalent		
5	ISO/IEC 27001 or equivalent		
6	Any Other (Please specify)		

Signature

Business Associate Name

ANNEXURE-II

CORPORATE SUSTAINABILITY POLICY

At Tata Power, our Sustainability Policy integrates economic progress, social responsibility and environmental concerns with the objective of improving quality of life. We believe in integrating our business values and operations to meet the expectations of our customers, employees, partners, investors, communities and public at large

- We will uphold the values of honesty, partnership and fairness in our relationship with stakeholders
- We shall provide and maintain a clean, healthy and safe working environment for employees, customers, partners and the community
- We will strive to consistently enhance our value proposition to the customers and adhere to our promised standards of service delivery
- We will respect the universal declaration of human rights, International Labour Organization's fundamental conventions on core labour standards and operate as an equal opportunities employer
- We shall encourage and support our partners to adopt responsible business policies, Business Ethics and our Code of Conduct Standards
- We will continue to serve our communities:
    - By implementing sustainable Community Development Programmes including through public/private partnerships in and around our area of operations
    - By constantly protecting ecology, maintaining and renewing bio-diversity and wherever necessary conserving and protecting wild life, particularly endangered species
    - By encouraging our employees to serve communities by volunteering and by sharing their skills and expertise
    - By striving to deploy sustainable technologies and processes in all our operations and use scarce natural resources efficiently in our facilities
    - We will also help communities that are affected by natural calamities or untoward incidence, or that are physically challenged in line with the Tata Group's efforts

The management will commit all the necessary resources required to meet the goals of Corporate Sustainability.

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

Supplier Code of Conduct

Tata Power follows the Tata Code of Conduct (TCoC) and the Whistle blower Policy and expect all its Suppliers to adhere to the same principles. **"Supplier"** here means any business, company, corporation, person or other entity that provides, sells or seeks to sell, any kind of goods or services to Tata Power, including the Supplier's employees, agents and other representatives.

Tata Code of Conduct- (TCoC): https://www.tatapower.com/pdf/aboutus/Tata-Code-of-Conduct.pdf

Whistle Blower Policy: https://www.tatapower.com/pdf/aboutus/whistle-blower-policy-and-vigil-mechanism.pdf

Anti-Bribery & Anti-Corruption Policy: https://www.tatapower.com/pdf/aboutus/abac-policy.pdf

The suppliers are expected to adhere to the following Do's and Don'ts:

Do's

1. The Suppliers shall be committed to supplying products and services of high quality that meet all applicable standards and laws, including product packaging, labelling and after-sales service obligations.
2. Comply with all applicable laws and regulations, both in letter and in spirit, in all the territories in which it operates.
3. Strive to provide a safe, healthy and clean working environment for its employees.
4. Strive for environmental sustainability, particularly with regard to the emission of greenhouse gases, consumption of water and energy and the management of waste and hazardous materials.
5. The Supplier shall represent our company (including Tata brand) only with duly authorised written permission from our company.
6. Safeguard the confidentiality on the use of intellectual property, information and data of the Company.
7. Gifts and hospitality given or received should be modest in value and appropriate as per Company Policy.
8. The assets of Tata Power shall be employed primarily and judiciously for the purpose of conducting the business for which they are duly authorised.
9. All actual or potential conflicts due to financial or any other relationship with a Tata Power employee shall be disclosed.

Don'ts

1. The Supplier shall not make unfair or misleading statements about the products and services of competitors.
2. Children shall not be employed at workplaces.
3. Forced labour shall not be used in any form.
4. The Suppliers shall neither receive nor offer or make, directly or indirectly, any illegal payments, remunerations, gifts, donations or comparable benefits that are intended, or perceived, to obtain uncompetitive favours for the conduct of its business with Tata Power.

Reporting Violations

The Supplier shall notify the Company regarding any known or suspected improper behaviour of other suppliers or employees relating to its dealings with Tata Power, by email to: cecounsellor@tatapower.com. The same can also be raised through our 3rd party ethics helpline facility:

Toll-free Number	1800 267 4065
Email	tatapower@tip-offs.in
Website & Chatbot	www.tatapower.tip-offs.in
Postal address	Attn to: Mr. Puneet Arora, Deloitte Touch Tohmatsu India LLP, 6 floor, AIPL Business, Sector 62, Gurugram, Haryana 122102

CYBERSECURITY COMPLIANCE

The Vendor unconditionally undertakes, for the entirety of the contract term and the warranty / support period, to comply with the cybersecurity obligations set out below. Acceptance of this clause is a condition precedent to award; non-compliance constitutes a material breach.

1. Universal Obligations — applicable to all Vendors and all supplies

(a) ISO/IEC 27001:2022 certification covering the supply scope is maintained current; where the supply includes vendor develop software, firmware, or a vendor operated software solution, an independent third-party VAPT of the offered solution has been conducted within the last 12 months (this VAPT requirement does not apply to distributors reselling OEM hardware such as laptops, switches, routers, and similar IT/OT and networking equipment's).

(b) No private Wi-Fi, personal hotspots, 4G/5G modems, unmanaged switches, or unauthorised broadband shall be deployed at Tata Power sites. All remote access shall be conducted exclusively through Tata Power's approved Secure Remote Access (SRA) solution and processes defined.

(c) MFA is enforced for privileged and remote access; integration with enterprise IAM (SAML 2.0 / AD / LDAP) is supported; RBAC under least privilege is applied; dedicated named accounts are used (no shared Vendor credentials); hardcoded or default credentials are prohibited in production; data is encrypted at rest using AES-256 (or equivalent) and in transit using TLS 1.2 or higher, with SSL / TLS 1.0 / 1.1 disabled.

(d) All operational, configuration, and diagnostic data remains the sole property of Tata Power; the supplied solution contains no hidden telemetry, backdoors, undisclosed data collection, or background cloud synchronisation.

(e) For IT solutions and applications, security patches shall be provided within: Critical (CVSS ≥ 9.0) 15 days; High (7.0–8.9) 30 days; Medium (4.0–6.9) 60 days; Low (< 4.0) 90 days. For OT solutions, security patches for vulnerabilities with a CVSS score above 8.0 shall be provided to Tata Power as and when released by the OEM / Vendor, after due testing in a representative environment to prevent operational instability. Zero-Day interim mitigation is issued within 24–48 hours of internal discovery. Not less than 12 months' written notice of any EOL / EOS milestone shall be given.

(f) Tata Power shall be notified of any confirmed or suspected security breach within 4 hours of discovery, with full cooperation for CERT-In's 6-hour mandate.

2. Conditional Obligations — applicable where the supply category applies

(a) IT Software / Firmware (where the supply includes Vendor-developed software or firmware): A documented SSDLC with SAST, DAST, and SCA gates is operated; a machine-readable SBOM is delivered identifying all components, versions, licences, and known CVEs at delivery.

