NIT No.: TPNODL/OT/2021-22/049 Dtd.07.08.21

Open Tender Notification

For

RATE CONTRACT FOR SITC of 33kV and 11kV Control & Relay Panels along with SITC of IEDs in TPNODL Area

Tender Enquiry No.: TPNODL/OT/2021-22/049 Dt. 07.08.2021

Due Date for Tender Fee: 18.08.2021 [15:00 Hrs.]

Due Date for Bid Submission: 03.09.2021 [15:00 Hrs.]

TP NORTHERN ODISHA DISTRIBUTION LIMITED
(A TATA Power and Odisha Government Joint Venture)
Contracts & Material Management Department,
Corporate Office, Januganj, Balasore-756019

NIT No.: TPNODL/OT/2021-22/049 Dtd.07.08.21

Procedure to Participate in Tender

Tender Enquiry No- TPNODL/OT/2021-22/028

Tender Enquiry No.	Tender Group	Work Description	EMD (Rs.)	Tender Fee (Rs.)	Last Date and Time for payment of Tender Fee
TPNODL/OT/2021-22/028	A.	Supply of 33KV Control Relay Panel For Transformer as per TPNODL Specification Installation Testing & Commissioning along with Integration with SCADA (if any)- 33KV Control Relay Panel For Transformer 33KV Control Relay Panel For IC/OG as per TPNODL specs. Installation Testing & Commissioning along with Integration with SCADA (if any)- 33KV Control Relay Panel For IC/OG 11KV Control relay panel as per TPNODL specs. Installation Testing & Commissioning along with Integration with SCADA (if any)-11KV Control relay panel Supply of Transformer Differential RELAY as per TPNODL specs Supply of Feeder Protection relay as per TPNODL specs Supply of Master trip relay as per TPNODL specs. ITC of Relay- Differential Relay ITC of Relay- Feeder Protection relay	10,00,000/-	5,000	17.08.2021, 15:00 Hrs.

		ITC of Relay- Master trip relay			
		Supply of 24 -48 DC RTU with Panel as per TPNODL Specs.			
		Supply of 24-48V DC Ethernet Switch (12 Port) as per TPNODL Specs.			
		Supply of CAT VI ethernet Cable (MTR)			
		Supply of RJ45 Connector			
		Services ITC of RTU Panel along with CAT VI and RJ connectors			
		ITC of Ethernet Switch along with CAT-VI & other acsesorries.			

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

Procedure to Participate in Tender.

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

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

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

    g. Payment UTR No- ……. Having Remark (Bidder Name_NIT Number)

    h. ANID & User ID of ARIBA System(If Any)

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

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

E-mail with necessary attachment to be sent to supriya.panigrahi@tpnodl.com with copy to vipin.Chauhan@tpnodl.com before last date and time for payment of Tender Fee.

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

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

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

Also it may be strictly noted that once date of "Last date and time for Payment of Tender Participation Fee" is lapsed no Bidder will be sent link from TPNODL E-Tender System (Ariba). Without this link 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 Fee / EMD by Bidder who have not done the prerequisite will not be refunded.

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

NIT No.: TPNODL/OT/2021-22/049 Dtd.07.08.21

Open Tender Notification

For

RATE CONTRACT FOR SITC of 33kV and 11kV Control & Relay Panels along with SITC of IEDs in TPNODL Area

Tender Enquiry No.: TPNODL/OT/2021-22/049

Due Date for Tender Fee: 18.08.2021 [15:00 Hrs.]

Due Date for Bid Submission: 03.09.2021 [15:00 Hrs.]

TP NORTHERN ODISHA DISTRIBUTION LIMITED
(A Tata Power and Odisha Government Joint Venture)
Contracts & Material Management Department
Corporate office: Januganj, Balasore, Odisha-756019

CONTENTS OF THE ENQUIRY

1.0 Event Information

1.1 Scope of work

SITC of 33kV and 11kV Control & Replay Panels along with SITC of IEDs TP Northern Odisha Distribution Ltd. It is included, loading, unloading transportation from OEM factory to TPNODL site/ Store. The detailed scope of work is mentioned in BOQ and TPNODL specification. Open Tenders are invited in e-tender bidding process from interested bidders for entering into a Rate Contract valid for a period of 12 Months as defined below:

Group No.	Description	EMD (Rs.)	Tender Fee (Rs.)
1	Supply of 33KV Control Relay Panel For Transformer as per TPNODL Specification	10,00,000/-	5,000
	Installation Testing & Commissioning along with Integration with SCADA (if any)- 33KV Control Relay Panel For Transformer		
	33KV Control Relay Panel For IC/OG as per TPNODL specs.		
	Installation Testing & Commissioning along with Integration with SCADA (if any)- 33KV Control Relay Panel For IC/OG		
	11KV Control relay panel as per TPNODL specs.		
	Installation Testing & Commissioning along with Integration with SCADA (if any)-11KV Control relay panel		
	Supply of Transformer Differential RELAY as per TPNODL specs		
	Supply of Feeder Protection relay as per TPNODL specs		
	Supply of Master trip relay as per TPNODL specs.		
	ITC of Relay- Differential Relay		
	ITC of Relay- Feeder Protection relay		
	ITC of Relay- Master trip relay		
	Supply of 24 -48 DC RTU with Panel as per TPNODL Specs.		
	Supply of 24-48V DC Ethernet Switch (12 Port) as per TPNODL Specs.		
	Supply of CAT VI ethernet Cable (MTR)		
	Supply of RJ45 Connector		
	Services ITC of RTU Panel along with CAT VI and RJ connectors		
	ITC of Ethernet Switch along with CAT-VI & other asseccerires		

1.2 Availability of Tender Documents

Please refer “Procedure to participate in the e-tender”.

1.3 Calendar of Events

(a)	Last Date of receipt of Tender Fee	18.08.2021 ; 15:00 Hrs
(b)	Date & Time of Pre-Bid Meeting (If any)	Not Applicable due to COVID-19, Queries to be answered through e-mail/TPNODL Tender website.
(c)	Last Date of receipt of pre-bid queries, if any	21.08.2021 up to 15:00 Hrs
(d)	Last Date of Posting Consolidated replies to all the pre-bid queries as received	27.09.2021 up to 18:00 Hrs
(e)	Last date and time of receipt of Bids	03.09.2021 up to 15:00 Hrs
(f)	Date & Time of opening technical bids & EMD	03.09.2021 up to 15:30 Hrs
(g)	Date & Time of opening of Price of qualified bids	Will be notified to the successful bidders through our website / e-mail.

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

Pre bid meeting shall be scheduled at TPNODL Corporate Office or Online. Same shall be communicated to the interested bidders post receipt of their Tender Fee.

1.4 Mandatory documents required along with the Bid

1.4.1 EMD of requisite value and validity.
1.4.2 Tender Fee in case the tender is downloaded from website
1.4.3 Requisite Documents for compliance to Qualification Criteria mentioned in Clause 1.7.
1.4.4 Drawing, Type Test details along with a sample of each item as specified at Annexure I (as applicable)
1.4.5 Duly signed and stamped 'Schedule of Deviations' as per Annexure III on bidder's letter head.
1.4.6 Duly signed and stamped 'Schedule of Commercial Specifications' as per Annexure IV on bidder's letter head.
1.4.7 Proper authorization letter/ Power of Attorney to sign the tender on the behalf of bidder.
1.4.8 Copy of PAN, GST, PF, ESI Registration and valid Labour License (In case any of these documents is not available with the bidder, same to be explicitly mentioned in the 'Schedule of Deviations')

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

1.5 Deviation from Tender

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

1.6 Right of Acceptance/ Rejection

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

1.6.1 EMD of requisite value and validity

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

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

1.7 Qualification Criteria

1.7.1 The bidder should have average Annual Turnover of Rs. 3.00 Cr. In last 3 financial years. Copy of audited P&L account to be submitted in this regard.

1.7.2 The bidder/ OEM should have executed either 100% of the average Order value in line with Clause above (Point 1), during last 5 years; or single Order of 50% of above value during last 5 years; or 2 Orders of 30% each of the above value during last 5 Years. Copy of Work Order / Completion Certificate to be submitted in this regard.

1.7.3 Bidder/ OEM should have the In-house testing facilities for acceptance test as per TPNODL specifications. Self-undertaking to be submitted in this regard. TPNODL reserves the right to inspect the said manufacturing facility as a proof of compliance to this parameter.

1.7.4 Bidder/OEM should have one year performance certificate from at least one government utility/ reputed organization.

1.8 Marketing Integrity

We have a fair and competitive marketplace. The rules for bidders are outlined in the General Condition of Contracts. Bidders must agree to these rules prior to participating. In addition to other remedies available, TPNODL reserves the right to exclude a bidder from participating in future markets due to the bidder's violation of any of the rules or obligations contained in the General Condition of Contracts. A bidder who violates the market place rules or engages in 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/NIT

1.9 BAs Confidentiality

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

2.0 Evaluation Criteria

- The bids will be evaluated technically on the compliance to tender terms and conditions.

- If Qualified technically, the bids will be evaluated commercially on the overall item wise lowest cost as calculated in Schedule of Items [ANNEXURE I]. TPNODL however, reserves the 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.
- Bidder has to mandatorily quote as per Schedule of Items [Annexure-I]. Failing to do so TPNODL may reject the bid.

NOTE: In case of a new bidder not registered, existing sites shall be visited by TPNODL officials for confirming overall performance of the BA. However TPNODL reserves the right to carry out sites inspection and evaluation for any bidder prior to technical qualification. In case a bidder is found as Disqualified in the sites visit evaluation, their bid shall not be evaluated any further and shall be summarily rejected. The decision of TPNODL shall be final and binding on the bidder in this regard.

2.1 Price Variation Clause: The year wise prices as finalized shall remain firm during the entire contract period.

3.0 Submission of Bid Documents

3.1 Bid Submission

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

Bids shall be submitted in 3 (Three) parts:

FIRST PART: "EMD" of Rs. 10,00,000/- (Rupees Four Lacs Forty Thousands only). The EMD shall be valid for 210 days from the due date of bid submission in the form of BG/ Bankers Pay Order favoring 'TP Northern Odisha Distribution Limited", payable at Balasore only. The EMD has to be strictly in the format as mentioned in General Condition of Contract, failing which it shall not be accepted and the bid as submitted shall be liable for rejection. A separate non-refundable tender fee of stipulated amount also needs to be transferred online through NEFT/ RTGS in case the tender document is downloaded from our website.

TPNODL Bank Details for transferring Tender Fee and EMD is as below:

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

In case the EMD is in the form of BG, ***EMD Original Hard Copy*** *shall be delivered at the following address in Envelope clearly indicating Tender Reference Number, Name of Tender and Bidder Name before opening of the Bid.*

The Envelop shall be addresses to:

H.O.D. (Contracts)
TP NORTHERN ODISHA DISTRIBUTION LIMITED
(A Tata Power and Odisha Government Joint Venture)

The envelop shall also bear the Name & Address of the bidder along with our Tender No. and subject.

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

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

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

THIRD PART: "PRICE BID" shall contain only the price details and strictly in format as mentioned in Annexure I along with explicit break up of basic prices, Taxes & duties, Freight etc. In case any discrepancy is observed between the item description stated in Schedule of Items mentioned in the tender and the price bid submitted by the bidder, the item description as mentioned in the tender document (to the extent modified through Corrigendum issued if any) shall prevail. Price Bid is to be submitted in soft copy through TPNODL E-Tendering system (Ariba) only. Hard copy of Price Bid not be submitted.

SIGNING OF BID DOCUMENTS:

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

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

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

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

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

3.2 Contact Information

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

Communication Details:

Package Owner - Contracts

Name: Ms. Supriya Panigrahi

Contact No.: 8895590483

E-Mail ID: supriya.panigrahi@tpnodl.com

HOD Contracts

Name: Mr. Vipin Chauhan

Contact No: 9717393121

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

Bidders are strictly advised to communicate with Package Owner through TPNODL E-tender System (Ariba) only. They need to pay Tender Participation Fee to receive the Ariba log-in.

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 rate for each item & total price with taxes, duties & freight up to destination at various sites of TPNODL. The all-inclusive prices offered shall be inclusive of all costs as well as Duties, Taxes and Levies paid or payable during the execution of the supply / work, breakup of price constituents.

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

Applicable GST to be specified clearly.

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

3.4 Bid Currencies

Prices shall be quoted in Indian Rupees Only.

3.5 Period of Validity of Bids

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

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

3.6 Alternative Bids

Bidders shall submit Bids, which comply with the Bidding documents. Alternative bids will not be considered. The attention of Bidders is drawn to the provisions regarding the rejection of Bids in the terms and conditions, which are not substantially responsive to the requirements of the bidding documents.

3.7 Modifications and Withdrawal of Bids

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

3.8 Earnest Money Deposit (EMD)

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

- Banker's Cheque/ Demand Draft/ Pay order drawn in favor of "TP Northern Odisha Distribution Limited", payable at Balasore only
- Online transfer of requisite amount through NEFT/ RTGS.
- Bank Guarantee valid for 210 days after due date of submission.

The EMD shall be forfeited in case of:

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

Or

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

3.9 Type Tests (if applicable)

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

4.0 Bid Opening & Evaluation process

4.1 Process to be confidential

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

4.2 Technical Bid Opening

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

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

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

4.3 Preliminary Examination of Bids/ Responsiveness

TPNODL will examine the Bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the Bids are generally in order. TPNODL may ask for submission of original documents in order to verify the documents submitted in support of qualification criteria.

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

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

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

4.4 Techno Commercial Clarifications

Bidders need to ensure that the bids submitted by them are complete in all respects. To assist in the examination, evaluation and comparison of Bids, TPNODL may, at its discretion, ask the Bidder for a clarification on its Bid for any deviations with respect to the TPNODL specifications and attempt will be made to bring all bids on a common footing. All responses to requests for clarification shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted owing to any clarifications sought by TPNODL. After all techno commercial issues are clarified, the date of price bid opening will be intimated to the technically accepted bidders and same shall also be notified at TPNODL website.

4.5 Price Bid Opening

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

4.6 Reverse Auctions

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

5.0 Award Decision

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

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

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

6.0 Order of Preference/Contradiction:

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

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

7.0 Post Award Contract Administration

7.1 Special Conditions of Contract

- After finalization of tender, Rate Contract shall be issued on successful bidder with a validity period of **12 Months**. Prices shall remain firm till validity of issued rate contract. Within the validity of rate contract and as per requirement of material, release order shall be issued time to time. TPNODL reserves the right to extend this RC according to the performance, quality of the material for **06 Months.**
- Post award of rate contract, Business Associate (BA) shall submit applicable Performance Bank Guarantee as per GCC within 15 days. PBG applicable shall 5% of Rate Contract Value. PBG submitted, shall be released after completion of applicable minimum 18months or guarantee period plus one month.
- Guarantee period shall be as per technical specifications.
- **Within 15 days of Rate Contract issuance by TPNODL, it is the responsibility of BA to get manufacturing clearance and CAT-A issued from TPNODL.** In case BA does not get necessary approvals for issuance of CAT-A within mentioned timelines, then TPNODL reserve the right to cancel issued rate contract / release order and also reserve the right to forfeit EMD / PBG.
- BA will ensure & co-ordinate with TPNODL team for approval of CAT-A / drawing / GTP within 15days from issue of RC.
- Delivery period shall be 12 weeks from the approval of GTPs and drawings. BA needs to submit drawings within 15 Days from award.
- **Ratings of 33KV, 11KV CONTROL & RELAY PANELs will be informed in RO.**
- TPNODL reserves the rights to short close the issued Release Order / Rate contract, in case of any quality issues.
- Any change in statutory taxes, duties and levies shall be borne by TPNODL.

- All other terms and conditions of TPNODL GCC shall be applicable.

7.2 Drawing Submission & Approval

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

7.3 Delivery Terms

Supply Part: - The C&R Panel shall be delivered within 21 weeks from the date of issuance of the order (this include the drawing submission time - BA shall submitted the drawing within 7 days from the date of issuance of the order)
For ITC Part: - Installation, Testing and commissioning of the Panels shall be done within 4 weeks from the date of site clearance.

For calculation of LD if any, total time of 25 weeks shall be considered. TPNODL shall approve/ provide comments on the submitted drawings within 7 days of first submission. These timelines shall be 4 days in case of resubmission. At least one mutual face to face discussion at TPDDL Office shall also be required within 3-5 days of drawing submission by the BA. In case of any delay from TPDDL side on the above timelines, suitable time extension shall be provided to the BA.

7.4 Warranty Period

Guarantee/Warranty Period of the supplied material shall be of 18Months from the date of supply of material at TPNODL/as per technical specification attached separately with this tender.

7.5 Payment Terms

For Supply Part:-
80% of supply payment shall be released post completion of supply of Panel/ IEDs at site and balance 20% will be released after commissioning of Panel and certification by TPNODL EIC.
-If there is any delay in readiness of site for more than 3 months reasons attributable to TPNODL, then balance 20% shall also be released against the submission of the BG (Valid for 6 months) of balance amount.
For Erection Part: - 100% payment shall be released within 45 days from the date of submission of the invoice after commissioning of the panel in all respect.
Note: - PBG-3 % of Contract value shall be applicable for this contract. The validity of PBG shall be till the warranty period plus one month.