(b) IT Hardware & Endpoints (servers, workstations, laptops, network equipment): EDR / AV with 3 years of free updates is bundled, or formal compatibility with Tata Power's chosen EDR / AV with central manager is declared; Windows endpoints are hardened to CIS Benchmark Level 1; BIOS / UEFI password protection is enabled; boot-from-external-media is disabled; USB ports are lockable; unused ports, services, and default accounts are disabled and documented; shipments arrive in tamper-evident packaging.

(c) Operational Technology / ICS (PLCs, RTUs, IEDs, SCADA, EMS, DCS, HMIs, OT firewalls, MES, SIS, engineering workstations and OT endpoints/computers): IEC 62443-4-1 and 4-2 compliance is held or independently assessed; architecture aligns with the Purdue Model with a Communication Matrix; MES-to-OT exchanges traverse approved OT firewalls (no direct IT-to-Level 1 / 2 connectivity); Secure Boot with cryptographic firmware validation; offline patching via removable media or local update server (no internet dependency); SIS is physically and logically segregated from BPCS (no shared credentials, networks, or power); secure industrial protocols supported (DNP3 SAv5, IEC 61850 with TLS, OPC-UA SignAndEncrypt) — Telnet, FTP, SNMP v1 / v2c, unencrypted HTTP, rsh, rlogin are not used on any OT segment; application whitelisting enabled on HMIs by default; all OT project files (PLC / DCS / RTU programs, HMI projects, SCADA exports, IEC 61850 SCL / CID / SCD files, network device configs, SIS files) are delivered in native and vendor-agnostic formats at handover and refreshed after every configuration change. Cybersecurity compliance during FAT and SAT is a condition of acceptance; non-conformance entitles Tata Power to reject equipment without commercial impact, with any re-FAT / re-SAT at Vendor's cost.

(d) Cloud / SaaS (solutions hosted outside Tata Power's infrastructure): A current SOC 2 Type II report or ISO 27017 / 27018 certification covers the offered service; all data processing, storage, and transmission occurs exclusively within India unless explicitly approved in writing by the Tata Power CISO and Legal teams.

(e) Personal Data Processing (any solution processing personal data on behalf of Tata Power, regardless of hosting model): The Digital Personal Data Protection Act, 2023 is complied with; a Data Processing Agreement defining data categories, retention, deletion, sub-processor disclosure, and the Vendor's processor role shall be executed prior to go-live.

3. Remedies, Indemnity, and Survival

(a) Any false, misleading, or materially incomplete declaration, or any material non-compliance with this clause, shall entitle Tata Power to: (i) disqualify the bid; (ii) terminate any awarded contract for material breach; (iii) forfeit bid security and performance guarantees; (iv) blacklist the Vendor for a period determined by Tata Power; and (v) pursue such other legal recourse, civil or criminal, as may be available.

(b) The Vendor shall indemnify Tata Power against losses, penalties, damages, regulatory fines, and reasonable legal costs arising from a security breach attributable to the Vendor's negligence or non-compliance with this clause.

(c) Sub-clauses 1(d), 1(f), 2(d), and 2(e) shall survive expiry or termination of the contract for the period during which Tata Power data remains in the Vendor's custody, or any obligation remains capable of giving rise to a cause of action, whichever is longer.

OLA for supply of HT Smart Meters for Mumbai Distribution. Ref. No.4100073948/CC27ADO018	**THE TATA POWER COMPANY LIMITED**	
	SPECIAL CONDITIONS OF CONTRACT	

Sr. No.	TOPIC	PRINCIPLES OF TERMS & CONDITIONS
1	GENERAL	The following **Special Conditions of Contract (SCC)** shall supplement the General Terms and Conditions Supply. Wherever there is a conflict, the provisions herein shall prevail over those in the "General Terms and Conditions Supply".
2	Earnest Money Deposit (EMD)	Bidders willing to participate in the tender shall submit an EMD for Rs. 31,000/- (Rs. Thirty-One Thousand Only) in the form of Bank Guarantee (BG). Hard copy of EMD BG shall reach Tata Power at below mentioned address before the bid submission Date and Time. EMD BG shall be valid for 180 days from the due date of bid submission, favouring 'The Tata Power Company Limited'. The EMD must be strictly in the format as mentioned in Tender Document, failing which it shall not be accepted by Tata Power and the bid as submitted shall be liable for rejection. Address for submission of EMD BG- Head – Procurement The Tata Power Company Limited, Smart Centre of Procurement Excellence, 2nd Floor, Sahar Receiving Station, Near Hotel Leela, Sahar Airport Road, Andheri East, Mumbai-400059 EMD BG of the successful bidder shall be returned after submission of Contract Performance Bank Guarantee. EMD BG of unsuccessful bidders shall be returned on completion of the tendering process.
4	WARRANTY/GUARANTEE	As per clause 19 - "Guarantee" of technical specifications.
5	CONTRACT PERFORMANCE BANK GUARANTEE (CPBG)	This is further to General Terms & Conditions – Supply Clause 9 Vendor shall submit an unconditional and irrevocable Contract Performance Bank Guarantee (CPBG) cum performance Bank Guarantee (PBG) for a value equal to 5% of the total Outline Agreement value. Such CPBG shall be valid till the expiry of the Guarantee period as defined in Technical Specifications with a further claim period of 6 months.
6	TERMS OF PAYMENT	This is further to General Terms & Conditions – Services. Payment will be made as per the milestones defined below: 1) 90 % of invoice value shall be approved after successful receipt and successful sample testing and acceptance of the supply.

		2) 10% of invoice value shall be approved after 90 days of successful delivery, subject to at least 90% of installed meters are communicating with the HES. Credit period shall be 60 days for Non MSME vendors and 45 days for MSME vendors. Credit period shall start after acceptance of Invoice. The aforesaid payments shall be subject to receipt of invoices along with enclosures/supporting documents for having completed the Job according to the Scope and duly verified/certified by Owner's Order Manager against which payment is being claimed. Payments due to the Contractor shall be made after deduction of the Liquidated Damages (LD) amount, TDS, Safety Retention etc. as applicable.
7	Safety Retention	Not Applicable
8	Delivery Schedule:	All meters shall be delivered within 1 month from the date of CRO.
9	Liquidated Damages (LD)	This is further to General Terms and Conditions – Indigenous Supply – Clause No. 10 Price Reduction. LD shall be applicable, @1% per week Maximum up to 10% of the Order Value.
10	INSURANCE	This is further to General Terms & Conditions Complete Insurance will be in Bidder's scope.
11	Splitting of Quantities	NA
12	Reverse Auction	Tata Power reserves the right to go for Reverse Auction (RA) for price negotiation and discover the most competitive price on ARIBA portal, Tata Power's official e-tendering platform. Date and time of e-auction will be intimated through E-Tender system to Authorized Person of Interested Bidder.This will be decided after techno-commercial evaluation of the bids. Bidders need to give their acceptance with the offer for participation in RA. Non-acceptance to participate in RA may result in non-consideration of their bids, in case Tata Power decides to go for RA. Only those bidders who are techno-commercially qualified shall be eligible to participate further in RA process. However, the original H1 bidder (whose price bid is the highest post techno-commercial evaluation) shall not be allowed to participate in further RA process provided minimum three techno-commercially qualified bids are available.

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TATA CODE OF CONDUCT 2015

LEADERSHIP THAT INSPIRES

For over 100 years, the Tata group has been led by visionaries who have stayed true to the vision of the founder, Jamsetji Tata.
A vision that placed the greater good of society at par with business growth.
A vision that put into practice pioneering social initiatives that changed the way responsible business was run.
And a vision that brought into the group a strong social conscience.



We do not claim to be more unselfish, more generous or more philanthropic than other people. But we think we started on sound and straightforward business principles, considering the interests of the shareholders our own, and the health and welfare of the employees, the sure foundation of our success.

Jamsetji Tata
Founder of the Tata group
Chairman (1868 – 1904)

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FOREWORD

Tata companies have consistently adhered to the values and ideals articulated by the Founder for over 150 years. The Tata Code of Conduct was first formalized by Mr Ratan Tata. It articulates the Group's values and ideals that guide and govern the conduct of our companies as well as our colleagues in all matters relating to business. Today, the Code is a bedrock on which we base our individual, as well as leadership commitments to core Tata values.

The Tata Code of Conduct outlines our commitment to each of our stakeholders, including the communities in which we operate, and is our guiding light when we are sometimes faced with business dilemmas that leave us at ethical crossroads. The Code is also dynamic in that it has been periodically refreshed in order to remain contemporary and contextual to the changes in law and regulations. However it remains unaltered at its core.

Our stellar reputation and success as a business entity has been defined by the powerful commitment and adherence to the core values and principles expressed in this Code, by all our employees, directors and partners. I trust every Tata colleague and Tata company will continue to not only comply with the laws and regulations that govern our business interests around the world, but will continue to set new standards of ethical conduct that will generate deep respect and inspire emulation by others.

N. Chandrasekaran
21st February, 2017



A. OUR VALUES

TATA has always been values-driven. The five core values that underpin the way we conduct our business activities are:



INTEGRITY

We will be fair, honest, transparent and ethical in our conduct; everything we do must stand the test of public scrutiny.

UNITY

We will invest in our people and partners, enable continuous learning, and build caring and collaborative relationships based on trust and mutual respect.

RESPONSIBILITY

We will integrate environmental and social principles in our businesses, ensuring that what comes from the people goes back to the people many times over.

PIONEERING

We will be bold and agile, courageously taking on challenges, using deep customer insight to develop innovative solutions.

EXCELLENCE

We will be passionate about achieving the highest standards of quality, always promoting meritocracy.

These universal values serve as the foundation for the Tata Code of Conduct. They find expression within the value system of every Tata company.

B. SCOPE AND PURPOSE OF THIS CODE

1. This Code sets out how we behave with:
   - our employees, or those who work with us;
   - our customers;
   - the communities and the environment in which we operate;
   - our value-chain partners, including suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents;
   - our joint-venture partners or other business associates;
   - our financial stakeholders;
   - the governments of the countries in which we operate; and
   - our group companies.
2. In this Code, "we or us" means our company, our executive directors, officers, employees and those who work with us, as the context may require.
3. The term "our group companies" in this Code typically means companies Tata Sons intends for this Code to apply to, and / or to whom Tata Sons has issued this Code.
4. This Code sets out our expectations of all those who work with us. We also expect those who deal with us to be aware that this Code underpins everything we do, and in order to work with us they need to act in a manner consistent with it.

REMEMBER...

It is our commitment to protect our reputation and our brand equity by adhering to the values and principles set out in this Code. By doing so, we strengthen our unique culture and identity.

OUR CORE PRINCIPLES



The Tata philosophy of management has always been, and is today more than ever, that corporate enterprises must be managed not merely in the interests of their owners, but equally in those of their employees, of the consumers of their products, of the local community and finally of the country as a whole.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

C. OUR CORE PRINCIPLES

1. We are committed to operating our businesses conforming to the highest moral and ethical standards. We do not tolerate bribery or corruption in any form. This commitment underpins everything that we do.
2. We are committed to good corporate citizenship. We treat social development activities which benefit the communities in which we operate as an integral part of our business plan.
3. We seek to contribute to the economic development of the communities of the countries and regions we operate in, while respecting their culture, norms and heritage. We seek to avoid any project or activity that is detrimental to the wider interests of the communities in which we operate.
4. We shall not compromise safety in the pursuit of commercial advantage. We shall strive to provide a safe, healthy and clean working environment for our employees and all those who work with us.
5. When representing our company, we shall act with professionalism, honesty and integrity, and conform to the highest moral and ethical standards. In the countries we operate in, we shall exhibit culturally appropriate behaviour. Our conduct shall be fair and transparent and be perceived as fair and transparent by third parties.
6. We shall respect the human rights and dignity of all our stakeholders.
7. We shall strive to balance the interests of our stakeholders, treating each of them fairly and avoiding unfair discrimination of any kind.
8. The statements that we make to our stakeholders shall be truthful and made in good faith.
9. We shall not engage in any restrictive or unfair trade practices.
10. We shall provide avenues for our stakeholders to raise concerns or queries in good faith, or report instances of actual or perceived violations of our Code.
11. We shall strive to create an environment free from fear of retribution to deal with concerns that are raised or cases reported in good faith. No one shall be punished or made to suffer for raising concerns or making disclosures in good faith or in the public interest.
12. We expect the leaders of our businesses to demonstrate their commitment to the ethical standards set out in this Code through their own behaviour and by establishing appropriate processes within their companies.
13. We shall comply with the laws of the countries in which we operate and any other laws which apply to us. With regard to those provisions of the Code that are explicitly dealt with under an applicable law or employment terms, the law and those terms shall take precedence. In the event that the standards prescribed under any applicable law are lower than that of the Code, we shall conduct ourselves as per the provisions of the Code.

REMEMBER...

"Good faith" means having a reasonable belief that the information you have provided is truthful. It does not mean having 'all the evidence' about the potential violation or case reported.

OUR EMPLOYEES



Once you got the best people, the people who shared our values and ideals, we left them free to act on their own. We do not fetter them. We encourage them and give them opportunities for leadership.

J.R.D. Tata
Chairman, Tata Sons (1938 – 1991)

D. OUR EMPLOYEES

Equal opportunity employer

1. We provide equal opportunities to all our employees and to all eligible applicants for employment in our company. We do not unfairly discriminate on any ground, including race, caste, religion, colour, ancestry, marital status, gender, sexual orientation, age, nationality, ethnic origin, disability or any other category protected by applicable law.
2. When recruiting, developing and promoting our employees, our decisions will be based solely on performance, merit, competence and potential.
3. We shall have fair, transparent and clear employee policies which promote diversity and equality, in accordance with applicable law and other provisions of this Code. These policies shall provide for clear terms of employment, training, development and performance management.

Q&A

A job requirement entails extensive travel. One of the candidates has excellent relevant experience and qualifications. However, this candidate is a single parent. As a result, I feel such a situation would significantly hinder this candidate's ability to cope with the job requirement. What should I do?