7.6 Climate Change

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

7.7 Ethics

- TPNODL is an ethical organization and as a policy TPNODL lays emphasis on ethical practices across its entire domain. Bidder should ensure that they should abide by all

the ethical norms and in no form either directly or indirectly be involved in unethical practice.

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

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

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

8.0 Specification and standards

Attached separately with tender.

9.0 General Condition of Contract

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

10.0 Safety

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

http:// www.tpnodl.com

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

All jobs are this tender have to be executed strictly in compliance to the Safety terms and Conditions of TP Northern Odisha Distribution Limited. Please refer attached Safety terms and conditions, Annexure-X, for details. Violation of Safety norms will result in Penalty as mentioned in the above document.

ANNEXURE-I

Schedule for Items

Sr No	Panel	Make	Quantity	Unit	Basic Unit Price (Rs.)	GST	All inclusive UNIT Price (FOR Price)-Rs.	Amount (Rs.)	HSN/ SAC
1	Supply of 33KV Control Relay Panel For Transformer as per TPNODL Specification	Siemens /ABB/Alstom/Schendier /L & T							
2	Installation Testing & Commissioning along with Integration with SCADA (if any)- 33KV Control Relay Panel For Transformer	Siemens /ABB/Alstom/Schendier /L & T							
3	33KV Control Relay Panel For	Siemens /ABB/Al							

	IC/OG as per TPNODL specs.	stom/Schendier /L & T							
4	Installation Testing & Commissioning along with Integration with SCADA (if any)- 33KV Control Relay Panel For IC/OG	Siemens /ABB/Alstom/Schendier /L & T							
5	11KV Control relay panel as per TPNODL specs.	Siemens /ABB/Alstom/Schendier /L & T							
6	Installation Testing & Commissioning along with Integration with SCADA (if any)- 11KV Control relay panel	Siemens /ABB/Alstom/Schendier /L & T							
7	Supply of Transformer Differntial RELAY as per TPNODL specs	Siemens /ABB/Alstom/Schendier /L & T							
8	Supply of Feeder Protection relay as per TPNODL specs	Siemens /ABB/Alstom/Schendier /L & T							
9	Supply of Master trip relay as per TPNODL specs.	Siemens /ABB/Alstom/Schendier /L & T							
10	ITC of Relay- Differential Relay	Siemens /ABB/Alstom/Schendier /L & T							
11	ITC of Relay- Feeder Protection relay	Siemens /ABB/Alstom/Sc							

		hendier /L & T							
12	ITC of Relay-Master trip relay	Siemens /ABB/Alstom/Schendier /L & T							
13	Supply of 24 -48 DC RTU with Panel as per TPNODL Specs.	Siemens /ABB/Alstom/Schendier /L & T							
14	Supply of 24-48V DC Ethernet Switch (12 Port) as per TPNODL Specs.	Siemens /ABB/Alstom/Schendier /L & T							
15	Supply of CAT VI ethernet Cable (MTR)	Siemens /ABB/Alstom/Schendier /L & T							
16	Supply of RJ45 Connector	Siemens /ABB/Alstom/Schendier /L & T							
17	Services ITC of RTU Panel along with CAT VI and RJ connectors	Siemens /ABB/Alstom/Schendier /L & T							
18	ITC of Ethernet Switch along with CAT-VI & other accessories.	Siemens /ABB/Alstom/Schendier /L & T							
Total									

NOTE:

- The quantity mentioned above is for evaluation purpose only and may vary during the execution. Release Orders against this Rate Contract shall be issued by TPNODL as per actual requirement.
- The overall period of the rate contract shall be for a period of **12 Months** and price shall be firm till the validity of contract. Extendable to **6 Months**(Optional)

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

Annexure II
Technical Specifications

Mentioned after GCC

ANNEXURE III
Schedule of Deviations

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

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

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

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

Seal of the Bidder:

Signature:

Name:

ANNEXURE IV

Schedule of Commercial Specifications

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

S. No.	Particulars	Remarks
1.	Prices firm or subject to variation (If variable indicate the price variation clause with the ceiling if applicable)	Firm / Variable
1a.	If variable price variation on clause given	Yes / No
1b.	Ceiling	--------- %
1c.	Inclusive of Excise Duty	Yes / No (If Yes, indicate % rate)
1d.	GST 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 (For **3or5%** of order value for guarantee period)	Yes / No
6.	Liquidated damages clause acceptable	Yes / No
7.	Validity (180 days) (From the date of opening of technical bid)	Yes / No
8.	Inspection during stage of manufacture	Yes / No
9.	Rebate for increased quantity	Yes / No (If Yes, indicate value)
10.	Change in price for reduced quantity	Yes / No (If Yes, indicate value)
11.	Covered under Small Scale and Ancillary Industrial Undertaking Act 1992	Yes / No (If Yes, indicate, SSI Reg'n No.)

ANNEXURE V

Checklist of all the documents to be submitted with the Bid

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

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

Annexure VI

Acceptance Form for Participation In Reverse Auction Event

(To be signed and stamped by the bidder)

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

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

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

Signature & Seal of the Bidder

Annexure VII

General Conditions of Contract

CONTENTS	
CLAUSE NO.	**DESCRIPTION**
1.0	**ORGANIZATIONAL VALUES**
2.0	**ETHICS**
2.1	Tata Code of Conduct
3.0	**CONTRACT PARAMETERS**
3.1	Issue/Award of Contract
3.2	Contract Commencement Date
3.3	Contract Completion Date
3.4	Contract Period/ Time
3.5	Contract Execution Completion Date
3.6	Contract Price /Value
3.7	Contract Document
3.8	Contract Language
3.9	Reverse Auction
4.0	**SCOPE OF WORK**
4.1	Bid Evaluation- Commercial & Technical
5.0	**PRICES/RATES/TAXES**
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7.0	**MODE OF PAYMENT**
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9.0	**STATUTORY COMPLIANCE**
9.1	Compliance to Various Acts
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10.1	Knowledge of Requirements
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10.3	Adherence to Rules & Regulations

CONTENTS	
CLAUSE NO.	**DESCRIPTION**

CONTENTS	
CLAUSE NO.	**DESCRIPTION**

1.0 ORGANIZATIONAL VALUES

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

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

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

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

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

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

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

2.0 ETHICS

In our effort towards Excellence and in Management of Business Ethics at TPNODL, an Ethics Management Team is constituted.

The main objective of the Ethics Management Team is to:

1. Record, address and allay the issues and concerns on ethics raised by different stakeholders like employees, consumers, vendors, Associates etc. by initiating immediate corrective actions.
2. Ensure proper communication of the ethics policies and guidelines through prominent displays at all offices of TPNODL and through printed declarations in all concerned documents where external stakeholders are involved.
3. Ensure proper framework of policies as preventive measures against any ethics violation recorded by them.
4. Prepare and submit MIS of all issues and concerns, corrective and preventive actions on monthly basis to the top management for their information.

All Associates and Stakeholders are requested to register any grievance on ethics violation on reported to the following e-mail ID: ceooffice@tpnodl.com

3.0 CONTRACT PARAMETERS

3.1 Issue/ Award of Contract

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

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

3.2 Contract Commencement Date

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

3.3 Contract Completion Date

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

3.4 Contract Period/Time

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

3.5 Contract Execution Completion Date

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

3.6 Contract Price /Value

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

3.7 Contract Document

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

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

3.8 Contract Language

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

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

3.9 Reverse Auction

TPNODL reserves the right to conduct the reverse auction (instead of public opening of price bids) for the products / services being asked for in the tender. The terms and conditions for such reverse auction events shall be as per the Acceptance Form attached in Annexure F. The bidders along with the tender document shall mandatorily submit a duly signed copy of the Acceptance Form as mentioned in the Annexure J as a token of acceptance for the same.

4.0 Scope of Work

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

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

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

TPNODL have the right, during the performance of the Contract, to change the scope and/or technical character of the Project and/or of the supplies and services stipulated in the Contract by submitting a request in writing to the Associate. The Associate shall, within

fifteen days of receipt of such request from the TPNODL, provide Purchaser with a reasonably detailed estimate of the cost of the change outlined in the request.

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

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

4.1 Bid Evaluation- Commercial & Technical

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

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

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

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

5.0 PRICES/RATES/TAXES

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

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

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

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

5.1 Changes in Statutory Tax Structure

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

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

6.0 TERMS OF PAYMENT

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

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

Bills/ invoices shall mention Supplier's GST Number. TPNODL will make 100% payment within 45 days of submission of the Bill/Invoice complete in all respects and along with all the requisite documents mentioned above, subject to condition that Associate has furnished the requisite Security-cum-Performance Guarantee as stipulated in the contract.

6.1 Quantity Variation

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

6.2 Full and Final Payment

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

7.0 MODE OF PAYMENT

Payment shall be made RTGS / NEFT whichever of the two modes chosen by the Associate, in favour of Associate's Bank Account on TPNODL records, on whose name Contract has been issued. Those Associates opting for the RTGS mode shall submit the details of Bank Account and other details as per annexure G. Further, for any payments made, TPNODL is

not responsible for any consequences/disputes Associate have among the owners channel partners, sub-Associates and all such dispute/concerns shall be settled solely by the Associate.

8.0 SECURITY CUM PERFORMANCE DEPOSIT

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

- 5% of the RC value as per prevailing Govt. Orders however same can be change or enhanced in case of any change in Govt. direction. BA is supposed to pay the difference of PBG amount as and when demanded by TPNODL.

  This shall remain valid till the Guarantee period plus one month.

- For PO/RC values less than Rs. 5 lacs, Associate may request for deduction of amount equivalent to SPBG value from their first invoice. Such amount shall be withheld by TPNODL while processing the invoice and shall be released after completion of Guarantee Period plus one month.

- For PO/RC values less than Rs. 3 lacs, the clause (8.0) for Security cum Performance Bank Guarantee (SPBG) shall not be applicable.

- In case of RC (Rate Contract) after the expiry of RC validity, Associate shall have to submit SPBG. However, the Associate has the option to re-submit the SPBG as per actual RO

  (Release Order) value issued against the RC, valid for Guarantee Period plus one month.

  The Guarantee Period shall be considered as per the last RO issued against the said RC. The original SPBG as submitted against the RC shall be released on submission of the new SPBG to TPNODL. Alternatively, Associate may extend the validity of original SPBG only till the requisite period, i.e. Guarantee Period plus one month.

9.0 STATUTORY COMPLIANCE

9.1 Compliance to Various Acts

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

9.2 SA 8000

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

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

9.3 Affirmative Action

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

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

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

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

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

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

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

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

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

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

9.4 ISO 14001

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

10.0 QUALITY

10.1 Knowledge of Requirements

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

10.2 Material/Equipment/Works Quality

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

10.3 Adherence to Rules & Regulations

The Associate shall procure and/or fabricate/erect all materials and equipment in accordance with all requirements of Central and State enactment, rules and regulations governing such work in India and at site. This shall not be construed as relieving the

Associate from complying with any requirement of TPNODL as enumerated in the Contract which may be more rigid than and not contrary to the above mentioned rules, nor providing such construction as may be required by the above mentioned rules and regulations. In case of variance of the Technical Specification from the laws, ordinance, rules and regulations governing the work, the Associate shall immediately notify the same to the TPNODL. It is the sole responsibility of the Associate, however, to determine that such variance exists. Wherever required by rules and regulations, the Associate shall also obtain the statutory authorities' approval for the plant, machinery and equipment to be supplied by the Associate.

10.4 Specifications and Standards

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

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

11.0 INSPECTION/PARTICIPATION

11.1 Right to Carry Out Inspection

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

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

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

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

11.2 Facilitating Inspection

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

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

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

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

11.3 Third Party Nomination

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

11.4 Waiver of Inspections

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

11.5 Incorrect Inspection Call

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

12.0 MDCC & DELIVERY OF MATERIALS

12.1 Material Dispatch Clearance Certificate

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

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

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

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

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

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

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

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

Timelines for inspection and MDCC is as below:

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

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

12.2 Right to Rejection on Receipt

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

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

12.3 Consignee

Unless otherwise specified in the Contract Document, Materials/Goods/Equipment shall be consigned to "**SDO (Elect.), Central Store, TPNODL, Sovarampur, Balasore, Odisha-756001**"

12.4 Submission of mandatory documents on Delivery

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

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

12.5 Dispatch and Delivery Instructions

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

13.0 GUARANTEE

13.1 Guarantee of Performance

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

13.2 Guarantee Period

The Guarantee Period will be equipment/service/work specific and shall be as specified in the Standard Specifications of TPNODL for the equipment/material/service/work and where standard specifications are not part of contract documents or guarantee period is not specified in the standard specifications, the guarantee period shall be as per the Special Terms and Conditions of the Contract. In case of no mention of the guarantee period in standard specifications or SCC Guarantee Period will be 48 Months from the Date of Commissioning or 60 months from the date of delivery of final lot of supplies made, whichever is earlier.

13.3 Failure in Guarantee Period (GP)

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

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

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

13.4 Cost of repairs on failure in GP

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

13.5 Guarantee period for Goods Outsourced

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

13.6 Latent Defect

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

13.7 Support beyond the Guarantee Period

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

14.0 LIQUIDATED DAMAGES

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

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

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

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

14.1 LD Waiver Request

Any request of LD waiver shall be submitted within thirty (30) days of deducting LD. Request submitted beyond the timeline shall not be entertained. The TPNODL management will review on the LD Waiver Request on the facts and will decide about the LD Waiver which may be part or the % of the LD imposed, however the TPNODL's management decision will be full and final.

15.0 UNLAWFUL ACTIVITIES

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

16.0 CONFIDENTIALITY

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

16.1 Documents

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

16.2 Geographical Data

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

16.3 Associate's Processes

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

16.4 Exclusions

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

- Which at the time of disclosure are in the public domain which later on become part of public domain through no fault of the party concerned, or
- Which were in the possession of the party concerned prior to disclosure to him by the other party, or

- Which were received by the party concerned after the time of disclosure without restriction on disclosure or use, from a third party who did not acquire such information directly or indirectly from the other party or has no obligation of confidentiality for such information.

16.5 Violation

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

17.0 INTELLECTUAL PROPERTY RIGHTS

If, in the course of performance of its functions and duties as envisaged by the scope of the present GCC, the Associate acquires or develops, any unique knowledge or information which would be covered, or, is likely to be covered within the definition of a trademark, copyright, patent, business secret, geographical indication or any other form of intellectual property right, it shall be obliged, under the terms of this present GCC, to share such knowledge or information with the TPNODL. All rights, with respect to, or arising from such intellectual property, as afore mentioned, shall solely vest in TPNODL.
Moreover, the Associate undertakes not to breach any intellectual property right vesting in a third party/parties, whether by breach of statutory provision, passing off, or otherwise. In the event of any such breach, the Associate shall be wholly liable to compensate, indemnify or make good any loss suffered by such third party/parties, or any compensation/damages arising from any legal proceeding/s, or otherwise. No liability of TPNODL shall arise in this respect, and any costs, damages, expenses, compensation payable by TPNODL in this regard to a third party/parties, arising from a legal proceeding/s or otherwise, shall be recoverable from the Associate.

18.0 INDEMNITY

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

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

such other further instruments and to comply with all the requirements of such laws and regulation as may be necessary there under to conform and effectuate the Contract and to protect the TPNODL.

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

19.0 LIABILITY & LIMITATIONS

19.1 Liability

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

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

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

19.2 Limitation of Liability

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

20.0 FORCE MAJEURE

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

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

- Act of war (whether declared or undeclared), invasion, armed conflict or act of foreign enemy, embargo, blockade, revolution, riot, bombs, religious strife or civil commotion or terrorism, etc.

- Action or Act of Government or Governmental agency for which remedy is beyond the control of the affected parties. Any act of God.

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

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

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

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

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

21.0 SUSPENSION OF CONTRACT

21.1 Suspension for Connivance

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

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

- Immediately discontinue further supply of material/goods specified in the suspension notice for supply contracts
- Immediately discontinue further service/work and supply of materials of those services/materials/work specified in the suspension notice for service /composite contract
- Promptly make every reasonable effort to obtain suspension, upon terms satisfactory to TPNODL, of all orders, outsourcing arrangements, and rental Contracts to the extent that they relate to performance of the portion of Work suspended by the notice.

- Protect and maintain the portion of the service/Work already completed, including the portion of the Work suspended hereunder, unless otherwise specifically stated in the notice.
- Continue delivering/carrying out the supply/service/work items as per contract conditions, which do not fall under purview of the suspension notice.

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

21.2 Suspension for Breach of Contract conditions.

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

21.3 Compensation in lieu of Suspension

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

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

22 TERMINATION OF CONTRACT

22.1 Termination for Default/Breach of Contract

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

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

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

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

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

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

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

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

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

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

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

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

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

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

b) Associate shall ensure that no further steps are being taken towards discharge of the obligations, terms and conditions as contained in the contract/PO. This shall include initiation of actions not limited to discontinuation of other allied and associated

arrangements which the associate might have entered into with third parties for due discharge of its obligations under the contract with TPNODL.

c) The Associate shall perform thereafter such tasks as may be necessary to preserve and protect the terminated portion of the material/service/work in progress and the materials and equipment at TPNODL sites or in transit thereto. However the associate shall continue to fulfill its contractual obligations with regard to the part of contract not terminated.