In accordance with the Code, the decision to recruit an employee should be based upon merit. We cannot make a presumption that the candidate would not be able to meet the travel requirements of the job. All eligible candidates should be provided with equal opportunity to demonstrate or justify that they can cope with the travel requirements of the job. Being a single parent cannot be a ground to be discriminated against at any stage of recruitment or ongoing employment in our company.

REMEMBER...

We do not tolerate harassment in any form and therefore we expect every employee to discourage such misdemeanours in the workplace.

Dignity and respect

4. Our leaders shall be responsible for creating a conducive work environment built on tolerance, understanding, mutual cooperation and respect for individual privacy.
5. Everyone in our work environment must be treated with dignity and respect. We do not tolerate any form of harassment, whether sexual, physical, verbal or psychological.
6. We have clear and fair disciplinary procedures, which necessarily include an employee's right to be heard.
7. We respect our employees' right to privacy. We have no concern with their conduct outside our work environment, unless such conduct impairs their work performance, creates conflicts of interest or adversely affects our reputation or business interests.

Human rights

8. We do not employ children at our workplaces.
9. We do not use forced labour in any form. We do not confiscate personal documents of our employees, or force them to make any payment to us or to anyone else in order to secure employment with us, or to work with us.

Bribery and corruption

10. Our employees and those representing us, including agents and intermediaries, shall not, directly or indirectly, offer or receive any illegal or improper payments or comparable benefits that are intended or perceived to obtain undue favours for the conduct of our business.

REMEMBER...

Violation by even a single employee of any law relating to anti-bribery, anti-corruption, anti-competition, data privacy, etc. could result in severe financial penalties and cause irreparable reputational damage to the company.

Gifts and hospitality

11. Business gifts and hospitality are sometimes used in the normal course of business activity. However, if offers of gifts or hospitality (including entertainment or travel) are frequent or of substantial value, they may create the perception of, or an actual conflict of interest or an 'illicit payment'. Therefore, gifts and hospitality given or received should be modest in value and appropriate, and in compliance with our company's gifts and hospitality policy.

Freedom of association

12. We recognise that employees may be interested in joining associations or involving themselves in civic or public affairs in their personal capacities, provided such activities do not create an actual or potential conflict with the interests of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

REMEMBER...

As a general rule, we may accept gifts or hospitality from a business associate, only if such a gift:

- has modest value and does not create a perception (or an implied obligation) that the giver is entitled to preferential treatment of any kind;
- would not influence, or appear to influence, our ability to act in the best interest of our company;
- would not embarrass our company or the giver if disclosed publicly.

The following gifts are never appropriate and should never be given or accepted:

- gifts of cash or gold or other precious metals, gems or stones;
- gifts that are prohibited under applicable law;
- gifts in the nature of a bribe, payoff, kickback or facilitation payment*;
- gifts that are prohibited by the gift giver's or recipient's organisation; and
- gifts in the form of services or other non-cash benefits (e.g. a promise of employment).

(*'Facilitation' payment is a payment made to secure or speed up routine legal government actions, such as issuing permits or releasing goods held in customs.)

Working outside employment with us

13. Taking employment, accepting a position of responsibility or running a business outside employment with our company, in your own time, with or without remuneration, could interfere with your ability to work effectively at our company or create conflicts of interest. Any such activity must not be with any customer, supplier, distributor or competitor of our company. Our employees must notify and seek prior approval for any such activity as per the 'Conflicts of Interest' clause of this Code and in accordance with applicable company policies and law.

Integrity of information and assets

14. Our employees shall not make any wilful omissions or material misrepresentation that would compromise the integrity of our records, internal or external communications and reports, including the financial statements.

15. Our employees and directors shall seek proper authorisation prior to disclosing company or business-related information, and such disclosures shall be made in accordance with our company's media and communication policy. This includes disclosures through any forum or media, including through social media.

16. Our employees shall ensure the integrity of personal data or information provided by them to our company. We shall safeguard the privacy of all such data or information given to us in accordance with applicable company policies or law.

17. Our employees shall respect and protect all confidential information and intellectual property of our company.

18. Our employees shall safeguard the confidentiality of all third party intellectual property and data. Our employees shall not misuse such intellectual property and data that comes into their possession and shall not share it with anyone, except in accordance with applicable company policies or law.

19. Our employees shall promptly report the loss, theft or destruction of any confidential information or intellectual property and data of our company or that of any third party.

Q&A

I am an accountant in the finance department of my company. Due to my artistic skills, I received an offer to pen cartoons for a children's publication for which I would receive compensation. I plan to undertake this activity during week-ends. What should I do before accepting this offer?

Before accepting the offer, you should ascertain whether the company policies and rules require you to make a disclosure to your supervisor so that the company may determine whether your undertaking this activity adversely affects our company's interests. On confirmation from the company that it does not do so, you would be free to take up the activity. It is also your duty to bring to the attention of the company whenever there is any change in the situation you have disclosed.

20. Our employees shall use all company assets, tangible and intangible, including computer and communication equipment, for the purpose for which they are provided and in order to conduct our business. Such assets shall not be misused. We shall establish processes to minimise the risk of fraud, and misappropriation or misuse of our assets.

21. We shall comply with all applicable anti-money laundering, anti-fraud and anti-corruption laws and we shall establish processes to check for and prevent any breaches of such laws.

Insider trading

22. Our employees must not indulge in any form of insider trading nor assist others, including immediate family, friends or business associates, to derive any benefit from access to and possession of price sensitive information that is not in the public domain. Such information would include information about our company, our group companies, our clients and our suppliers.

Q&A

Our company has recently announced the launch of a new business initiative. In connection with this, your friend who is a journalist with a leading business newspaper has asked you to provide some information that he could cover in his forthcoming article. He has promised not to quote you, or reveal your identity. Should you be giving him this information?

No. You should not be sharing information of this nature with the media, even if it is assured that the source would remain anonymous. Only authorised personnel in the company are permitted to speak to the media and provide information of this nature.

Our company has a "Use of Social Media" policy that lays down the "dos and don'ts" for use of social media even if you may access such media on your own time. Why is there such a policy?

External communication is a serious matter. It must be carefully managed because information put out with reference to our company or its businesses needs to be clear, truthful and not violate any undertakings we have given to other parties. In each business there are managers nominated to authorise and make different types of statements to the outside world. These managers should be consulted about any request for information you may receive or information you think we should give out.
In using social media, in particular blogs or social networking sites, you should exercise great caution while talking about our company or the business we do. It may feel like you are chatting with friends or expressing a personal opinion but even while doing so you cannot share any confidential information of our company.

REMEMBER...

We must respect the property rights of others by never misusing their assets, intellectual property or trade secrets, including the copying or downloading of unauthorised software, trademarks, copyrighted material or logos. We should never make unauthorised copies of computer software programs or use unlicensed personal software on company computers.

Prohibited drugs and substances

23. Use of prohibited drugs and substances creates genuine safety and other risks at our workplaces. We do not tolerate prohibited drugs and substances from being possessed, consumed or distributed at our workplaces, or in the course of company duties.

Conflicts of interest

24. Our employees and executive directors shall always act in the interest of our company and ensure that any business or personal association *including close personal relationships* which they may have, does not create a conflict of interest with their roles and duties in our company or the operations of our company. Further, our employees and executive directors shall not engage in any business, relationship or activity, which might conflict with the interest of our company or our group companies.

25. Should any actual or potential conflicts of interest arise, the concerned person must immediately report such conflicts and seek approvals as required by applicable law and company policy. The competent authority shall revert to the employee within a reasonable time as defined in our company's policy, so as to enable the concerned employee to take necessary action as advised to resolve or avoid the conflict in an expeditious manner.

26. In the case of all employees other than executive directors, the Chief Executive Officer / Managing Director shall be the competent authority, who in turn shall report such cases to the Board of Directors on a quarterly basis. In case of the Chief Executive Officer / Managing Director and executive directors, the Board of Directors of our company shall be the competent authority.

Q&A

You are responsible for maintaining our company's customer database. One of your friends is starting a business venture and requests you to share a few particulars from this database for marketing purposes of his business. He assures you that he would keep the data as well as his source confidential. Should you do so?

No. You should respect the confidentiality of customer information and not share any part of the database with any person without due authorisation.

You have access to revenue numbers of different business units of our company. While having a conversation with you over evening drinks, your friend enquires about the financial performance of our company. You do not share detailed information with your friend, but share approximate revenue figures. Is this conduct of yours correct?

No, it is not. You are not permitted to share financial information of our company with others who do not need to know this information. Financial information should always be safeguarded and disclosed only on a need-to-know basis after obtaining requisite approvals. Sharing of any price sensitive information that is not generally available with the public could also lead to violation of applicable insider trading laws.

27. Notwithstanding such or any other instance of conflict of interest that exists due to historical reasons, adequate and full disclosure by interested employees shall be made to our company's management. At the time of appointment in our company, our employees and executive directors shall make full disclosure to the competent authority, of any interest leading to an actual or potential conflict that such persons or their immediate family (including parents, siblings, spouse, partner, children) or persons with whom they enjoy close personal relationships, may have in a family business or a company or firm that is a competitor, supplier, customer or distributor of, or has other business dealings with, our company.

REMEMBER...

A conflict of interest could be any known activity, transaction, relationship or service engaged in by an employee, his/her immediate family (including parents, siblings, spouse, partner, and children), relatives or a close personal relationship, which may cause concern (based upon an objective determination) that the employee could not or might not be able to fairly perform his/her duties to our company.

Examples of Potential Conflicts of Interest

A conflict of interest, actual or potential, arises where, directly or indirectly, an employee or executive director:

(a) engages in a business, activity or relationship with anyone who is party to a transaction with our company;

(b) is in a position to derive an improper benefit, personally or for any family member or for any person in a close personal relationship, by making or influencing decisions relating to any transaction;

(c) conducts business on behalf of our company or is in a position to influence a decision with regard to our company's business with a supplier or customer where a relative of, or a person in close personal relationship with, an employee or executive director is a principal officer or representative, resulting in a personal benefit or a benefit to the relative;

(d) is in a position to influence decisions with regard to award of benefits such as increase in salary or other remuneration, posting, promotion or recruitment of a relative or a person in close personal relationship employed in our company or any of our group companies;

(e) undertakes an activity by which the interest of our company or our group companies can be compromised or defeated; or

(f) does anything by which an independent judgement of our company's or our group companies' best interest cannot be exercised.

28. If there is a failure to make the required disclosure and our management becomes aware of an instance of conflict of interest that ought to have been disclosed by an employee or executive director, our management shall take a serious view of the matter and consider suitable disciplinary action as per the terms of employment. In all such matters, we shall follow clear and fair disciplinary procedures, respecting the employee's right to be heard.

Examples of activities normally approved (post-disclosure) as per applicable company policy

Acceptance of a position of responsibility (whether for remuneration or otherwise) in the following cases would typically be permitted, provided the time commitments these demand do not disturb or distract from the employee's primary duties and responsibilities in our company, and are promptly disclosed to the relevant competent authority:

(a) Directorships on the Boards of any of our group companies, joint ventures or associate companies.

(b) Memberships/positions of responsibility in educational/professional bodies, where such association will promote the interests of our company.

(c) Memberships or participation in government committees/bodies or organisations.

Q&A

You are in a relationship with a colleague who has been recently moved into your team and would now be reporting to you. What should you do?

Romantic or close personal relationships with another employee where a reporting relationship exists and one is responsible for evaluating the other's performance, is likely to create a conflict of interest. In such a situation, you would need to report the potential conflict to your supervisor.

Your company is submitting a proposal to a company in which you were previously employed. You have confidential information pertaining to your previous employer, which you believe will help your present employer in winning the contract. Should you share this information?

No. You should not share this information with your company since it relates to confidential information of a third party. Your company respects its employees' duty to protect confidential information that they may have relating to their previous employers.

You are the purchasing manager in the procurement department of your company. You receive an invitation from a supplier to attend a premier sporting event as her guest. This particular supplier is one of the vendors who has submitted a proposal for an open tender issued by your company. Should you accept the invitation?

No. You should not accept the invitation in this instance. Since you are in a key decision-making role for the tender, any unusual benefit that you receive could be perceived as an inducement that could compromise your objectivity.

OUR CUSTOMERS



We have continued to enjoy prosperity, even with adverse times to fight against. Our relations with all concerned are the most friendly. We have maintained the same character for straight-forward dealing with our constituents and customers. Our productions have continued to be of the same high quality, and therefore command the best reputation and realise the highest prices. … I mention these facts only to point out that with honest and straight-forward business principles, close and careful attention to details, and the ability to take advantage of favourable opportunities and circumstances, there is a scope for success.

Jamsetji Tata

Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

E. OUR CUSTOMERS

Products and services

1. We are committed to supplying products and services of world-class quality that meet all applicable standards.
2. The products and services we offer shall comply with applicable laws, including product packaging, labelling and after-sales service obligations.
3. We shall market our products and services on their own merits and not make unfair or misleading statements about the products and services of our competitors.

Export controls and trade sanctions

4. We shall comply with all relevant export controls or trade sanctions in the course of our business.

Fair competition

5. We support the development and operation of competitive open markets and the liberalisation of trade and investment in each country and market in which we operate.
6. We shall not enter into any activity constituting anti-competitive behaviour such as abuse of market dominance, collusion, participation in cartels or inappropriate exchange of information with competitors.
7. We collect competitive information only in the normal course of business and obtain the same through legally permitted sources and means.

Dealings with customers

8. Our dealings with our customers shall be professional, fair and transparent.
9. We respect our customers' right to privacy in relation to their personal data. We shall safeguard our customers' personal data, in accordance with applicable law.

Q&A

You are the Regional Sales Manager of our company. You have become a member of an "informal group", on an instant messaging service, whose members are the regional sales heads of our company's competitors. The administrator of the group has requested an in-person meeting to informally discuss market conditions and brainstorm on "pricing strategy" from an industry perspective. What should you do?