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

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

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

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

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

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

In the event of such termination, TPNODL may finish the Work by whatever method it may deem expedient, including the hiring of services and /or purchase of material equipment from such third parties as TPNODL may deem fit or may itself provide any labor or materials and perform any part of the Work. The associate undertakes to bear the incremental costs if any paid by TPNODL in such a case attributable to failure on the part of the associate. The Associate in such a case shall not be entitled to receive any further payments and any sums found payable to it may be adjusted by TPNODL against the amount recoverable from him on this ground. The same shall be without prejudice to other rights available to TPNODL under law against the associate.

Upon the termination of any of the contract due to occurrence of any circumstances provided in clauses stated above and constituting repeated breach or misconduct , TPNODL shall be entitled to bar the associates its agents , affiliates from undertaking any negotiation / tendering, bidding , participation activities concerning TPNODL for a period of two years from date of such termination. The same shall be without prejudice to other rights available to TPNODL.

22.2 Termination for Convenience of Associate

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

22.3 Termination for Convenience of TPNODL

TPNODL at its sole discretion may terminate the contract by giving 30 days prior notice in writing or through email to the Associate. TPNODL shall pay the Associate for all the supplies/ services rendered till the actual date of contract termination against submission of invoice by the Associate to that effect.

23.0 DISPUTE RESOLUTION & ARBITRATION

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

23.1 Governing Laws and Jurisdiction

The parties shall be subject to the jurisdiction of the courts of law in Balasore & the writ jurisdiction of Hon'ble High Court of Odisha at Cuttack and any matter arising here from shall be subject to applicable law in force in India.

24.0 ATTRIBUTES OF GCC

24.1 Cancellation

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

24.2 Severability

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

24.3 Order of Priority

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

25.0 ERRORS AND OMISSIONS

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

26.0 TRANSFER OF TITLES

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

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

27.0 INSURANCE

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

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

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

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

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

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

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

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

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

28.0 SUGGESTIONS & FEEDBACK

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

You may send your feedback by filling up our Business Associate Feedback Form enclosed herewith as *Annexure-I.* You can also provide your feedback to E-Mail at sunil.bhattar@tpnodl.com

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

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

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29.0 CONTACT POINTS

In case Business Associate needs information with respect to payments or has any grievances, same may be E-Mail to Chandan.bhatnagar@tpnodl.com

30.0 LIST OF ANNEXURES

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

ANNEXURE-A

PROFORMA FOR BID SECURITY BANK GUARANTEE

TP Northern Odisha Distribution Limited

Balasore

HEREAS, (Name of the Bidder) ……. (hereinafter called "the BIDDER") has submitted his bid dated …… for the (Name of Contract) …… (hereinafter called "the BID").

KNOW ALL men by these presents we (Name of the Bank) …….. of (Name of the Country) …… having our registered office at …… (hereinafter called "the BANK) are bound unto TP Northern Odisha Distribution Limited (TPNODL) in the sum of …….. for which payment well and truly to be made to the TPNODL the Bank binds himself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this ……. day of ……. 20 ……..

The CONDITIONS of this obligation are**:**

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

Or

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

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

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

DATE …… **SIGNATURE OF THE BANK** ……..

WITNESS …… **SEAL** ……..

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

ANNEXURE- B

PROFORMA FOR PERFORMANCE BANK GUARANTEE (CP cum EP)

(On Rs.100/- Stamp Paper)

Note:

(a) Format shall be followed in Toto

(b) Claim period of one month must be kept up

(c) The guarantee to be accompanied by the covering letter from the bank confirming the signature to the guarantee

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TP Northern Odisha Distribution Limited

Balasore **CP cum EP BG No……..**

Order/Contract No……dated……

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

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

6. We also agree that you shall be entitled at your option to enforce this guarantee against our bank as a principal debtor, in the first instance, notwithstanding any other security or guarantee that you may have in relation to "the Vendor's" liabilities in respect of the premises
7. This guarantee shall not be affected by any change in the constitution of our Bank or "the Vendor" or for any other reason whatsoever.
8. Any claim / extension under the guarantee can be lodge-able at outstation banks or at Balasore branch and claim will also be payable at Balasore Branch (to be confirmed by Balasore Branch by a letter to that effect in case BG is from the branch outside Balasore)
9. Notwithstanding anything herein contained, our liability under this guarantee is limited to Rs._____ (Rupees_____ only and the guarantee will remain in force up to and including _____(Date) and shall be extended from time to time for such period or period as may be desired by "the Vendor".
10. Unless a demand or claim under this guarantee is received by us in writing within one months from_____ (expiry date) i.e. on or before _____ (claim period end date), we shall be discharged from all liabilities under this guarantee thereafter.

Dated at_____ this_____ day of _____ 200__

Witness

Bank's rubber stamp

1. _____ Banks full address

Designation of Signatory

2. _____ Bank official number

ANNEXURE-C

PROFORMA FOR "NO DEMAND CERTIFICATE" BY ASSOCIATE

(On Company's Letter head or with Company Seal)

(To be submitted by the Associate to TPNODL Accounts Department at the time of receipt of full and final payment)

(Certificate No. CCP/002)

Name of the Project

Order/ Contract No.

Dated

Name of the Associate

Scheme No. / Job No.

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

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

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

Dated **Signature**

Place **Name**

Designation

(Company Seal)

ANNEXURE-D

PROFORMA FOR APPLICATION FOR ISSUANCE OF CONSOLIDATED TDS CERTIFICATE

To be printed on the letterhead

To,

TP Northern Odisha Distribution Limited,

Balasore

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

Dear Sir,

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

For and on behalf of

Signature

Name

Address

Contact No. (Land Line)

(Mobile)

PAN #

Assessing authority

ATTACH THE COPY OF PAN CARD

ANNEXURE-E

BUSINESS ASSOCIATE FEEDBACK FORM

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

You are associated with us as

OEMs		Service Contractor		Material Contractor		Material & Manpower Supplier	

You are associated with us for

Less than 1 Year		More than 1 Year but less than 18 Monthss		More than 18 Monthss	

Your office is located at

Balasore		Within 200 Kms from Balasore		More than 200 Kms from Balasore	

Your nearly turnover with TPNODL

Less than 25 Lacs		25 Lacs to 1 Crore		More than 1 Crore	

Additional information

Your Name	
Your Designation	
Your Organization	
Contact Nos.	
Email	

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

SECTION - A

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

S. No.	Parameters	1 Do Not Agree	2 Slightly in Agreement	3 In Fair Agreement	4 Mostly in Agreement	5 Fully Agree	Remarks/ Suggestion
1	You receive all relevant queries / tenders from us in timely manner.						
2	We provide you enough lead time to respond to our queries / tenders.						
3	We provide you adequate support (drawings, documents, clarifications, briefing etc.) to enable you meet our requirements.						
4	All following elements of our contract / purchase order are rational:						
4.1	Scope of Work						
4.2	Delivery / Execution Schedule						
4.3	Payment Terms						
4.4	Liquidated Damages						
4.5	Performance Guarantee						
5	Our purchase orders / contracts are simple, specific & easy to understand						
6	TPNODL demonstrate willingness to be flexible in administration of Contract / Purchase Order						
7	We provide timely responses / clarifications to your queries						
8	TPNODL representative you interact / coordinate with is adequately empowered to support you in meeting contractual obligations						
9	TPNODL provide you all necessary infrastructure						

S. No.	Parameters	1 Do Not Agree	2 Slightly in Agreement	3 In Fair Agreement	4 Mostly in Agreement	5 Fully Agree	Remarks/ Suggestion
	support for timely and quality completion of work (including AMC)						
10	TPNODL Engineer-in-Charge timely certifies the jobs executed/ material supplied						
11	TPNODL Engineer-in-Charge efficiently supervises the job execution for timely completion of job						
12	Are you satisfied with the overall payment release mechanism of TPNODL						
13	Our approach for Inspection and Quality Assurance effective to expedite project completion?						
14	TPNODL never defaults on contractual terms						
15	In TPNODL Contracts closure is done within set time limit						
16	Our material receiving procedures are well defined and efficiently deployed to reduce mutual inconvenience						
17	Bank Guarantees are released in time bound manner						
18	Our processes related to payment / account settlement are effective.						
19	You get payments on time						
20	TPNODL Employees follow Ethical behavior						

SECTION - B

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

SN	Parameters	1	2	3	4	5	Remarks/ Suggestion
1	How do you rate courtesy/ empathy/ attitude level and warmth of TPNODL employees you interact with from following team?						
1.1	Project Engineering						
1.2	Circle / Division						
1.3	Projects/HOG (TS &P)						
1.4	Inspection & Quality Assurance						
1.5	Stores						
1.6	Metering & Billing						
1.7	Accounts / Finance						
1.8	Administration						
1.9	IT & Automation						
2	How would you rate TPNODL in comparison to your other clients in terms of **fairness of treatment and transparency** with its Business Associates?						
3	How would you rate TPNODL in comparison to your other clients in terms of **processes and systems to manage partnership** with its Business Associates						
4	How would you rate TPNODL in comparison to your other clients in terms of **building long term & mutually relationship** with its Business Associates						

SECTION – C

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

S. No.	Parameters	Certainly NO	Probably NO	Probably YES	Certainly YES	Remarks/ Suggestion
1	Based on your experience with TPNODL, would you like to continue your relationship with TPNODL?					
2	If someone asks you about TPNODL, would you talk "positively" about TPNODL?					
3	Would you refer TPNODL name to others in your community, fraternity and society as a professional & dynamic organization?					

SECTION - D

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

1	2	3	4	5	6	7	8	9	10

SECTION – E

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

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

Please spare your thoughts for TPNODL's improvement in particular areas of major concerns for you. We also welcome your suggestions to adopt any best practices, altitudes that you have observed / experienced elsewhere in Indian/ International organization.

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

We thank you for your time and courtesy!!

ANNEXURE - F

ACCEPTANCE FORM FOR PARTICIPATION IN REVERSE AUCTION EVENT

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

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

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

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

Signature & Seal of the Bidder

ANNEXURE - G

To,

Drawing & Disbursing Officer

TP Northern Odisha Distribution Limited
Balasore

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

Dear Sir,

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

Vendor Code	:	
Title of Account in the Bank	:	
Account Type	:	(Please mention here whether account is Savings/Current/Cash Credit)
Bank Account Number	:	
Name & Address of Bank	:	
Bank Contact Person's Names	:	
Bank Tele Numbers with STD Code	:	
Bank Branch MICR Code	:	(Please enclose a Xerox a copy of a cheque. This cheque should not be a payable at par cheque)
Bank Branch IFSC Code	:	(You can obtain this from branch where you have your account)
Email Address of accounts person (to send payment information)	:	

Name of the Authorized Signatory :

Contact Person's Name :

Official Correspondence Address :

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

Thanking you,

For _____

(Authorised Signatory)

(Signature with Rubber Stamp)

Certification from Bank:

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

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

(Manager's/ Officers Signature under Bank Stamp)

ANNEXURE-H

VENDOR APPRAISAL FORM

TO BE SUBMITTED BY VENDOR (To be filled as applicable)			
Part A			
1.0	**DETAILS OF THE FIRM**		
	1.1	NAME (IN CAPITAL LETTERS)	
	1.2	TYPE OF CONCERN (PROPRIETORY) PARTNERSHIP PVT.LTD., PUBLIC LTD. ETC.	
	1.3	YEAR OF ESTABLISHMENT	
	1.4	LOCATION OF OFFICE POSTAL ADRESS	
	1.5	CONTACT DETAIL OF BA's REPRESENTATIVE NAME E-MAIL ID CELL NO.	
	1.6	LOCATION OF MANUFACTURING UNITS	:
		i) UNITS 1	:
		ii) OTHER UNITS	:
2.0	**PRODUCTS / SERVICES BEING OFFERED**		:
3.0	**TURNOVER DURING THE LAST 18 MonthsS (TO BE VERIFIED WITH THE LATEST PROFIT & LOSS STATEMENT).**		:
4.0	**AVALABILITY OF STATUTORY DOCUMENTS I.E. COPY OF PAN CARD**		:
5.0	AVALABILITY OF STATUTORY DOCUMENTS I.E. COPY OF **GST REGISTRATION**		÷
6.0	**BA BELONGS TO AA COMMUNITY (SC/ST)**		÷
7.0	**DOCUMENTS VERIFYING ADDRESS PROOF (SUPPORTED BY ANY GOVT. ISSUED DOCUMENT)**		÷
8.0	**TECHNICAL**		
	8.1	NO.OF DESIGN ENGINEERS (INDICATE NO.OF YEARS EXPERIENCE IN RELATED FIELDS)	:
	8.2	NO.OF DRAUGHTSMEN	:
	8.3	COLLABORATION DETAILS (IF ANY)	:
		8.3.1 DATE OF COLLABORATION	:

		8.3.2 NAME OF COLLABORATOR	:
		8.3.3 RBI APPROVAL DETAILS	:
		8.3.4 EXPERIENCE LIST OF COLLABORATOR	:
		8.3.5 DURATION OF AGREEMENT	:
	8.4	AVAILABILITY OF STANDAR0DS / DESIGN PROCEDURES / COLLA-BORATOR'S / DOCUMENTS (CHECK WHETHER THESE ARE LATEST/CURRENT	:
	8.5	TECHNICAL SUPPORT, BACK-UP GUARANTEE, SUPERVISION, QUALITY CONTROL BY COLLABORATOR (WHEREVER ESSENTIAL). (THIS CLAUSE IS RELEVANT WHEN VENDOR'S EXPERIENCE IS INADEQUATE)	:
	8.6	QUALITY OF DRAWINGS	:
9.0	**MANUFACTURE**		
	9.1	SHOP SPACE, LAYOUT LIGHTING, VENTILATION, ETC.	:
	9.2	POWER (KVA)	:
		MAINS INSTALLED	:
		UTILISED	:
		STANDBY POWER SOURCE	:
	9.3	MANUFACTURING FACILITIES (ATTACH LIST OF EQUIPMENTS AS APPLICABLE)	:
		10.3.1 MATERIAL HANDLING	:
		10.3.2 MACHINING	:
		10.3.3 FABRICATION	:
		10.3.4 HEAT TREATMENT	:
		10.3.5 BALANCING FACILITY	:
		10.3.6 SURFACE TREATMENT PRIOR TO PAINTING/ COATING, POLISHING, PICKLING, PASSIVATION, PAINTING, ETC.	:
	9.4	SUPERVISORY STAFF	:
	9.5	ADEQUACY OF SKILLED LABOURS (MACHINISTS, WELDERS, ETC.)	:
	9.6	NO. OF SHIFTS	:
	9.7	TYPE OF MATERIAL HANDLED (SUCH AS CS, SS, ETC.)	
	9.8	WORKMANSHIP	:
	9.9	MATERIAL IN STOCK AND VALUE	:
	9.10	TRANSPORT FACILITIES	:
	9.11	CARE IN HANDLING	:
10.0	**INSPECTION / QC / QA / TESTING**		

	10.1	NUMBER OF PERSONNEL (INDICATE NO.OF YEARS OF EXPERIENCE)	:
	10.2	INDEPENDENCE FROM PRODUCTION	:
	10.3	AVAILABILITY OF PROCEDURAL WRITE UP/QUALITY PLAN	:
	10.4	INCOMING MATERIAL CONTROL AND DOCUMENTATION	:
	10.5	RELIABILITY/REPUTATION OF SUPPLY SOURCES	:
	10.6	STAGE INSPECTION AND DOCUMENTATION	:
	10.7	SUB-ASSEMBLY & DOCUMENTATION	:
	10.8	FINAL INSPECTION AND DOCUMENTATION	:
	10.9	PREPARATION OF FINAL DOCUMENTATION PACKAGE	:
	10.10	TYPE TEST FACILITIES	:
	10.11	ACCEPTANCE TEST FACILITIES	:
	10.12	CALIBRATION OF INSTRUMENTS AND GAUGES (WITH TRACEABILITY TO NATIONAL STANDARDS) (ATTACH LIST)	:
	10.13	STATUTORY APPROVALS LIKE BIS, IBR, ETC.(AS APPLICABLE)	:
	10.14	SUB-VENDOR APPROVAL SYSTEM AND QUALITY CONTROL	:
	10.15	DETAILS OF TESTS CARRIED OUT AT INDEPENDENT RECOGNISED LABORATORIES	:
		i) FURNISH LIST OF TESTS CARRIED OUT AND THE NAME OF THE LABORATORY WHERE THE TESTS WERE CONDUCTED	:
		ii) CHECK AVAILABILITY OF CERTIFICATES AND REVIEW THESE WHEREVER POSSIBLE	:
11.0	**EXPERIENCE (INCLUDING CONSTRUCTION / ERECTION / COMMISSIONING) TO BE FURNISHED IN THE FORMAT INDICATED IN APPENDIX)**		:
12.0	**SALES, SERVICE AND SITE ORGANISATIONAL DETAILS**		:
13.0	**CERTIFICATE FROM CUSTOMERS (ATTACH COPIES OF DOCUMENTS)**		:
14.0	**POWER SITUATION**		:
15.0	**LABOUR SITUATION**		:
16.0	**APPLICABILITY OF SC/ST RELAXATION (Y/N) IF YES, SUPPORTING DOCUMENTS TO BE ATTACHED**		
Part C Supporting Documents			

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

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

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

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

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

ANNEXURE-I

MANUFACTURER AUTHORIZATION FORM

(To be submitted on OEM's Letter Head)

Date: …….