Any meeting with competitors, especially to discuss "pricing strategy", could be an attempt to promote an anti-competitive practice or manipulate prices. You should respond by declining this invitation and exiting the "informal group". You should also report this incident to your supervisor and your Legal department.

You are attending a customer meeting with a colleague, and your colleague makes an untruthful statement about the company's services. What should you do?

You should assist your colleague in correcting the inaccuracy during the meeting if possible. If this is not possible, raise the issue with your colleague after the meeting to enable him/her or the company to correct any misrepresentation made to the customer.

While working on a customer project, you receive a call from your colleague. He used to manage that customer account before you took over his role. He recalls that he had worked with the customer on developing a new ordering system which he thinks would be beneficial for another customer and requests you to send him the project details. What should you do?

You must not share this information without specific approval of the customer; you are not permitted to use a customer's assets, including software, for another customer or for any personal use.

REMEMBER...

Striving for excellence in the standards of our work and in the quality of our goods and services is a core Tata value. It is the unwavering practice of this value that builds and sustains customer trust in our brand.

OUR COMMUNITIES AND THE ENVIRONMENT



In a free enterprise, the community is not just another shareholder in business but is in fact the very purpose of its existence.

Jamsetji Tata

Founder of the Tata group
Chairman, Tata Sons (1868 – 1904)

F. OUR COMMUNITIES AND THE ENVIRONMENT

Communities

1. We are committed to good corporate citizenship, and shall actively assist in the improvement of the quality of life of the people in the communities in which we operate.
2. We engage with the community and other stakeholders to minimise any adverse impact that our business operations may have on the local community and the environment.
3. We encourage our workforce to volunteer on projects that benefit the communities in which we operate, provided the principles of this Code, where applicable, and in particular the 'Conflicts of Interest' clause are followed.

The environment

4. In the production and sale of our products and services, we strive for environmental sustainability and comply with all applicable laws and regulations.
5. We seek to prevent the wasteful use of natural resources and are committed to improving the environment, particularly with regard to the emission of greenhouse gases, consumption of water and energy, and the management of waste and hazardous materials. We shall endeavour to offset the effect of climate change in our activities.

OUR VALUE-CHAIN PARTNERS



If we had done some of the things that some other groups have done, we would have been twice as big as we are today. But we didn't, and I would not have it any other way.

J.R.D. Tata

Chairman, Tata Sons (1938 – 1991)

(on the pace of expansion of the Tata group in the 1960s and 70s)

G. OUR VALUE-CHAIN PARTNERS

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 authorised 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.

Q&A

You head the procurement function in our company. You have tight budgetary constraints for a project that you are working on. In order to complete the project within the targeted costs, you intend to request your supplier to provide you an exceptional discount on this project order on the understanding that you would "make it up to him" in future orders. Would you be violating the Code?

Yes, you would. Inducement in any form, including future benefits to the supplier, could compromise your ability to act objectively and in the best interests of the company and therefore must be avoided.

REMEMBER...

Our value-chain partners would include our suppliers and service providers, distributors, sales representatives, contractors, channel partners, consultants, intermediaries and agents; joint-venture partners and other business associates.

OUR FINANCIAL STAKEHOLDERS



Ethical behaviour in business – in every sphere and with all constituents – has been the bedrock on which the Tata group has built, and operates, its enterprises. This has been an article of faith for the group ever since its inception, a fundamental element of our cherished heritage and the essence of our way of life.

Ratan Tata
Chairman, Tata Sons (1991 – 2012)

H. OUR FINANCIAL STAKEHOLDERS

1. We are committed to enhancing shareholder value and complying with laws and regulations that govern shareholder rights.
2. We shall inform our financial stakeholders about relevant aspects of our business in a fair, accurate and timely manner and shall disclose such information in accordance with applicable law and agreements.
3. We shall keep accurate records of our activities and shall adhere to disclosure standards in accordance with applicable law and industry standards.

GOVERNMENTS



> Business, as I have seen it, places one great demand on you; it needs you to impose a framework of ethics, values, fairness and objectivity on yourself at all times. It is not easy to do this; you cannot impose it on yourself forcibly because it has to become an integral part of you.

Ratan Tata
Chairman, Tata Sons (1991 – 2012)

I. GOVERNMENTS

Political non-alignment

1. We shall act in accordance with the constitution and governance systems of the countries in which we operate. We do not seek to influence the outcome of public elections, nor to undermine or alter any system of government. We do not support any specific political party or candidate for political office. Our conduct must preclude any activity that could be interpreted as mutual dependence/favour with any political body or person, and we do not offer or give any company funds or property or other resources as donations to any specific political party, candidate or campaign.

   Any financial contributions considered by our Board of Directors in order to strengthen democratic forces through a clean electoral process shall be extended only through the Progressive Electoral Trust in India, or by a similar transparent, duly-authorised, non-discriminatory and non-discretionary vehicle outside India.

Government engagement

2. We engage with the government and regulators in a constructive manner in order to promote good governance. We conduct our interactions with them in a manner consistent with our Code.

3. We do not impede, obstruct or improperly influence the conclusions of, or affect the integrity or availability of data or documents for any government review or investigation.

OUR GROUP COMPANIES



I do not think anyone was on par with Jamsetji as an industrial visionary. But that is not the sole reason why I have been an admirer of Jamsetji. The major reason was his sense of values, sterling values, which he imparted to this group. If someone were to ask me, what holds the Tata companies together, more than anything else, I would say it is our shared ideals and values which we have inherited from Jamsetji Tata.

J.R.D. Tata
Chairman, Tata Sons (1938 – 1991)

J. OUR GROUP COMPANIES

1. We seek to cooperate with our group companies, including joint ventures, by sharing knowledge, physical resources, human and management resources and adopting leading governance policies and practices in accordance with applicable law including adherence to competition law, where relevant.
2. We shall strive to achieve amicable resolution of any dispute between us and any of our group companies, through an appropriate dispute resolution mechanism so that it does not adversely affect our business interests and stakeholder value.
3. We shall have processes in place to ensure that no third party or joint venture uses the TATA name/brand to further its interests without proper authorisation.
4. Our Board of Directors shall consider for adoption policies and guidelines periodically formulated by Tata Sons and circulated to group companies.

Q&A

You are in the process of selecting potential vendors for an IT project in our company. In the final shortlist of two companies, one is a new start-up with limited references and a lower price-quotation, while the other is a Tata company with thirty years of implementation experience and good references, but a marginally higher quote for the same job. With all other parameters of choice being nearly equal, which company should you select for the job?

While price is undoubtedly an important criterion for decision making, it is clearly not the only one to be evaluated. You may also need to consider good customer references, proven track record and shared value systems in order to decide on your IT partner.

You are in the process of selecting potential vendors for a project. One of the three finalists is a group company. In reviewing the final proposals, you rank the group company second out of the three proposals based on pricing and total cost of ownership, and select the first-ranked vendor. Is this the right decision?

Yes. You should select the vendor that, on its own merits, is the vendor that is most appropriate for your company's requirements. You should not select a group company only because of its affiliation.

RAISING CONCERNS

We encourage our employees, customers, suppliers and other stakeholders to raise concerns or make disclosures when they become aware of any actual or potential violation of our Code, policies or law. We also encourage reporting of any event (actual or potential) of misconduct that is not reflective of our values and principles.

Avenues available for raising concerns or queries or reporting cases could include:

- immediate line manager or the Human Resources department of our company
- designated ethics officials of our company
- the 'confidential reporting' third party ethics helpline (if available)
- any other reporting channel set out in our company's 'Whistleblower' policy.

We do not tolerate any form of retaliation against anyone reporting legitimate concerns. Anyone involved in targeting such a person will be subject to disciplinary action.

If you suspect that you or someone you know has been subjected to retaliation for raising a concern or for reporting a case, we encourage you to promptly contact your line manager, the company's Ethics Counsellor, the Human Resources department, the MD/CEO or the office of the group's Chief Ethics Officer.



My supervisor has asked me to do something which I believe may be illegal. I am afraid if I do not do what I am told, I could lose my job. Should I do it?

No. Breaking the law is never an option. Discuss the situation with your supervisor to be certain that you both understand the facts. If your concerns are not resolved, contact a higher level supervisor, the Ethics Counsellor, the Legal department or report them via the company's confidential reporting system, if available.

I feel that my supervisor is treating me unfairly for reporting a concern to the Ethics Counsellor. What should I do?

Retaliation against anyone who raises a concern is a violation of the Code. You should therefore promptly report this action of your supervisor to the Ethics Counsellor or the MD/CEO of your company or via the company's confidential reporting system, if available.

ACCOUNTABILITY

This Code is more than a set of prescriptive guidelines issued solely for the purpose of formal compliance. It represents our collective commitment to our value system and to our core principles.

Every person employed by us, directly or indirectly, should expect to be held accountable for his/her behaviour. Should such behaviour violate this Code, they may be subject to action according to their employment terms and relevant company policies.

When followed in letter and in spirit, this Code is *'lived'* by our employees as well as those who work with us. It represents our shared responsibility to all our stakeholders, and our mutual commitment to each other.

SPEAK UP...

If you are unsure whether a particular action you are about to take is consistent with the principles set forth in the Code, ask yourself:

- Could it directly or indirectly endanger someone or cause them injury?
- Is it illegal/unlawful or out of line with our policies and procedures?
- Does my conscience reject it? Does it conflict with my personal values?
- Would I feel uncomfortable if the story appeared in the media? Would it shame my company, spouse, partner, parent or child?
- Does it 'feel' wrong?

If the answer to any of these questions is "Yes", please stop and consult your reporting manager, the Ethics Counsellor, the Human Resource department, the Legal department or any member of the senior management team, to assist you in making the decision.

When faced with a dilemma: Stop, Think, Act Responsibly

NOTE

The Code does not provide a comprehensive and complete explanation of all expectations from a company standpoint or obligations from a stakeholder standpoint.

Our employees have a continuing obligation to familiarise themselves with all applicable law, group-level advisories and policies, company-level policies, procedures and work rules as relevant. For any guidance on interpretation of the Code, we may seek support from our company's Ethics Counsellor or from the group's Chief Ethics Officer, as appropriate.

All joint ventures are encouraged to adopt the Tata Code of Conduct (TCOC) or a code of conduct that incorporates all elements of the TCOC.

This version of the Tata Code of Conduct supersedes all earlier versions and associated documents and stands effective from 29th July, 2015.

For any query or clarification on the Code, please contact the office of the group's Chief Ethics Officer via email at: ethicsoffice@tata.com.

TATA CODE OF CONDUCT – 2015

I acknowledge that I have received the Tata Code of Conduct.

I have read the Tata Code of Conduct and I acknowledge that as a Tata employee, I am required to comply with the guidelines described therein and failure to do so may subject me to action as per my employment terms and relevant company policies.

If I have a concern about a violation, or a potential violation of the Tata Code of Conduct, I understand that there are channels available to me in my company to report such concerns. By making use of these channels when necessary, I will play my part in maintaining the high ethical standards to which we hold ourselves.

Signature: _____

Date: _____

Name: _____

Department: _____

Address: _____

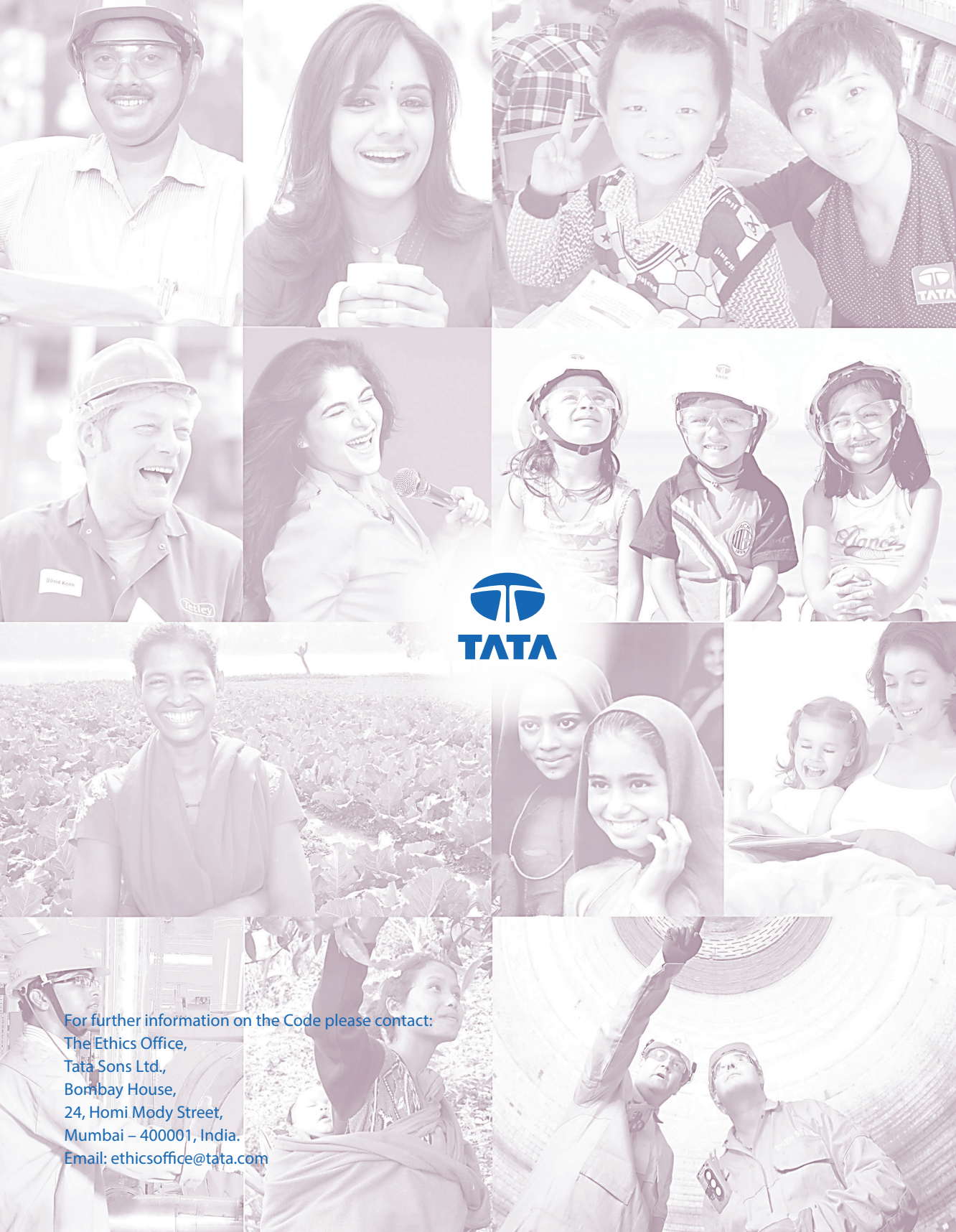
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_____