Tender Enquiry No.: ……..

To,
H.O.D (Contracts)
TP Northern Odisha Distribution Ltd,
Balasore, Odisha

Sir,

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

…… and to subsequently negotiate and sign the Contract.

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

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

Yours Sincerely,

For ……..

Authorized Signatory

Annexure-J

TATA CODE OF CONDUCT (TCoC)

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

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

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

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

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

In case any Ethical Concern is faced during the course of your business dealings with TPNODL, one may e mail at: ceooffice@tpnodl.com

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

Core Values:

All six core values are already mentioned in GCC.

Core Principles:

1. **Zero tolerance to bribery or corruption** in any form.
2. Committed to **good corporate citizenship**
3. Contribute to the **economic development of the communities** of the countries & regions we operate in.
4. No compromise on **Safety**
5. Our conduct shall be **fair & transparent**

6. Respect the **human rights & dignity** of our stakeholders
7. **No unfair discrimination** of any kind
8. Statements made to stakeholders shall be **truthful** & made in **good faith**
9. Not engage in any restrictive or **unfair trade practice**
10. Provide avenues for our stakeholders to **raise concerns in good faith**
11. Environment **free from fear** of retribution to deal with concerns that are raised
12. Expect the leaders to be **role model**
13. **Comply with the laws** of the countries in which we operate

Gift Policy:

Principles for acceptance of gifts/benefits –

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

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

Principles for non-acceptance of gifts/benefits -

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

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

Violation –

1. Not abiding with this policy would constitute violation of "Our Employees" Stakeholder group Clause "Gifts and Hospitality" of the Tata Code of Conduct (TCoC) 2015. Prompt action will be taken against violations.
2. Any deviation from this policy must be supported by appropriate rationale and must be duly approved by CEO who is also the Principal Ethics Officer. In any case, in dealing with such deviations, the spirit of the TCoC should in no case be compromised.
3. If it is determined that an employee / associate has violated this policy, appropriate action including termination of the employee's / associate's employment or association with TPNODL may be decided upon.

Annexure VIII

Inspection Test Plan

NA

ANNEXURE IX
TATA CODE OF CONDUCT

The Owner abides by the Tata Code of Conduct in all its dealing with stake holders and the same shall be binding on the Owner and the Contractor for dealings under this Order/ Contract. A copy of the Tata Code of Conduct is available a tour website:

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

The Contractor is requested to bring any concerns regarding this to the notice of our Chief-Contracts & Material Management e-mail sunil.bhattar@tpnodl.com.

ANNEXURE X

ENVIRONMENT & SUSTAINABILITY POLICY

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

(Praveer Sinha)
CEO & Managing Director

Date: 15th June, 2018

TATA POWER
Lighting up Lives!

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!

CONTENTS :-

19.0 SCHEDULE OF DEVIATIONS

1.0	**Scope**	The scope of this specification covers the technical requirements of design, manufacture, testing at manufacturer's works, packing, forwarding, supply and unloading of Panels as mentioned in the specification, at site/stores complete with all accessories including supply, installation, testing and commissioning of efficient and trouble-free control and relay panel. The specific requirements are covered in the enclosed technical data sheet.
2.0	**Applicable Standards**	The equipment covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with latest revisions of relevant Indian/IEC/other applicable standards shall confirm to the regulations of local statutory authorities.
2.1	IS 9000	Basic Environmental testing procedure for electrical and electronic items
2.2	IS 694-1990	PVC insulated cables for working voltage up to and including 1100V
2.3	IS 2629-1985	Recommended practice for Hot Dip Galvanizing of iron & Steel.
2.4	IS 2633-1986	Test for uniformity of Zinc Coating
2.5	IEC 60529	Degrees of Protection provided by enclosures (IP Code)

2.6	IEC 62052-11	Electricity metering equipment (a.c.) – General requirements, tests & test conditions
2.7	IEC 62053-22	Static meter for active energy (Class 0.2S and 0.5S)
2.8	IEC 61850	Communication networks and systems in substations (all parts including IEC 61850-8-1, IEC 61850-9-2)
2.9	IEC 61869-9	Digital Interface for Instrument Transformers
2.10	IEC 61869-13	Stand-alone Merging Units

2.11	IEC 61588/IEEE 1588v2	Precision clock synchronization protocol for networked measurement and control systems
2.12	IEC 62351	Power systems management and associated information exchange - Data and communications security

3.0	**Climatic Conditions of the Installations**	The service conditions shall be as follows: 1. Maximum altitude above sea level 1,000m 2. Maximum ambient air temperature 50°C 3. Maximum daily average ambient air temperature 35°C 4. Minimum ambient air temperature 0°C 5. Maximum relative humidity 95% 6. Average number of thunderstorm days per annum (isokeraunic level) 70 7. Average number of rainy days per annum 120 8. Average annual rainfall 150cm 9. Earthquakes of an intensity in horizontal direction - equivalent to seismic acceleration of 0.3g 10. Earthquakes of an intensity in vertical direction - equivalent to seismic acceleration of 0.15g (g being acceleration due to gravity) 11 .Wind velocity: 300 km/hr, 200 km/hr and 160 km/hr. environmentally, some of the regions, where the work will take place includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas. Therefore, Outdoor material and equipment shall be designed and protected for use in
		exposed, heavily polluted, salty, corrosive and humid coastal atmosphere
4.0	**General Technical Requirements**	

4.1	**General Requirements from the Business Associates**	• The supplier should have at least 10 years of experience in design and supply of control and protection systems for electricity transmission and distribution applications. • The manufacturer, whose protection system is offered, should have designed, manufactured, tested, installed and commissioned such a system for electricity transmission and distribution for at least two years. • The manufacturer needs to submit the proof of completing such tasks with other utilities/concerns as its experience certificate. • The Business Associate can offer an innovative and advanced system. The offer is subjected to an approval from TPNODL after a thorough discussion between the BA and TPNODL. In case, an approval is not awarded to the BA's offered innovative system, TPNODL's existing/desired infrastructure prevails and the BA shall provide the system accordingly. • The BA should optimize on the cost of software products offered to TPNODL considering already available licenses with TPNODL. The BA should clearly indicate licensing policy for the software tools offered. • The BA should provide necessary training to the personnel recommended by TPNODL to maintain the system and troubleshooting reports
4.2	**General System Design**	Protection and Control IEDs respond to the signals of currents and voltages measured at certain points of the power system, and assess the state of the protected power system component. The System shall be suitable for operation and monitoring of the complete substation including future extensions and shall works on IEC 61850.

		Conventionally, analog values are injected directly into the IED through instrument transformers. IEDs combine analog-to-digital conversion of the signals with their analysis (digital filtering) and decision-making algorithms.
4.3	**Fibre Optic Cable**	Between Control Room and Switchyard/Switchgear Room: 4 Core, 62.5/125µm Multi-mode, Loose tube, Jelly filled, Armoured Fiber Optic Cable Within Control Room: 2 Core, 62.5/125µm Multi-mode Fiber Optic Patch Chord
4.4	**CAT – VI**	4 Pairs, 23 AWG Solid Bare Copper Conductor, PE Insulation, Unshielded Twisted Pair (UTP) with separator and PVC Outer Jacket It should be designed to the ANSI/TIA-568-C.2 | ISO / IEC 11801 Category 6 requirements and transmit data at 1000 Mbps (~1 Gigabit per second) with a frequency of 250 MHz and suitable for 10BASE-T, 100BASE-TX Fast Ethernet and 1000BASE-T / 1000BASE-TX (Gigabit Ethernet).
5.0	**General Construction of CRP**	Switchgear panel construction is governed by individual specification in minimum. For 33KV/ 11KV control and relay panel following features to be ensured.
5.1	**Simplex Panel**	Simplex panel with dust proof design shall consist of a vertical front panel with equipment mounted thereon and having wiring access from rear for control panels & either front or rear for relay panels. In case of panel having width equal to or more than 800mm, double leaf-doors shall be provided. Doors shall have handles with either built-in locking facility or will be provided with pad- lock.

5.2	**Constructional Features**	Control and Relay Board shall be of panels of simplex type design as indicated in bill of quantity. It is the responsibility of the BA to ensure that the equipment specified and such unspecified complementary equipment

		required for completeness of the protective/control schemes is properly accommodated in the panels without congestion and if necessary, provide panels with larger dimensions. No price increase at a later date on this account shall be allowed. However, the width of panels that are being offered to be placed in existing switchyard control rooms, should be in conformity with the space availability in the control room. Panels shall be completely metal enclosed and shall he dust, moisture and vermin proof. The enclosure shall provide a degree of protection not less than IP-54 in accordance with IS: 2147. Panels shall be free standing, floor mounting type and shall comprise structural frames completely enclosed with specially selected smooth finished, cold rolled sheet steel of thickness not less than 3 mm for weight bearing members of the panels such as base frame, front sheet and door frames, and 2.0mm for sides, door, top and bottom portions. There shall be sufficient reinforcement to provide level transportation and installation. All doors, removable covers and panels shall be gasketed all around with synthetic rubber gaskets Neoprene/EPDM generally conforming to provision of IS 11149. However, XLPE gaskets can also be used for fixing protective glass doors. Ventilating louvers, if provided shall have screens and filters. The screens shall be made of either brass or GI wire mesh. Design, materials selection and workmanship shall be such as to result in neat appearance, inside and outside with no welds, rivets or bolt head apparent from outside, with all exterior surfaces tune and smooth. Panels shall have dual exhaust fan at its rear end for dissipation of heat. Panels shall have base frame with smooth bearing surface, which shall he fixed on the embedded foundation channels/insert plates. Anti-vibration strips made of shock absorbing materials that shall be supplied by the contractor, shall be placed between panel & base frame. Cable entries to the panels shall be from the bottom. Cable gland plate fitted on the bottom of the panel shall he connected to earthing of the panel/station through a flexible braided copper conductor rigidly.

		Relay panels of modern modular construction would also be acceptable.
5.3	**Mounting**	All equipment on and in panels shall be mounted and completely wired to the terminal blocks ready for-external connections. The equipment on front of panel shall he mounted flush. Equipment .shall be mounted such that removal and replacement can be accomplished individually without interruption of service to adjacent devices and are readily accessible without use of special tools. Terminal marking-on the equipment shall be clearly visible. The BA shall carry out cut out, mounting and wiring of the free issue items supplied by others which are to be mounted in his panel in accordance with the corresponding equipment manufacturer drawings. Cut outs if any, provided for future mounting of equipment shall be properly blanked off with blanking plate. The centre lines of switches, push buttons and indicating lamps shall be not less than 750mm from the bottom of the panel. The centre lines of relays, meters and recorders shall be not less than 450mm from the bottom of the panel. The centre lines of switches, push buttons and indicating lamps shall be matched to give a neat and uniform appearance. Likewise the top lines of all meters, relays and recorders etc. shall be matched. No equipment shall be mounted on the doors. At existing station, panels shall be matched with other panels in the control room in respect of dimensions, colour, appearance and arrangement of equipment (centre lines of switches, push buttons and other equipment) on the front of the panel.

5.4	**Panel Internal Wiring**	Panels shall be supplied complete with interconnecting wiring provided between all electrical devices mounted and wired in the panels and between the devices and terminal blocks for the devices to be connected to

		equipment outside the panels. When panels are arranged to be located adjacent to each other all inter panel wiring and connections between the panels shall be furnished and the wiring shall be carried out internally, this is in the BA's scope. All wiring shall be carried out with 1100V grade, single core, stranded copper conductor wires with PVC insulation. The minimum size of the multi-stranded copper conductor used for internal wiring shall be as follows: Internal wiring to be connected to external equipment shall terminate on terminal blocks. The terminal blocks for CTs VTs shall be provided with test links and isolating facilities. The CT terminal blocks shall be provided with short circuiting and earthing facilities. Shall have 20% terminals as spare terminals in each panel. All equipment mounted on front of the panels shall have individual name-plates with equipment designation engraved. Each panel shall also have circuit/feeder designation name plate. All wiring shall be with 660/1100 V grade, single core, PVC insulated stranded copper conductor. Wires shall be vermin proof. Minimum size of conductor shall be 2.5 sq. mm in general, but for CT & VT circuits it shall be 4 sq.mm. CT VT wiring will be colored as per standard sign color configuration including neutral and neutral CT wiring. Rest wiring will be in grey color and earthing will be done by green colored control cable. Contractor shall be solely responsible for completeness and correctness of all the wiring, and for proper functioning of the connected equipment.

		Specification for Auxiliary relays/ MCB's

Initiator		HoG (Plant Engineering)	

		• Fuse Failure relay and trip Circuit Supervision relay shall be suitably selected, considering burden and auxiliary voltage. External circuitry like compensating resistances will not be accepted. • Auxiliary contact multiplier relays should be of reputed make and selected on the basis of continuous current carrying capacity and rated voltage. The fluctuation in voltage level must be accounted for (+/-) 10% continuously. • DC MCB's should not be substituted by AC MCB's for DC Distribution, irrespective of manufacturer's individual multi usage Recommendations. • DC Fail Supervision relay (80) shall be provided on all control and IED panels. • Suitable contactor arrangement to be made in 33 KV line incomer panel/ 11 KV incomer panel so that in case of station DC failure the power pack driven by PT circuit powers up the relay and tripping circuits and keeps protection in service. Spare I/Os wiring shall be brought upto terminal block for future use. All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Wiring gutters & troughs shall be used for this purpose. Auxiliary bus wiring for AC and DC supplies, voltage transformer circuits, annunciation circuits and other common services shall be provided near the top of the panels running throughout the entire length of the panels. Wire termination shall be made with solder less crimping type and tinned copper lugs, which firmly grip the conductor. Insulated sleeves shall be provided at all the wire terminations. Engraved core identification plastic

		ferrules marked to correspond with panel wiring diagram shall be fitted at both ends of each wire. Ferrules shall fit tightly on the wire and shall not fall

		off when the wire is disconnected from terminal blocks. All wires directly connected to trip circuit breaker or device shall be distinguished by the addition of red colored unlettered ferrule. Longitudinal troughs extending throughout the run length of the panel shall he preferred for inter panel wiring. Inter-connections to adjacent panel shall be brought out to a separate set of terminal blocks located near the slots of holes meant for taking the inter-connecting wires. BA shall be solely responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment.

5.5	**Terminal Blocks**	All internal wiring to be connected to external equipment shall terminate on terminal blocks. Terminal blocks shall be 11.00 V grade and have 10 Amps. Continuous rating, moulded piece, complete with insulated barriers, stud type terminals, washers, nuts and lock nuts. Markings on the terminal blocks shall correspond to wire number and terminal numbers on the wiring diagrams. All terminal blocks shall have shrouding with transparent unbreakable material. Disconnecting type terminal blocks for AC/DC, current transformer and voltage transformer secondary leads shall be provided. Also current transformer secondary leads shall be provided with short circuiting and earthing facilities. At least 20% spare terminals shall be provided on each panel and these spare terminals shall be uniformly distributed on all terminal blocks. Unless otherwise specified, terminal blocks shall be suitable for connecting the following conductors of external cable on each side • All CT &PT circuits: minimum of two of 4 sq. mm copper. • AC/DC Power Supply Circuits: One of 6 sq. mm Copper. • All other circuits: minimum of one of 2.5 sq. mm Copper.

		There shall be a minimum clearance of 250 mm between the first row of terminal blocks and the associated cable gland plate or panel side wall. Also the clearance between two rows of terminal blocks edges shall be minimum of 150mm. Arrangement of the terminal block assemblies and the wiring channel within the enclosure shall be such that a row of terminal blocks is run in parallel and close proximity along each side of the wiring-duct to provide for convenient attachment of internal panel wiring. The side of the terminal block opposite the wiring duct shall he reserved for the Owner's external cable connections. All adjacent terminal blocks shall also share this field wiring corridor. All wiring shall be provided with adequate support inside the panels to hold them firmly and to enable free and flexible termination without causing strain on terminals. The number and sizes of the TPNODL's multi core incoming external cables will be furnished to the BA after placement of the order. All necessary cable terminating accessories such as gland plates, supporting clamps & brackets, wiring troughs and gutters etc. (except glands & lugs) for external cables shall be included the scope of supply.

5.6	**Painting**	All sheet steel work shall be phosphate in accordance with the IS: 6005 "Code of practice for phosphate iron and steel". It should follow the seven tank process. Oil, grease, dirt and swarf shall be thoroughly removed by emulsion cleaning. Rust and scale shall he removed by pickling with dilute acid followed by washing with running water rinsing with a slightly alkaline hot water and drying. After phosphating, thorough rinsing shall be carried out with clean water followed by final rinsing with dilute dichromate solution and oven drying. The phosphate coating shall be sealed with application of two coats of ready mixed, stoved type zinc chromate primer. The first coat may be "flash dried" while the second coat shall be stoved. Thereafter an established painting procedure like electrostatic painting followed for
		powder coating the panel. The colour shade shall be Siemens grey RAL 7032.

5.7	**Miscellaneous Accessories**	**Plug Point**: 240V, Single phase 50Hz, AC socket with switch suitable to accept 5 Amps and 15 Amps pin round standard Iridian plug, shall be provided in the interior of each cubicle with ON-OFF switch. **Interior Lighting:** Each panel shall be provided with an LED: lighting fixture rated for 240 Volts, single phase, 50 Hz supply for the interior illumination of the panel controlled by the respective panel door switch. **Switches and Fuses:** Each panel shall be provided with necessary arrangements for receiving, distributing and isolating of DC and AC supplies for various control, signaling, lighting and space heater circuits. The incoming and sub-circuits shall be separately provided with miniature circuit breakers (MCB). Selection of the main and sub-circuit MCB rating shall be such as to ensure selective clearance of sub-circuit faults. MCBs shall confirm to IS: 13947. Each MCB shall be provided with one potential free contact and the same shall be wired for annunciation purpose. However voltage transformer circuits for relaying and metering shall be protected by fuses. All fuses shall he HRC cartridge type conforming to IS: 13703 mounted on plug-in type fuse bases.. Fuse carrier base as well as MCBs shall have imprints of the fuse 'rating' and 'voltage'. **Space Heater**: Each panel shall be provided with a space heater rated for 240V, single phase, 50 Hz Ac supply for the internal heating of the panel to prevent condensation of moisture. The fittings shall be complete with switch unit.
5.8	**Earthing**	All panels shall be equipped with an earth bus securely fixed. Location of earth bus shall ensure no radiation interference for earth systems under various switching conditions of isolators and breakers. The material and the sizes of the bus bar shall be at least 25 X 6 sq. mm perforated copper with threaded holes at a gap of 50mm with a provision of bolts and nuts for

		connection with cable armors and mounted equipment etc for effective earthing. When several panels are Mounted adjoining each other, the earth bus shall be made continuous and necessary connectors and clamps for this purpose shall be included in the scope of supply of the Contractor. Provision shall he made for extending the earth bus bars to future adjoining panels on either side. Provision shall be made on each bus bar of the end panels for connecting Substation earthing grid. Necessary terminal clamps and connectors for this purpose shall be included in the scope of supply of BA. All metallic cases of relays, instruments and other panel mounted equipment including gland plate, shall be connected to the earth bus by copper wires of size not less than 2.5 sq. mm. The colour code of earthing wires shall he green. Looping of earth connections, which would result in loss of earth connection to other devices when the loop is broken, shall not be permitted. However, looping of earth connections between equipment to provide alternative paths to earth bus shall he provided. VT and CT secondary neutral or common lead shall be earthed at one place only at the terminal blocks where they enter the panel. Such earthing shall be made through links so that earthing may be removed from one group without disturbing continuity of earthing system for other groups.

5.9	**Switches**	Control and instrument switches shall be rotary operated type with escutcheon plates clearly marked to show operating position and circuit designation plates and suitable for flush mounting with only switch front plate and operating handle projecting out. The selection of operating handles for the different types of switches shall be as follows: □ Breaker, Isolator: Pistol grip, black control switches

- Selector switches: Oval or knob, black
- Instrument switches: Round, knurled, black

The control switch of breaker and isolator shall be of spring return to neutral type. The switch shall have spring return from close and trip positions to "after close" and "after trip" positions respectively.

Instrument selection switches shall be of maintained contact (stay put) type. Ammeter selection switches shall have make-before-break type contacts so as to prevent open circuiting of CT secondary when changing the position of the switch. Voltmeter transfer switches for AC shall be suitable for reading all line- to-line and line-to-neutral voltages for non-effectively earthed systems and for reading all line to line voltages for effectively earthed systems.

Lockable type of switches which can be locked In particular positions shall be provided when specified. The key locks shall be fitted on the operating handles.

The contacts of all switches shall preferably open .and close with snap action to minimize arcing. Contacts of switches shall he spring assisted and contact faces shall be with rivets of pure silver or silver alloy. Springs shall not be used as current carrying parts

The contact combination and their operation shall be such as to give completeness to the interlock and function of the scheme.

The contact rating of the switches shall be as follows:

Description (Contact rating in Amps)	24VDC	50VDC	240VAC
Make and Carry	10	10	10
Continuously Make and Carry for 0.5 sec	30	30	30

		Break for resistive load	20	20	7	

		Inductive Load with L/R = 40ms	0.2

5.10	**Indicating Lamps**	Indicating lamps shall he of cluster LED type suitable for panel mounting with rear terminal connections. Lamps shall be provided with series connected resistors preferably built in the lamp assembly. Lamps shall have translucent lamp covers to diffuse lights colored red, green, amber, dear white or blue as specified The lamp cover shall be preferably of screwed type, unbreakable and moulded from heat resisting material. The lamps shall be provided with suitable resistors. Lamps and lenses shall be interchangeable and easily replaceable from the front of the panel. Tools, if required for replacing the bulbs and lenses shall also be included in the scope of the supply. The indicating lamps with resistors shall withstand 120% of rated voltage on a continuous basis. Red – Breaker ON Green – Breaker OFF White – Spring Charged Amber – 86 operated Blue – Breaker in test Blue – Breaker in service Dear white – TCS1 fail Dear white – TCS2 fail
5.11	**Dust Proof Environment**	All the panels in the control room and switchgear room have to be in a dust proof environment. Civil works have to be taken care in the same directions.

5.12	**Energy Meters**	The Energy Measurements should be preferably done as per 3 wattmeter method. It shall use Potential Transformer and the Metering Core of the respective Current Transformers. The desired Metering class accuracy of 0.2s is expected for metering functions. • Supply and Integration of Energy Meters with Software for centralized meter data reading shall be in supplier's scope. Supplied Software shall have independent for meter make or OEM to retrieving the meter data. • Laying of Communication Cable along with conduit shall be in supplier's scope • Supply and Installation of RJ11 Splitters shall be in supplier's scope • Supply, Installation and Configuration of TCP/IP to Serial Converter shall be in supplier's scope if required. • Software configuration for integration of energy meters (at centralized meter data acquisition system) shall be in supplier's scope. Supplier shall have ensured the data communication. The basic metering functions should be additionally supported by following:

S. No.	Description	Requirement
01	Type of the Meter	3 Phase 4 Wire, CT/PT Operated Static Meters
02	Accuracy Class of the Meter	Active Energy – Will be informed at detailed engineering stage Reactive Energy – 2 or better

		03	Basic Current (Ib) & rated Max. Current (Imax)	When Ib=1A; Imax=2A When Ib=5A; Imax=10A
		04	Rated Secondary Current (I_b)	1A or 5A for 66/33kV (balanced and unbalanced load), 5A for 11kV (balanced and unbalanced load)
		05	Reference conditions for testing the performance of the meter	V_{ref} = 110V ± 1% Freq = 50Hz ± 0.3% Temperature = 27°C ± 2°C
		06	Operating Voltage	110V (P-P), Meter shall be operational with required accuracy from 0.6 V_{ref} to 1.2Vref
		07	Operating Frequency	50Hz ± 5%
		08	Power Consumption	Voltage Circuit: Max. 1.5W and 10VA, Current Circuit: Max. 1VA
		09	Starting Current	0.1% of I_b
		10	Short time over current	The meter shall be able to carry for 0.5s a current equal to 20 times the max. current
		11	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 45oC

		12	Rated Impulse withstand voltage	6kV (Shall be applied ten times with one polarity & then repeated with the other polarity and minimum time between each impulse to be 3s)

Initiator		HoG (Plant Engineering)	

		13	AC withstand voltage for 1 min	4kV
		14	Insulation resistance between	Frame & current, voltage circuits connected together: 5MΩ Each current circuit (and voltage circuit) & each and every other: 50MΩ
		15	Mechanical Requirements	Meter shall be in compliance with clause 12.3 of IS 14697
		16	Resistance to Heat and Fire	The terminal block, terminal cover and Meter case shall ensure safety against spread of fire. They should not be ignited by thermal overload of live parts in contact with them as per clause 6.8 of IS 14697. Fire retardant material shall be used.
		17	Protection against penetration of dust and water	Degree of Protection: IP 51, but without suction in the meter
		18	Resistance against Climatic influence	Meter shall be in compliance with clause 12.6 of IS 14697
		19	Electromagnetic Compatibility (EMC)	Meter shall be in compliance with clause 12.8 of IS 14697
		20	Accuracy requirements	Meter shall be in compliance with clause 11.0 of IS 14697
		21	Power Factor Range	Zero lag to Zero lead

			22	Energy Measurement	Fundamental energy +Energy due to Harmonics. Energy meters shall preferably record. Total Harmonics distortion (THD) in voltage and current for at least 30 days
			23	Connection Diagram	The connection diagram for the system shall be provided on terminal cover
			24	Self-Diagnostic Feature	Self-diagnostic for calendar, RTU, Battery, all display segments and NVM.
			25	Initial startup of meter	Meter shall be fully functional within 5s after reference voltage is applied to the meter terminals
			26	Internal diameter of the terminal holes and Depth	5.5mm (min), 25mm
				of terminal hole	
			27	Clearance between adjacent Terminals	10mm (min)
			28	Display	Backlit LCD, Scrolling, 10s for each parameter

			29	History requirements	The meter shall be capable of recording the last two months data for following parameters, at the end of every month at 24:00 hrs: • Active demand (MW), import • Apparent demand (MVA), import • Reactive energy (MVArh) lag, import • Reactive energy (MVArh) lead, import • Active energy (MWh), import Apparent energy (MVAh), import • Active demand (MW), export • Apparent demand (MVA), export • Reactive energy (MVA) lag, export • Reactive energy (MVArh) lead, export • Active energy (MWh), export • Apparent Energy (MVAh), export
			30	Security feature	Programmable facility to restrict the access to the information recorded at

				different security level such as read communication, write communication, etc.
		31	Software and Communication compatibility	The BCS and CMRI Software shall be supplied by the bidder for free of cost. Training for the use of the software shall also be provided by the bidder
		32	Calibration	Meters shall be software calibrated at factory and modifications in calibration shall not be possible at site by any means.
		Aux. Supply of Serial to TCP/IP Converter should be on Station DC Supply and usage of power converters are not allowed. There should be PT selection scheme in line panel for selection of BUS-PT and Line PT for metering purpose. In transformer panel PT selection scheme in the transformer panel is also required based on bus isolation selection.		

6.0	**Name Plate & Marking**	All equipment mounted on front and rear side as well as equipment mounted inside the panels shall be provided with individual name plates with equipment designation engraved. Also on the top of each panel on front as well as rear side, large and bold nameplates shall be provided for circuit/feeder designation. All front mounted equipment shall also be provided at the rear with individual name plates engraved with tag numbers corresponding to the one shown in the panel internal wiring to facilitate easy tracing of the wiring. Each IED and meter shall be prominently marked. All relays- and other devices shall be clearly marked with manufacturer's name, manufacturer's
		type, serial number and electrical rating data. Name Plates shall be made of anodized aluminium. Name plates shall be black with white engraving lettering. Each switch shall bear clear inscription identifying its function e.g. 'BREAKER"52A`, "SYNCHRONISING" etc. Similar inscription shall also be provided on each device whose function is not other-wise identified. If any switch device does not bear this inscription separate name plate giving its function shall be provided for it. Switch shall also have clear inscription for each position Indication e.g. "Trip- Neutral-Close", "ON-OFF", "R-Y-B-OFF" etc. All the panels shall be provided with name plate mounted inside the panel bearing PO No & Date, Name of the Substation & feeder and reference drawing number.

7.0	**Tests**	**Factory Acceptance Test:** The manufacturing phase of the C&R Panel shall be concluded by the factory acceptance test (FAT). The purpose is to ensure that the Contractor has interpreted the specified requirements correctly and that the FAT includes checking to the degree required by the user. The general philosophy shall be to deliver a system to site only after it has been thoroughly tested and its specified performance has been verified, as far as site conditions can be simulated in a test lab. If the FAT comprises only a certain portion of the system for practical reason. An integrated-FAT shall be conducted as per the TPNODL I-FAT Document (ENG-EHV-1006 Rev. 00 - Annexure-III). If the complete system consists of parts from various suppliers or some parts are already installed on site, in such case supplier will arrange the intra-communication between RTU/DC and such IEDs to meet the requirement. **Hardware Integration Tests** shall be performed on the specified systems to be used for Factory tests when the hardware has been installed in the

		factory. The operation of each item shall be verified as an integral part of system. Applicable hardware diagnostics shall be used to verify that each hardware component is completely operational and assembled into a configuration capable of supporting software integration and factory testing of the system. The equipment expansion capability shall also be verified during the hardware integration tests. **Integrated System Tests** shall verify the stability of the hardware and the software. During the tests all functions shall run concurrently, and all equipment shall operate a continuous 100 Hours period. The integrated system test shall ensure the IEDs is free of improper interactions between software and hardware while the system is operating as a whole.

8.0	**Type Test Certificates**	Test reports for following type tests shall be submitted for the Protection IED along with the Bid

8.1 Insulation Test

S. No.	Description	Standard
1	Dielectric Withstand Test	IEC 60255-5 ANSI/IEEE C37.90-1989 2kV rms for 1 minute between all case terminals connected together and the case earth. 2kV rms for 1 minute between all terminals of independent circuits with terminals on each independent circuit connected together.
2	High Voltage Impulse Test, class III	IEC 60255-5 5kV peak; 1.2/50 □sec; 0.5J; 3 positive and 3negative shots at intervals of 5s

8.2 Electrical Environment Tests

S. No.	Description	Standard
1	DC Supply Interruption	IEC 60255-11 The unit will withstand a 20ms interruption in the auxiliary supply, in its quiescent state, Without de-energizing.
2	AC Ripple on DC supply	IEC 60255-11 The unit will withstand a 12% ac ripple on the dc supply.
3	AC voltage dips and short Interruptions	IEC 61000-4-11 20ms interruptions/dips.

		4	High Frequenc y Disturbance	IEC 60255–22–1, class III At 1MHz, for 2s with 200 ohms source impedance: 2.5kV peak; 1 MHz; T = 15 sec; 400 shots/sec; duration 2 sec between independent circuits and independent circuits and case earth. 1.0kV peak across terminals of the same circuit.	
		5	Fast Transient Disturbance	IEC 60255-22-4, class IV 4kV, 2.5kHz applied directly to auxiliary supply 4kV, 2.5kHz applied to all inputs.	
		6	Surge Withstand Capability	IEEE/ANSI C37.90.1 (1989) 4kV fast transient and 2.5kV oscillatory applied directly across each output contact, optically isolated input and power supply circuit.	
		7	Radiated Immunity	C37.90.2: 1995 25MHz to 1000MHz, zero and 100% square wave modulated. Field strength of 35V/m.	
		8	Electrostatic Discharge	IEC 60255-22-2 Class 4 15kV discharge in air to user interface, display and exposed metal work. IEC 60255-22-2 Class 3 8kV discharge in air to all communication ports. 6kV point contact discharge to any part	
				of the front of the product.	

		9	Surge Immunity	IEC 61000-4-5: 1995 Level 4 4kV peak, 1.2/50ms between all groups and case earth. 2kV peak, 1.2/50ms between terminals of each group.
		10	Capacitor Discharge	No change of state or any operation shall ocany when a capacitor of capacitance shown bel charged to 1.5 Vn volts, is connected betw any combination of terminals and combina of terminals and ground. Master trip circuits - 10 F Other protection & control circuits - 2 F Carrier/channel interface - 0,2 F
8.3	**EMC Test**	**S. No.**	**Description**	**Standard**
		1	RadioFrequency Electromagnetic Field, Non-Modulated	IEC 60255–22–2, class III 10 V/m; 27 MHz to 500 MHz
		2	RadioFrequency Electromagnetic Field, Amplitude Modulated	ENV 50140, class III 10 V/m; 80 MHz to 1000 MHz; 80% AM; 1 kHz

		3	RadioFrequency Electromagnetic Field, Pulse Modulated	ENV 50140/ENV 50204 10 V/m; 900 MHz; repetition frequency 200 Hz; duty cycle 50 %
		4	Disturbances Induced by Radio Frequency fields, Amplitude Modulated	ENV 50141, class III 30 A/m continuous; 300 A/m for 3 sec; 50 Hz
		5	Power Frequency Magnetic Field	EN 61000-4-8, class IV 30 A/m continuous; 300 A/m for 3 sec; 50 Hz
		6	Interference Voltage, Aux. Voltage	EN 50081-* 150 kHz to 30 MHz
		7	Interference Field Strength	EN 50081-* 30 MHz to 1000 MHz

		S. No.	Description	Standard
8.4	**Atmospheric Environment Test**	1	Temperature	IEC 60255-6 Operating –25°C to +55°C Storage and transit –25°C to +70°C IEC 60068-2-1 for Cold IEC 60068-2-2 for Dry heat

		2	Humidity	IEC 60068-2-3 56 days at 93% RH and +40°C

8.5	**Mechanical Stress Test**	**S. No.**	**Description**	**Standard**
		1	Vibration (during Operation & Transportation)	IEC 255-21-1; IEC 68-2-6 Response Class 2 Endurance Class 2
		2	Shock (during Operation and Transportation)	IEC 255-21-2, class 1, IEC 68-2-27 Shock response Class 2 Shock withstand Class 1 Bump Class 1

		3	Seismic Vibration (during Operation)	IEC 60255-21-3 Class 2
		4	Continuous Shock (during Transportation)	IEC 255-21-2, class 1, IEC 68-2-27

9.0	**Pre-Dispatch Inspection**	Equipment shall be subject to inspection by a duly authorized representative of the Purchaser as detailed at Clause No.6.0. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the Purchaser. Following documents shall be sent along with material : a) Test reports b) MDCC issued by TPNODL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warranty card g) Delivery Challan h) Other Documents (as applicable)
10.0	**Inspection after receipt at Stores**	Equipment/material received at TPNODL store shall be inspected by Stores Department and shall be liable for rejection, if found different from PreDispatch Inspection Report. One copy of the Inspection Report shall be sent to the Plant Engineering and Protection & Testing Departments.
11.0	**Guarantee/ Warranty**	Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the contract for due and

	Details	intended performance of the same, as an integrated product delivered under this contract. In the event any defect is found by the Company up to a period of 60 months from the date of commissioning supplier shall be liable to undertake to replace/rectify such defects at his own costs within the mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of three years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company
12.0	**Packing**	Bidder shall ensure that all equipment covered by 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.
13.0	**Quality Control**	The bidder shall submit with the offer, quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and after finishing, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The purchaser's engineer or its nominated representative shall have free access to the manufacturer/sub-supplier's works to carry out inspections.
14.0	**Minimum Testing Facilities**	The Bidder shall have in house testing facilities for carrying outall routine tests and acceptance tests as per relevant international/Indian standards.