(Please submit this declaration to your Ethics Counsellor or the Human Resource department of your company.)

NOTES

NOTES



TATA

For further information on the Code please contact:
The Ethics Office,
Tata Sons Ltd.,
Bombay House,
24, Homi Mody Street,
Mumbai – 400001, India.
Email: ethicsoffice@tata.com

HEALTH AND SAFETY POLICY

We, at Tata Power, reaffirm our belief that the health and safety of our stakeholders is of the utmost importance and takes precedence in all our business decisions. In pursuit of this belief and commitment, we strive to:

- Maintain and proactively improve our management systems to minimize health and safety hazards to our stakeholders and all others influenced by our activities.
- Comply and endeavour to exceed all applicable occupational health & safety legal and other requirements by setting the highest standards.
- Integrate health & safety procedures and best practices into every operational activity with assigned line-functional responsibilities at all levels, for improving and sustaining health & safety performance.
- Involve our employees in maintaining a safe and healthy work environment through risk assessments, periodic reviews of operational procedures, safe work methods and adoption of new technology.
- Develop a culture of safety through active leadership and provide appropriate training at all levels to enable employees developing their skills to work safely.
- Incorporate appropriate health & safety criteria into business decisions for selection of plant and technology, performance appraisal of individuals and appointments in key positions.
- Ensure availability at all times of appropriate resources to fully implement the health & safety policy of the company.
- Promptly report incidents, investigate for root causes and ensure lessons learnt shared and deployed across the company.
- Ensure service providers and their workmen align with company's safety codes and practices for the health and safety of personnel working with us.
- Set safety & health metrics as indicators of excellence, monitor progress and continually improve performance.

We shall actively communicate this policy to all stakeholders by suitable means and periodically review its relevance in continuously changing business environment.

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

CORPORATE ENVIRONMENT POLICY

Tata Power is committed to a clean, safe and healthy environment, and we shall operate our facilities in an environmentally sensitive and responsible manner. Our commitment to environmental protection and stewardship will be achieved by:

- Complying with the requirements and spirit of applicable environmental laws and striving to exceed required levels of compliance wherever feasible
- Ensuring that our employees are trained to acquire the necessary skills to meet environmental standards
- Conserving natural resources by improving efficiency and reducing wastage
- Making business decisions that aim towards sustainable development
- Engaging with stakeholders to create awareness on sustainability

Date: 15th June, 2018

(Praveer Sinha)
CEO & Managing Director

TATA POWER
Lighting up Lives!

FORMAT OF EMD – Bid Guarantee BG

FORMAT OF EMD – Bid Guarantee BG

Note: a) Format shall be followed in toto
b) Claim period of six months must be kept. In case of Bank is not ready to give BG for six months and claim period of six months EMD BG valid of one year to be given
c) The guarantee to be accompanied by the covering letter from the bank confirming the signatories to the guarantee on the Bank's letter head.

The Tata Power Co Ltd
34,Sant Tukaram Road
Carnac Bunder,
Mumbai 400 009

Whereas (Name of the Contractor), a Company incorporated under the Indian Companies Act 1956, having its Registered office at _____, (hereinafter called the "BIDDER") has in response to your Invitation to Bid against Enquiry No. _____dated _____, for (name of work), offered to supply and/or execute the works as contained in Employers letter dated _____.

AND WHEREAS BIDDER is required to furnish to you a Bank Guarantee for the sum of Rs._____/-(Rupees ____ only) as Earnest Money against Bidder's offer as aforesaid.

AND WHEREAS we, (name of the bank) having our Registered Office at _____and Branch office at _____, have at the request of Bidder, agreed to give you this Guarantee as hereinafter contained.

NOW THEREFORE, in lieu of earnest money deposit, we, the undersigned, hereby covenant that the aforesaid Bid of the BIDDER shall remain open for acceptance by you during the period of validity as mentioned in the Bid Document or any extension thereof as requested by you and if Bidder shall for any reason back out, whether expressly or impliedly, from this said Bid during the period of its validity or any extension thereof as aforesaid, we hereby guarantee to you the payment of the sum of Rs._____/-(Rupees ____ only) on demand and without demur and notwithstanding the existence of any dispute between you and the BIDDER in this regard and we hereby further agree as follows:

(a) You shall have the right to file/make a claim on us under the Guarantee for a further period of six months from the said date of expiry.

(b) That this guarantee shall not be revoked during its currency without your written express consent.

(c) That you may without affecting this guarantee grant time or other indulgence to or negotiate further with BIDDER in regard to the conditions contained in the said Bid document and thereby modify these conditions or add thereto any further conditions as may be mutually agreed upon between you and BIDDER.

(d) That the guarantee hereinbefore contained shall not be affected by any change in the constitution of our Bank or in the constitution of BIDDER.

(e) That any account settled between you and BIDDER shall be conclusive evidence against us of the amount due hereunder and shall not be questioned by us.

(f) That this guarantee commences from the date hereof and shall remain in force till BIDDER, if his Bid is accepted by you, furnishes the Contract Performance Guarantee as required under the said specifications and executes formal Contract Agreement as therein provided or till ____Days (__days) from the date of submission of the Bid by the BIDDER i.e. (expiry date), whichever is earlier.

(g) That the expression, BIDDER and Bank, and OWNER herein used shall, unless such an interpretation is repugnant to the subject or context, include their respective successors and assignees.

(h) 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 and shall be extended from time to time for such period or periods as may be desired by you. Unless a demand or claim under this Guarantee is received by us in writing within six months from (expiry date), i.e. on or before (claim period date), we shall be discharged from all liabilities under this guarantee thereafter.

(i) Any claim/extension under the guarantee can be lodgeable at issuing outstation bank 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)**

Notwithstanding anything contained hereinabove :

a) Our liability under this Bank Guarantee shall not exceed Rs._____/-(Rupees _____ only).
b) This Bank Guarantee shall be valid upto ---------- 200.
c) Our Liability to make payment shall arise and we are liable to pay the guaranteed amount or any part there of under this Bank Guarantee only and only if you serve upon us a written claim or demand on or before ---------- 200.