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

			S. No.	Guaranteed Technical Particular	Bidder Response
16.0	**Ethernet Switches**		1	19” Rack Mountable with Power Socket and Ports at rear side	
			2	Compliance to IEC 61850-3, IEEE 1613 Standards	
			3	Port Speed: 10Mbps/100Mbps for Station Bus and 1Gbps for Process Buss	
			4	Should have minimum of 12 Ports, number of switches minimum 2	
			5	LED indicators for link establishment and data transfer for each port	
			6	Should support remote user setting configuration.	
			7	Should own separate maintenance/console port	
			8	Should support SNMP Server v1.0/v2.0/v3.0	
			9	Auxiliary Power Supply: 48 VDC or 24VDC (depending upon the Station DC Voltage) with ±15% tolerance, Dual Power Supply	
			10	All the cards/modules of the Switch must have conformal coating for protection against harsh and polluted environment	

16.0 Spares, Accessories and Tools

Spares for Project job for New Grids / Bay Extension

Master Trip Relay (86) common for 66kV/33kV and 11kV	
No. of relays in Panels	No. of Spare relays
1-10	1
11-20	2
21-30	3
31-40	4

20% spare material required for every item like TNC switch and other switches, indicating lamps, terminal blocks and any other auxiliary relays, if used.

17.0	**Drawings and Documents**	Following drawings and documents shall be prepared on Purchaser's specifications and statutory requirements and shall be submitted with the bid: 1. Completely filled in Technical Particulars 2. General description of the equipment and all components including brochures 3. Bill of material 4. Type test certificates 5. Hardware Specification 6. Sizing Calculations of various component 7. Standard Drawings After the award of the contract four (4) copies of drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and 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.
18.0	**Guaranteed Technical Particulars**	Bidder shall submit separate sheet showing compliances on all other clauses of the specification

19.0 SCHEDULE OF DEVIATIONS

(TO BE ENCLOSED WITH THE BID)

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

STANDARAD TECHNICAL SPECIFICATION OF DIFFERENTIAL RELAY FOR TRANSFORMER

CONTENTS

1. SCOPE:

The scope of this document is to give design and constructional features, inspection, supply, loading, forwarding and unloading of Differential Relay for Transformer to be used in TPNODL, Odisha distribution network.

2. APPLICABLE STANDARDS:

Except when they conflict with the specific requirements of this specification, the Relays at various sub-units/components mounted on the panels shall conform to the latest revisions of the following standards:

Sr No	Standard	Description
1	IS 3231 / 1986 Reaffirmed 1997	Electrical relays for power system protection
2	IEC 60255 amended up to date	Numerical biased protection relay
3	IEC 61850	Communication Protocol

3. CLIMATIC CONDITIONS:

The service conditions shall be as follows:

[a] Maximum altitude above sea level	: 1000 m
[b] Maximum ambient temperature	: 50 ° C
[c] Maximum daily average ambient air temperature	: 40 ° C
[d] Minimum ambient air temperature	: -5° C
[e] Maximum temperature attainable by an object exposed to the sun	: 60 ° C
[f] Maximum yearly weighted average ambient temperature	: 32° C
[g] Maximum relative humidity	: 100%
[h] Average no. of rainy days in a year	: 120 days
[i] Average annual rainfall	: 150 cm
[j] Maximum wind pressure	: 260 Kg/Sq.m
[k] Average number of thunderstorm days per annum	: 70

Environmentally, the region where the equipment will be installed includes coastal areas, subject to

high relative humidity, which can give rise to condensation.

Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for Relays.

Therefore, material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive, tropical and humid coastal atmosphere.

4. SYSTEM CONDITION:

PARTICULARS	DESCRIPTION
Frequency	50 Hz (±3%)
Nominal System Voltage	33 KV / 11 KV
Maximum System Voltage	36Kv / 12 KV
Number of phases	Three
Neutral Earthing Arrangement	Solidly Grounded

5. GENERAL TECHNICAL REQUIREMENTS:

Display	Advanced UMI with graphical LCD screen
Aux. supply	24V-250V DC If the auxiliary supply drifts, 2 alarms may be triggered: • High set point alarm, adjustable from 105 % to 150 % of rated supply (maximum 275 V). • Low set point alarm, adjustable from 60 % to 95 % of rated supply (minimum 20 V).

Protections	• Phase over current • Earth fault / Sensitive earth fault • Breaker Failure • Negative sequence / unbalance • Thermal overload • Restricted Earth Fault • Differential Protection (for T-87 relay) • Over fluxing(V/Hz) • Under voltage(L-L or L-N) • Over voltage(L-L or L-N) • Over frequency • Under frequency
Tripping curve For Phase over current and Earth Fault	Tripping time delay Timer hold Definite time DT SIT, LTI, VIT, EIT, UIT (1) DT RI DT IEC: SIT/A, LTI/B, VIT/B, EIT/C DT or IDMT IEEE: MI (D), VI (E), EI (F) DT or IDMT
Metering	• Phase current I1, I2, I3 RMS Measured residual current I0, calculated I0Σ Demand current I1, I2, I3 Peak demand current IM1, IM2, IM3 • Voltage U21, U32, U13, V1, V2, V3 Residual voltage V0 • Frequency • Active power P, P1, P2, P3 Reactive power Q, Q1, Q2, Q3 Apparent power S, S1, S2, S3 Peak demand power PM, QM • Power factor

Network and machine diagnostics	• Tripping current Trip I1, Trip I2, Trip I3 Phase fault and earth fault trip counters • Unbalance ratio / negative sequence current • Harmonic distortion (THD), current and voltage Ithd, Uthd Phase displacement Disturbance recording Remaining operating time before overload tripping Waiting time after overload tripping Running hours counter / operating time • Differential current Idiff1, Idiff2, Idiff3 • Through current It1, It2, It3 • CT / VT supervision • Trip circuit supervision • Auxiliary power supply monitoring • Cumulative breaking current • Watchdog function (The protection functions are inhibited, the output relays are forced to drop out and the "Watchdog" Output indicates relay protection functions are not working).
Setting of Phase over Current	• Definite time Setting 0.001 to 24 In, Time delay 0.001 s to 300 s • IDMT Setting 0.001 to 2.4 In, Time Delay.0 to 12.5 sec
Setting of Earth fault / Sensitive earth fault	• Definite time Setting 0.01 to 15 In0 (min. 0.1 A) Time Delay 0.0 to 300 s • IDMT Setting 0.001 to 1 In0 (min. 0.1 A), Time Delay 0.0 to 12.5 sec
Setting of Breaker Failure	Presence of current - 0.01 to 2 In Operating time 0.0 s to 3 s
Setting of Negative sequence / unbalance	• Definite time setting - 0.1 to 5 Ib/10% to 500% Time Delay-0.0 to 300 s • IDMT Setting 0.1 to 1 Ib/ 10% to 100% Time Delay 0.0 to 1s

Setting of Thermal overload	• Time constant Heating T1: 1 to 600 min • Cooling T2: 5 to 600 min • Alarm and tripping set points • 0 to 300 % of rated thermal capacity • Maximum equipment temperature 60 to 200 °C (140 °F to 392 °F)
Setting of Restricted Earth Fault	0.005 to 0.8 In (In > 20 A) 0.01 to 0.8 In (In < 20 A)
Setting of Differential Protection (T-87)	• Restraint on energization Current threshold - 1 to 10 % Time Delay - 0 to 300 s • Choice of restraint - conventional & Self-adapting
Setting of Over fluxing(V/Hz)	• Set Point 1.03 to 2 pu • Definite time Setting -0.0 to 20000 s IDMT Setting - 0.0 to 1250 s
Setting of Under voltage (L-L or L-N)	Set point 5 to 100 % of Unp Time Delay - 0.05 to 300 s
Pre-Logic	User programmable facility to achieve customized functions, create logics with external information through DI/DO etc. TPNODL approved configuration shall be supplied as a pre-configuredrelay.
Configuration Method	Relay shall be configurable from HMI as well as software through Laptop.
Relay Hardware Requirement	1. Design ambient temperature for relay shall be 50 ° C and capable of installing at outdoor kiosk for Western Odisha Region climatical conditions. Relay electronic cards shall have conformal coating.
Monitoring on HMI	1. RMS Current, Voltage (Primary & Secondary) 2. Active Power 3. Reactive Power 2. Power frequency
Mounting	1. Relay should be flush mounted with preferably DRAW OUT type model with CT shorting facility of make before break type. OR

	2. Flush Mounted with fixed type connections shall also be Considered 3. All relay connections shall be fixed screw type terminals with adequate spacing on back side. 4. Galvanic isolation between field connection & relay hardware.
LED indications	7 programmable LEDs & 1 LED for healthy indication. Colour of LED 01- Power ON – Green colour 02- Pick up – Yellow colour 03 – L1 – Red colour 04 – L2– Red colour 05 – L3– Red colour 06 – E/F– Red colour 4. 07 – High set– Red colour
Push buttons	Reset push button for resetting the relay manually. Functional keys should be available for separate trip command.
Output contacts	The relay shall have 20 NO + 4 changeover potential free and heavy duty programmable contacts. Min 12 no's relay output contacts shall be provided for specific function outputs for alarm, trip & trip circuit supervision. All output contacts should be freely programmable. Power contact should be capable of braking trip coil current.
Contact rating	Continuous carry -5A, Make & carry for 0.2 sec-30A
Input contacts	The relay shall have 24 no's of binary input contacts with pickup value 80% of input voltage.
Self-diagnosis feature	Relay should have self-diagnosis for its healthiness of functioning & should show indication in case of its failure.

	The relay shall have continuous automatic self-monitoring and alarming facilities. The above feature shall not affect the relay availability i.e. when an actual fault occurs in the system during the checking cycle, the above cycle shall be immediately interrupted and the relay shall check and respond to the system fault. The system shall have the following visual indications for supervision of each command channel.
Password protection	The relay should have provision password protection for the applied settings
Selectivity of primary CT current	The relay should have facility to select the primary CT current from 50A to 2000A in steps of 50A. The relay should display the CT primary current.
Operational indicator	LED
IS reference	IEC 61850, IEC 60255, IS 3231 amended up to date
LCD Display	Relay shall have minimum 4 line LCD backlit display
Features	Minimum 4 setting groups
Disturbances recorder	The DR shall capture waveforms of analogue channels, and all the DI channels & the DO channels. It shall be possible to configure and capture in DR, all the internal functions like overcurrent start etc. for better analysis of the fault information. It shall have a minimum storage of 10 records of 1 sec each. It shall have facility to record information prior to fault incidence with a pre- trigger time setting of 25 % (programmable).
Communication protocol	Numerical relays shall have two data port for local access using Hand-held device / Notebook PC (with software). All the numerical relays shall have common software. Each relay shall have IEC 61850 port which can be used for SCADA applications and relay networking for downloading DR waveforms. The

	relay communication protocol used shall support time stamping and waveform file transfer. Details of Numerical relay communication ports are as follows. Front: Ethernet port Rear: IEC 61850 (for integration of relays with SCADA and accessing DR from remote through Tata Power automation WAN) SNTP protocol support (from SCADA system).
Special Requirement	One complete set of Relay configuration tool (Laptop, communication cable, Moxa, Manual) to be supplied for every 5 no's lot of Relays, and pre-configured relay software along with all device configuration software to be pre- installed. The successful Bidder all provide training for relay configuration with goose messaging at supplier's works/ users location - 4 persons 3 days minimum to Engineers before dispatch. Venue of the training all be Bidders works or TATA POWER - PODL Office and same all be finalized by TATA POWER - PODL at the time of project closure/completion of SAT. The training all cover Engineering configuration of the IED, IED setting calculations, uploading/downloading, secondary injection testing on computerized IED testing kit, checking of DC logic etc. No extra charges all be payable for training However, lodging/boarding/transportation of trainees all be borne by TATA POWER - PODL.

6. MARKING:

Each Relay shall be legibly and indelibly marked to show the following:

1. Name of the Purchaser : "TPNODL"
2. Name or trade mark of the manufacturer
3. Year of Manufacturing
4. Certificate mark

7. TESTS:

All routine, acceptance & type test shall be carried out in accordance with the relevant IS/IEC. All routine, acceptance & type test (if not valid) shall be witnessed by TPNODL authorized representative. All the components shall be type tested with the relevant standard.
The Relay shall comply with following routine, type and acceptance tests as per IS 3231 / 1986 Reaffirmed 1997 and IEC 61850.

A. Type tests: IEC 60255-6 as base

1. Functional Test (Under normal operating condition)
2. Impulse voltage test
3. High frequency test
4. Discharge of static electricity test
5. High energy surge voltages
6. Power system frequency test
7. Mechanical impact test
8. Power consumption in current circuit
9. Power consumption in auxiliary circuit
10. Dielectric test
11. Impulse voltage test
12. High frequency interference test
13. Radiated radio frequency electromagnetic field immunity test
14. Surge immunity test
15. Electrostatic discharge test
16. Fast transient disturbance test
17. Vibration response test
18. Shock response test
19. Cold test (storage & operating)
20. Dry heat test (Storage & Operating)
21. Degree of protection IP 54
22. Thermal (short time thermal withstand test)
23. Drop out , pick up , ratio test
24. DC supply interruption
25. AC ripples on DC supply
26. Voltage dips and short interruptions

B. Acceptance test:

1. Operating value test
2. Operating time test
3. Communication/ SCADA compatibility conformance Test

C. Routine tests:

1. Operating value test
2. Operating time test
3. Communication/ SCADA compatibility conformance Test

8. TESTING FACILITIES:

a. The Bidder must clearly indicate what testing facilities are available in the works of the manufacturer and whether the facilities, are adequate to carry out all the routine as well as type tests. These facilities should be made available to Purchaser's Engineers is deputed to carry out or witness the tests. If any tests cannot be carried out at the manufacturer's works, the reasons should be clearly stated in the tender.

Bidder shall send one sample relay for TPNODL approval after electrical test at TPNODL premises. During testing OEM engineer shall be present to resolve the query.

b. The Bidder shall furnish detailed type test reports of the offered Relay as per clause-7 of this specification. All the above Type Tests shall be carried out at laboratories (ERDA/CPRI).

9. DRAWINGS:

Following drawings and documents shall be prepared based on Purchaser's specifications and statutory requirements and shall be submitted with the bid:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	GA Drawing	√		√

3	Installation Instruction/Manual		√	√
4	QA & QC Plan	√	√	√
5	Test Certificates	√	√	√

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 within 08 days. Bidder shall be 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 softcopy and three (3) 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 if any.

10. TEST CERTIFICATES:

1. The test shall be carried out as per the IS before dispatch and the test certificates shall be furnished for approval.
2. Copies of type test certificates of identical materials for each type with dimensional drawings shall invariably accompany the tender.
3. The type test validity shall be in accordance with CEA guidelines, May-2020.

11. SAMPLES:

One number configured sample relay to be submitted to TPNODL at the time of bidding.

12. PACKING:

Each relay must be packed as per industry standard to maintain its healthiness.

13. PRE-DESPATCH INSPECTION:

Equipment shall be subject to inspection by a duly authorized representative of the Purchaser.

Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Bidder shall grant free access to the places of manufacture to Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the Purchaser.

Following documents shall be sent along with material

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

14. INSPECTION AFTER RECEIPT AT STORES:

The material received at Purchaser's store shall be inspected for acceptance and shall be liable for rejection.

15. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, bidder shall be liable to undertake to replace/rectify such defects at his own costs, within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company 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 supplier or from the " Security cum Performance Deposit" as the case may be

16. QUALITY CONTROL:

The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

17. GUARANTEED TECHNICAL PARTICULARS:

GTP FOR DIFFRENTIAL RELAY FOR TRANSFORMER DIFFERENTIAL PROTECTION RELAY

Sr. No.	Parameter	Details	Confirmation /Comments /Data to Furnished by Bidder (YES/NO)
1	Protections	Relay should have at least following protection functions:	
		• Phase over current	
		• Earth fault / Sensitive earth fault	
		• Breaker Failure	
		• Negative sequence / unbalance	
		• Thermal overload	
		• Restricted Earth Fault	
		• Differential Protection	
		• Over fluxing(V/Hz)	
		• Under voltage (L-L or L-N)	
		• Over voltage (L-L or L-N)	
		• Over frequency	
		• Under frequency	
		Differential:	
		Restraint on energization	
		Current threshold - 1 to 10 %	

2	Settings of protection functions	Time Delay - 0 to 300 s	
		Choice of restraint - Conventional & Self-adapting.	
		Over fluxing (V/Hz):	
		Set Point 1.03 to 2 pu	
		Definite time Setting -0.1 to 20000 s	
		IDMT Setting - 0.1 to 1250 s	
		Over Current:	
		Definite time Setting 0.05 to 24 In, Time delay 0.05 s to 300 s	
		IDMT Setting 0.05 to 2.4 In, Time Delay 0.1 to 12.5 sec	
		Earth Fault:	
		Definite time Setting 0.01 to 15 In0 (min. 0.1 A)	
		Time Delay 0.05 s to 300 s	
		IDMT Setting 0.01 to 1 In0 (min. 0.1 A), Time Delay 0.1 to 12.5 sec	
		Breaker Failure:	
		Presence of current - 0.2 to 2 In	
		Operating time 0.05 s to 3 s	
		Negative Sequence/Unbalance:	
		Definite time setting - 0.1 to 5 Ib/10% to 500% Time Delay-0.1 to 300 s	
		IDMT Setting 0.1 to 1 Ib/ 10% to 100% Time Delay 0.1 to 1s	
		Under Voltage:	
		Set point 5 to 100 % of Unp	
		Time Delay - 0.05 to 300 s	

Name & Signature of Bidder with seal

18. RECOMMENDED IED's MAKE/MODELS:

1	ABB	RET 620	Numerical	TRF Differential
2	Siemens	7UT62	Numerical	TRF Differential
3	GE	P643	Numerical	TRF Differential

19. SCHEDULE OF DEVITAIONS:

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.

SCHEDULE OF DEVIATIONS:

(TO BE ENCLOSED WITH TECHNICAL 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 **Name & Signature of Bidder with seal**

STANDARAD TECHNICAL SPECIFICATION

For

HV FEEDER DIRECTIONAL & NON-DIRECTIONAL OVER-CURRENT & EARTH FAULT PROTECTION RELAY

CONTENTS

1. SCOPE:

The scope of this document is to give design and constructional features, inspection, supply, loading, forwarding and unloading of HV FEEDER NON-DIRECTIONAL OVER-CURRENT & EARTH FAULT PROTECTION RELAY to be used in TPNODL, Odisha distribution network.

2. APPLICABLE STANDARDS:

Except when they conflict with the specific requirements of this specification, the Relays at various sub-units/components mounted on the panels shall conform to the latest revisions of the following standards:

Sr No	Standard	Description
1	IS 3231 / 1986 Reaffirmed 1997	Electrical relays for power system protection
2	IEC 60255 amended up to date	Numerical biased protection relay
3	IEC 61850	Communication Protocol

3. CLIMATIC CONDITIONS:

The service conditions shall be as follows:

[a] Maximum altitude above sea level	: 1000 m
[b] Maximum ambient temperature	: 50 ° C
[c] Maximum daily average ambient air temperature	: 40 ° C
[d] Minimum ambient air temperature	: -5° C
[e] Maximum temperature attainable by an object exposed to the sun	: 60 ° C
[f] Maximum yearly weighted average ambient temperature	: 32° C
[g] Maximum relative humidity	: 100%
[h] Average no. of rainy days in a year	: 120 days
[i] Average annual rainfall	: 150 cm
[j] Maximum wind pressure	: 260 Kg/Sq.m
[k] Average number of thunderstorm days per annum	: 70

Environmentally, the region where the equipment will be installed includes coastal areas, subject to high relative humidity, which can give rise to condensation.
Onshore winds will frequently be salt laden. On occasions, the combination of salt and condensation may create pollution conditions for Relays.
Therefore, material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive, tropical and humid coastal atmosphere.

4. SYSTEM CONDITION:

PARTICULARS	DESCRIPTION
Frequency	50 Hz (±3%)
Nominal System Voltage	33 KV / 11 KV
Maximum System Voltage	36Kv / 12 KV
Number of phases	Three
Neutral Earthing Arrangement	Solidly Grounded

5. GENERAL TECHNICAL REQUIREMENTS:

Particulars	Requirement
Elements	4 Stages O/C + E/F With Two Stages of High set for both O/C & E/F separately (Practically any PSM selection and any TMS selection with resolution of 0.001 lowest at 0.01) Both over voltage and under voltage protection each of minimum 3 stages Negative Phase Sequence protection with minimum 2 stages Breaker failure protection Broken conductor(I2/I1) with minimum 2 stages
CT Secondary input current to relay	Selection for 1 A / 5 A through software & shall be possible at site

Operating Characteristics selectable	1. IDMT IEC – 3 Sec. 2. IDMT - 1.3 sec. 3. IEC Very Inverse 4. IEC Normal Inverse 5. IEC Extremely Inverse 6. IEC Definite time 7. IEC User defined inverse 8. IEC Long time inverse
Auxiliary supply	24 V to 48 V DC +/- 10 % tolerance
IDMT O/C Plug setting	5 % to 200% in steps of 1%
IDMT E/F Plug setting	5 % to 200 % in steps of 1 %
High Set O/C setting	10 % to 2000 % in steps of 1 % (20 times)
High Set E/F setting	10 % to 2000 % in steps of 1 % (20 times)
Time multiplier setting for O/C & E/F for IDMT	0.0 to 1.0 in steps of 0.01
Time delay for High set O/C & E/F	0 sec to 10 sec in steps of 0.01 sec
Memory storage for fault information	Storing of latest 500 events with date & time stamping and storage of latest 10 fault records, fault amplitude , type of fault, faulty phase with FIFO feature (available on display & shall be retrievable through software in standard CFG format). Waveform Capturable from both relay start & relay trip shall be configurable.
Broken Conductor Protection	The relay shall be capable of Broken Conductor Protection. Setting range should be I2/I1 from 0.001 to 1.0
Negative Phase Sequence Protection.	The relay shall be capable of Negative Phase Sequence Protection.
Over-voltage & Under- voltage protection	Relay shall comprise of two stage of Over-voltage protection and two stage Under-voltage protection. Single phase to ground PT voltage shall be 63.5V
Pre-Logic	User programmable facility to achieve customized functions, create logics with external information through DI/DO etc. TPNODL approved configuration shall be supplied as a pre-configured relay.
Configuration Method	Relay shall be configurable from HMI as well as software through Laptop.

Relay Hardware Requirement	1. Design ambient temperature for relay shall be 50 ° C and capable of installing at outdoor kiosk for Western Odisha Region climatical conditions. 2. Relay electronic cards shall have conformal coating.
Monitoring on HMI	1. RMS Current, Voltage (Primary & Secondary) 2. Active Power 3. Reactive Power 4. Power frequency
Mounting	1. Relay should be flush mounted with preferably DRAW OUT type model with CT shorting facility of make before break type. OR 2. Flush Mounted with fixed type connections shall also be Considered 3. All relay connections shall be fixed screw type terminals with adequate spacing on back side. 4. Galvanic isolation between field connection & relay hardware.
LED indications	7 programmable LEDs & 1 LED for healthy indication. Colour of LED 01- Power ON – Green colour 02- Pick up – Yellow colour 03 – L1 – Red colour 04 – L2– Red colour 05 – L3– Red colour 06 – E/F– Red colour 07 – High set– Red colour
Push buttons	Reset push button for resetting the relay manually. Functional keys should be available for separate trip command.
Output contacts	The relay shall have 10 NO + 2 changeover potential free and heavy duty programmable contacts. Min 12 no's relay output contacts shall be provided for specific function outputs for alarm, trip & trip circuit supervision. All output contacts should be freely programmable. Power contact should be capable of braking trip coil current.
Contact rating	Continuous carry -5A, Make & carry for 0.2 sec-30A

Input contacts	The relay shall have 24 no's of binary input contacts with pickup value 80% of input voltage.
Self-diagnosis feature	Relay should have self-diagnosis for its healthiness of functioning & should show indication in case of its failure. The relay shall have continuous automatic self-monitoring and alarming facilities. The above feature shall not affect the relay availability i.e. when an actual fault occurs in the system during the checking cycle, the above cycle shall be immediately interrupted and the relay shall check and respond to the system fault. The system shall have the following visual indications for supervision of each command channel.
Password protection	The relay should have provision password protection for the applied settings
Selectivity of primary CT current	The relay should have facility to select the primary CT current from 50A to 2000A in steps of 50A. The relay should display the CT primary current.
Operational indicator	LED
IS reference	IEC 61850, IEC 60255, IS 3231 amended up to date
LCD Display	Relay shall have minimum 4 line LCD backlit display
Features	Minimum 2 setting groups
Disturbances recorder	The DR shall capture waveforms of analogue channels, and all the DI channels & the DO channels. It shall be possible to configure and capture in DR, all the internal functions like overcurrent start etc. for better analysis of the fault information. It shall have a minimum storage of 10 records of 1 sec each. It shall have facility to record information prior to fault incidence with a pre-trigger time setting of 25 % (programmable).
Communication protocol	Numerical relays shall have two data port for local access using Hand- held device / Notebook PC (with software). All the numerical relays shall have common software. Each relay shall have IEC 61850 port which can be used for SCADA applications and relay networking for downloading DR waveforms. The relay communication protocol used shall support time stamping and waveform file transfer. Details of Numerical relay communication ports are as follows. Front: Ethernet port

	Rear: IEC 61850 (for integration of relays with SCADA and accessing DR from remote through Tata Power automation WAN) SNTP protocol support (from SCADA system).
Special Requirement	One complete set of Relay configuration tool (Laptop, communication cable, Moxa, Manual etc.) to be supplied for every 5 no's lot of Relays, and pre-configured relay software along with all device configuration software to be pre- installed. The successful Bidder all provide training for relay configuration with goose messaging at supplier's works/ users location - 4 persons 3 days minimum to Engineers before dispatch. Venue of the training all be Bidders works or TATA POWER - PODL Office and same all be finalized by TATA POWER - PODL at the time of project closure/completion of SAT. The training all cover Engineering configuration of the IED, IED setting calculations, uploading/downloading, secondary injection testing on computerized IED testing kit, checking of DC logic etc. No extra charges all be payable for training However, lodging/boarding/transportation of trainees all be borne by TATA POWER - PODL.

6. MARKING:

Each Relay shall be legibly and indelibly marked to show the following:

1. Name of the Purchaser : "TPNODL"
2. Name or trade mark of the manufacturer
3. Year of Manufacturing
4. Certificate mark

7. TESTS:

All routine, acceptance & type test shall be carried out in accordance with the relevant IS/IEC. All routine, acceptance & type test (if not valid) shall be witnessed by TPNODL authorized

representative. All the components shall be type tested with the relevant standard.
The Relay shall comply with following routine, type and acceptance tests as per IS 3231 / 1986 Reaffirmed 1997 and IEC 61850.

A. Type tests: IEC 60255-6 as base

1. Functional Test (Under normal operating condition)
2. Impulse voltage test
3. High frequency test
4. Discharge of static electricity test
5. High energy surge voltages
6. Power system frequency test
7. Mechanical impact test
8. Power consumption in current circuit
9. Power consumption in auxiliary circuit
10. Dielectric test
11. Impulse voltage test
12. High frequency interference test
13. Radiated radio frequency electromagnetic field immunity test
14. Surge immunity test
15. Electrostatic discharge test
16. Fast transient disturbance test
17. Vibration response test
18. Shock response test
19. Cold test (storage & operating)
20. Dry heat test (Storage & Operating)
21. Degree of protection IP 54
22. Thermal (short time thermal withstand test)
23. Drop out , pick up , ratio test
24. DC supply interruption
25. AC ripples on DC supply
26. Voltage dips and short interruptions

B. Acceptance test:

1. Operating value test
2. Operating time test

3. Communication/ SCADA compatibility conformance Test

C. Routine tests:

1. Operating value test
2. Operating time test
3. Communication/ SCADA compatibility conformance Test

8. TESTING FACILITIES:

a. The Bidder must clearly indicate what testing facilities are available in the works of the manufacturer and whether the facilities, are adequate to carry out all the routine as well as type tests. These facilities should be made available to Purchaser's Engineers is deputed to carry out or witness the tests. If any tests cannot be carried out at the manufacturer's works, the reasons should be clearly stated in the tender.

Bidder shall send one sample relay for TPNODL approval after electrical test at TPNODL premises. During testing OEM engineer shall be present to resolve the query.

b. The Bidder shall furnish detailed type test reports of the offered Relay as per clause-7 of this specification. All the above Type Tests shall be carried out at laboratories (ERDA/CPRI).

9. DRAWINGS:

Following drawings and documents shall be prepared based on Purchaser's specifications and statutory requirements and shall be submitted with the bid:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	GA Drawing	√		√
3	Installation Instruction/Manual		√	√
4	QA & QC Plan	√	√	√
5	Test Certificates	√	√	√

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 within 08 days. Bidder shall be 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 softcopy and three (3) 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 if any.

10. TEST CERTIFICATES:

1. The test shall be carried out as per the IS before dispatch and the test certificates shall be furnished for approval.
2. Copies of type test certificates of identical materials for each type with dimensional drawings shall invariably accompany the tender.
3. The type test validity shall be in accordance with CEA guidelines, May-2020.

11. SAMPLES:

One number configured sample relay to be submitted to TPNODL at the time of bidding.

12. PACKING:

Each relay must be packed as per industry standard to maintain its healthiness.

13. PRE-DESPATCH INSPECTION:

Equipment shall be subject to inspection by a duly authorized representative of the Purchaser. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Bidder shall grant free access to the places of manufacture to Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser or its authorized representatives shall not relieve the

bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the Purchaser.

Following documents shall be sent along with material

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

14. INSPECTION AFTER RECEIPT AT STORES:

The material received at Purchaser's store shall be inspected for acceptance and shall be liable for rejection.

15. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, bidder shall be liable to undertake to replace/rectify such defects at his own costs, within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company 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 supplier or from the " Security cum Performance Deposit" as the case may be

16. QUALITY CONTROL:

The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

17. GUARANTEED TECHNICAL PARTICULARS:

GTP FOR HV FEEDER NON-DIRECTIONAL OVER-CURRENT & EARTH FAULT PROTECTION RELAY

Particulars	Requirement	Bidders Comment
Reference Standard	IS 3231 / 1986 Reaffirmed 1997, IEC 60255 amended up to date & IEC 61850	
Elements	3 O/C + 1 E/F + Two Stages of High set for both O/C & E/F separately + UV & OV	
CT Secondary input current to relay	Selection for 1 A / 5 A through software & shall be possible at site	
Operating Characteristics selectable	1. IDMT IEC – 3 Sec. 2. IDMT - 1.3 sec. 3. IEC Normal Inverse 4. IEC Very Inverse 5. IEC Extremely Inverse 6. IEC Definite time 7. IEC User defined inverse 8. IEC Long time inverse	
Auxiliary supply	24 V to 48 V DC +/- 10 % tolerance	
IDMT O/C Plug setting	5 % to 200% in steps of 1%	
IDMT E/F Plug setting	5 % to 200 % in steps of 1 %	

High Set O/C setting	10 % to 2000 % in steps of 1 % (20 times)	
High Set E/F setting	10 % to 2000 % in steps of 1 % (20 times)	
Time multiplier setting for O/C & E/F for IDMT	0.02 to 1.0 in steps of 0.01	
Time delay for High set O/C & E/F	0 sec to 10 sec in steps of 0.01 sec	
Memory storage for fault information	Storing of latest 500 events with date & time stamping and storage of latest 10 fault records, fault amplitude , type of fault, faulty phase with FIFO feature (available on display & shall be retrievable through software in standard CFG format). Waveform capturable from both relay start & relay trip shall be configurable.	
Broken Conductor Protection	The relay shall be capable of Broken Conductor Protection. Setting range should be I2/I1 from 0.5 to 1.0	
Negative Phase Sequence Protection.	The relay shall be capable of Negative Phase Sequence Protection.	
Over-voltage & Under-voltage protection	Relay shall comprise of two stage of Over-voltage protection and two stage Under-voltage protection. Single phase to ground PT voltage shall be 63.5V	
Pre-Logic	User programmable facility to achieve customized functions, create logics with external information through DI/DO etc. TPNODL approved configuration shall be supplied as a pre-configured relay.	
Configuration Method	Relay shall be configurable from HMI as well as software through Laptop.	
Relay Hardware Requirement	3. Design ambient temperature for relay shall be 50 ° C and capable of installing at outdoor kiosk for Western Odisha Region climatical conditions. 4. Relay electronic cards shall have conformal coating.	5.

Monitoring on HMI	5. RMS Current, Voltage (Primary & Secondary) 6. Active Power 7. Reactive Power 8. Power frequency	9.
Mounting	5. Relay should be flush mounted with preferably DRAW OUT type model with CT shorting facility of make before break type. OR 6. Flush Mounted with fixed type connections shall also be Considered 7. All relay connections shall be fixed screw type terminals with adequate spacing on back side. 8. Galvanic isolation between field connection & relay hardware.	9.
LED indications	7 programmable LEDs & 1 LED for healthy indication. Colour of LED 01- Power ON – Green colour 02- Pick up – Yellow colour 03 – L1 – Red colour 04 – L2– Red colour 05 – L3– Red colour 06 – E/F– Red colour 07 – High set– Red colour	
Push buttons	Reset push button for resetting the relay manually. Functional keys should be available for separate trip command.	
Output contacts	The relay shall have 6 NO + 2 changeover potential free and heavy duty programmable contacts. Min 8 no's relay output contacts shall be provided for specific function outputs for alarm, trip & trip circuit supervision. All output contacts should be freely programmable. Power contact should be capable of braking trip coil current.	
Contact rating	Continuous carry -5A, Make & carry for 0.2 sec-30A	

Input contacts	The relay shall have 8 no's of binary input contacts with pickup value 80% of input voltage.	
Self-diagnosis feature	Relay should have self-diagnosis for its healthiness of functioning & should show indication in case of its failure. The relay shall have continuous automatic self-monitoring and alarming facilities. The above feature shall not affect the relay availability i.e. when an actual fault occurs in the system during the checking cycle, the above cycle shall be immediately interrupted and the relay shall check and Respond to the system fault. The system shall have the following visual indications for supervision of each command channel.	
Password protection	The relay should have provision password protection for the applied settings	
Selectivity of primary CT current	The relay should have facility to select the primary CT current from 50A to 2000A in steps of 50A. The relay should display the CT primary current.	
Operational indicator	LED	
IS reference	IEC 61850, IEC 60255, IS 3231 amended up to date	
LCD Display	Relay shall have minimum 4 line LCD backlit display	
Features	Minimum 2 setting groups	
Disturbances recorder	The DR shall capture waveforms of analogue channels, and all the DI channels & the DO channels. It shall be possible to configure and capture in DR, all the internal functions like overcurrent start etc. for better analysis of the fault information. It shall have a minimum storage of 10 records of 1 sec each. It shall have facility to record information prior to fault incidence with a pre-trigger time setting of 25 % (programmable).	
Communication protocol	Numerical relays shall have two data port for local access using Hand-held device / Notebook PC (with software). All the numerical relays shall have common software. Each	

	relay shall have IEC 61850 port which can be used for SCADA applications and relay networking for downloading DR waveforms. The relay communication protocol used shall support time stamping and waveform file transfer. Details of Numerical relay communication ports are as follows. Front: Ethernet port Rear: IEC 61850 (for integration of relays with SCADA and accessing DR from remote through Tata Power automation WAN) SNTP protocol support (from SCADA system).	
Special Requirement	One complete set of Relay configuration tool (Laptop, communication cable, Moxa etc) to be supplied for every 30 no's lot of Relays, and pre-configured relay software along with all device configuration software to be pre-installed.	

Name & Signature of Bidder with seal

18. RECOMMENDED IED's MAKE/MODEL:

The relays to be procured should be with conformal coating cards suitable for ambient temperature of 50° C and humidity more than 80%. These relays shall be compatible with IEC61850 protocol for SCADA communication.

For GIS PSS, BCPU to be considered with soft control commands.

1	ABB	REF 620	Numerical	Feeder / TRF O/C Protection
2	Ashida	ADR 141A	Numerical	Feeder / TRF O/C Protection
3	Siemens	7SJ80 / 7SJ66	Numerical	Feeder / TRF O/C Protection
4	GE	P127	Numerical	Feeder / TRF O/C Protection

19. SCHEDULE OF DEVITAIONS:

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.

TPNODL	**TATA POWER NORTHERN ODISHA DISTRIBUTION LTD, BALASORE**	Page 19 of 19
DOCUMENT TITLE	**STANDARD TECHNICAL SPECIFICATION FOR HV FEEDER DIRECTIONAL & NON-DIRECTIONAL OVER-CURRENT & EARTH FAULT PROTECTION RELAY.**	EFFECTIVE DATE 08/07/2021
DOCUMENT NO.	TPNODL/ENGG/SPEC/010/2021	REVISION NO: R0

SCHEDULE OF DEVIATIONS:

(TO BE ENCLOSED WITH TECHNICAL 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

Name & Signature of Bidder with seal

Automation Specifications for 33kV/11kV Power System Network in New Grid Station based on IEC-61850 Protocol

STANDARAD TECHNICAL SPECIFICATION

For

MASTER TRIP RELAY

CONTENTS

3	CLIMATIC CONDITIONS
4	SYSTEM CONDITION
5	MARKING
6	INSPECTION AFTER RECEIPT AT STORES
7	GAURANTEE
9	DRAWINGS
10	QUALITY CONTROL
11	TEST
12	TESTING FACILTY
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14	TEST CERTIFICATE
15	SAMPLE
16	PACKING
17	PRE-DESPATCH INSPECTION
18	INSPECTION AFTER RECEIPT AT STORES
19	GAURANTEE
	QUALITY CONTROL
	RECOMMENDED MAKE/MODELS:

1. SCOPE:

The scope of this document is to give design and constructional features, inspection, supply, loading, forwarding and unloading of Numerical Relay & Master Trip Relay for CRP PANEL to be used in TPNODL, Odisha distribution network.

2. APPLICABLE STANDARDS:

Except when they conflict with the specific requirements of this specification, the Relays at various sub-units/components mounted on the panels shall conform to the latest revisions.

3. CLIMATIC CONDITIONS:

The service conditions shall be as follows:

[A] Maximum altitude above sea level : 1000 m
[b] Maximum ambient temperature : 50 ° C
[c] Maximum daily average ambient air temperature : 40 ° C
[d] Minimum ambient air temperature : -5° C
[e] Maximum temperature attainable by an object exposed to the sun : 60 ° C
[f] Maximum yearly weighted average ambient temperature : 32° C
[g] Maximum relative humidity : 100%
[h] Average no. of rainy days in a year : 120 days
[i] Average annual rainfall : 150 cm
[j] Maximum wind pressure : 260 Kg/Sq.m
[k] Average number of thunderstorm days per annum : 70

Environmentally, the region where the equipment will be installed includes coastal areas, subject to

4. SYSTEM CONDITION:

PARTICULARS	DESCRIPTION
Rated voltage	24/48 V (low burden and high burden)
Nominal System Voltage	33 KV / 11 KV
Maximum System Voltage	36Kv / 12 KV
TYPE	Self-Reset Relay
Earthing Arrangement	Solidly Grounded

5. MARKING:

Each Relay shall be legibly and indelibly marked to show the following:

1. Name of the Purchaser : “TPNODL”
2. Name or trade mark of the manufacturer
3. Year of Manufacturing
4. Certificate mark

6. INSPECTION AFTER RECEIPT AT STORES:

The material received at Purchaser’s store shall be inspected for acceptance and shall be liable for rejection.

7. GUARANTEE:

Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 48 months from the date of commissioning or 60 months from the date of last supplies made under the contract, whichever is earlier, bidder

shall be liable to undertake to replace/rectify such defects at his own costs, within mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company 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 supplier or from the " Security cum Performance Deposit" as the case may be

8. 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, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

8. TESTS:

All routine, acceptance & type test shall be carried out in accordance with the relevant IS/IEC. All routine, acceptance & type test (if not valid) shall be witnessed by TPNODL authorized representative. All the components shall be type tested with the relevant standard.

A. Acceptance test:

1. Operating value test
2. Operating time test

B. Routine tests:

1. Operating value test
2. Operating time test

9. TESTING FACILITIES:

a. The Bidder must clearly indicate what testing facilities are available in the works of the manufacturer and whether the facilities, are adequate to carry out all the routine as well as type tests. These facilities should be made available to Purchaser's Engineers is deputed to carry out or witness the tests. If any tests cannot be carried out at the manufacturer's works, the reasons should be clearly stated in the tender.
Bidder shall send one sample relay for TPNODL approval after electrical test at TPNODL premises. During testing OEM engineer shall be present to resolve the query.

b. The Bidder shall furnish detailed type test reports of the offered Relay as per clause-7 of this specification. All the above Type Tests shall be carried out at laboratories (ERDA/CPRI).

10. DRAWINGS:

Following drawings and documents shall be prepared based on Purchaser's specifications and statutory requirements and shall be submitted with the bid:

S. No.	Description	For Approval	For Review Information	Final Submission
1	Technical Parameters	√		√
2	GA Drawing	√		√
3	Installation Instruction/Manual		√	√
4	QA & QC Plan	√	√	√
5	Test Certificates	√	√	√

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 within 08 days. Bidder shall be 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 softcopy and three (3) 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 if any.

11. TEST CERTIFICATES:

1. The test shall be carried out as per the IS before dispatch and the test certificates shall be furnished for approval.
2. Copies of type test certificates of identical materials for each type with dimensional drawings shall invariably accompany the tender.
3. The type test validity shall be in accordance with CEA guidelines, May-2020.

12. SAMPLES:

One number configured sample relay to be submitted to TPNODL at the time of bidding.

13. PACKING:

Each relay must be packed as per industry standard to maintain its healthiness.

14. PRE-DESPATCH INSPECTION:

Equipment shall be subject to inspection by a duly authorized representative of the Purchaser. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material is liable to rejection. Bidder shall grant free access to the places of manufacture to Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser or its authorized representatives shall not relieve the bidder of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the Purchaser.

Following documents shall be sent along with material

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

15. INSPECTION AFTER RECEIPT AT STORES:

The material received at Purchaser's store shall be inspected for acceptance and shall be liable for rejection.

16. QUALITY CONTROL:

The bidder shall submit with the offer Quality Assurance Plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The Purchaser's engineer or its nominated representative shall have free access to the manufacturer's/sub-supplier's works to carry out inspections.

17. RECOMMENDED MAKE/MODELS:

The relays to be procured should be with conformal coating cards suitable for ambient temperature of 50° C and humidity more than 80%.

For GIS PSS, BCPU to be considered with soft control commands.

1	ABB	RXMS1 / RXMH2
2	Siemens	7PG15 TR relays /7PJ521/7PJ1524
3	GE	MVAJ 05/10/20

1. The scheme drawing has been provided by TPNODL but after complete the work drawing implementation has to be submitted to TPNODL.

2. Recommended company deployed teams for this project so that work can be completed at multiple locations simultaneously. Teams worked as per plan and directions of TPNODL based on shutdown availability.

3. Wring martial, TBs, blanking plates are provided by teams. Panel cutting, Master trip relay installation, wiring modification activities including dressing are completed during shutdown in presence of TPDDL representatives.

18. SCHEDULE OF DEVITAIONS:

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.

SCHEDULE OF DEVIATIONS:
(TO BE ENCLOSED WITH TECHNICAL BID)
All deviations from this specification shall be set out by the bidders, clause by Clause in this schedule. Unless

S. No	Clause No.	Details of deviation with justifications

specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications: We confirm that there are no deviations apart from those detailed above.

Seal of the Company

Name & Signature of Bidder with seal

CONTENTS

1.0	Scope	The scope of this specification covers all the Technical Requirements of Design, Engineering, Manufacture, Configuration, Testing at manufacturer's works, Packing, Forwarding, Supply, Unloading, Storage, Preservation & Security at site/stores complete with all accessories including supply, testing, installation, testing and commissioning of efficient and trouble free Remote Terminal Unit (RTU)/Data Concentrator Unit (DCU), Network Switches, and all sort of Communication Cables including all works required for successful integration with all IED's, Meters etc. Master SCADA through RTU/DCU. The scope of this specification also covers the Automation requirement for Control and Relay Panels, IEDs, Aux. Relays, Network Switches and all other items required for SCADA controlled protection of 66kV/33kV/11kV power system. The specific requirements are covered in the enclosed technical data sheet.
2.0	Applicable Standards	The equipment covered by this specification shall unless otherwise stated, be designed, constructed and tested in accordance with latest revisions of relevant Indian/IEC/other applicable standards shall confirm to the regulations of local statutory authorities. • IEC 60870-5-104 • IEC 61850 (All Parts) • IEC 62439-3 (PRP) • IEC 61131-3 • IEC 62056 • IEC 61588/IEEE 1588v2 • IEC 62351
3.0	Climatic Conditions of the Installation	The atmosphere is generally laden with mild acid and dust suspended during dry months and subjected to fog in cold months. The design of the equipment and accessories shall be suitable to withstand seismic forces corresponding to an acceleration of 0.1g. Some of the regions, where the work will take place includes coastal areas, subject to high relative humidity, which can give rise to condensation. Onshore winds will frequently be salt laden. On occasions, the combination of

Max. Ambient Temperature	50oC
Max. Daily Average Ambient Temperature	40oC
Min. Ambient Temperature	0oC
Max. Humidity	95%
Min. Humidity	10%
Altitude above MSL not exceeding	1000 m
Wind Pressure of 10m	300 km/hr, 200 km/hr and 160 km/hr

		salt and condensation may create pollution conditions for outdoor insulators. Some places are in heavily industrial polluted areas. Therefore, outdoor material and equipment shall be designed and protected for use in exposed, heavily polluted, salty, corrosive and humid coastal atmosphere.
4.0	General Technical Requirements	
4.1	General Requirements from the Business Associates	• The supplier should have at least 10 years of experience in design and supply of control and protection systems for electricity transmission and distribution applications. • The manufacturer, whose substation automation system is offered, should have designed, manufactured, tested, installed and commissioned such a system for electricity transmission and distribution for at least two years. • The manufacturer needs to submit the proof of completing such tasks with other utilities/concerns as its experience certificate. • The SCADA system should be integrated with Numerical Relays on standard international protocols. • The Business Associate can offer an innovative and advanced system and the ways and cost to integrate the same in the existing infrastructure. The offer is subjected to an approval from TPNODL after a thorough discussion between the BA and TPNODL. In case, an approval is not awarded to the BA's offered innovative system, TPNODL's existing/desired infrastructure prevails and the BA shall provide the system accordingly. • The BA should optimize on the cost of software products offered to TPNODL considering already available licenses with TPNODL. The BA should clearly indicate licensing policy for the software tools offered. • The BA should provide necessary training to the personnel recommended by TPNODL to maintain the system and troubleshooting reports
4.2	General System Design	The Substation Automation System (SAS) shall be suitable for operation and monitoring of the complete substation including future extensions and shall works on IEC 61850 Edition-2. The offered IEDs shall be compliant to IEC 61850 Edition-2 with backward compatibility to Edition-1. The systems shall be of the state-of-the art suitable for operation under electrical environment present in high voltage substations (33/11kV), follow the latest engineering practice, and ensure long-term compatibility

		requirements and continuity of equipment supply and the safety of the operating staff. The offered SAS shall support remote control and monitoring from Remote Control centers (MCC/BCC) via gateways. The system shall be designed such that personnel without any background knowledge in Microprocessor-based technology are able to operate the system. The operator interface shall be intuitive such that operating personnel shall be able to operate the system easily after having received some basic training. The system shall incorporate the control, monitoring and protection functions specified, self-monitoring, signaling and testing facilities, measuring as well as memory functions, event recording and evaluation of disturbance records. Maintenance, modification or extension of components may not cause a shutdown of the whole substation automation system. Self-monitoring of components, modules and communication shall be incorporated to increase the availability and the reliability of the equipment and minimize maintenance. All IEDs must have conformal coating for protection against harsh environments
4.3	System Architecture	The SAS shall be based on a decentralized architecture and on a concept of bay-oriented, distributed intelligence. Functions shall be decentralized, object-oriented and located as close as possible to the process. The main process information of the station shall be stored in distributed databases. The typical SAS architecture shall be structured in two levels, i.e., Bay Level and Station Level. *At Bay Level*, the IEDs shall provide all bay level functions regarding control, monitoring and protection, inputs for status indication and outputs for commands. Each bay control IED shall be independent from each other and its functioning shall not be affected by any fault occurring in any of the other bay control units of the station. The data exchange between the Bay Level IEDs and RTU/DCU at Station Level shall take place via the communication infrastructure as per IEC 61850-8-1. This shall be realized using fibre-optic/CAT-VI cables, thereby guaranteeing

		disturbance free communication. The fibre optic cables shall be of armored cable and shall run in GI conduit pipes. Each fibre optic cable shall have four (4) spare fibres. The link between Bay Level IEDs and RTU/DCU shall be as per IEC 62439-3 Parallel Redundancy Protocol on dual star network topology with a redundant managed switched Ethernet communication infrastructure. The communication shall be made in 1+1 mode, including the links between individual bay IEDs to switch and RTU/DCU to switch, such that failure of one set of fibre/Ethernet shall not affect the normal operation of the SAS. However it shall be alarmed in SAS. Spare FO Core shall able be terminated at LIU end. The Ethernet switch must be IEC 61850 compliance. The Speed of the Ethernet switch should be 10/100Mbps for Station Bus. *At Station Level,* the entire station shall be controlled and supervised from the station Remote Terminal Unit/Data Concentrator Unit. It shall also be possible to control and monitor the bay from the bay level equipment at all times. Clear control priorities shall prevent operation of a single switch at the same time from more than one of the various control levels, i.e. MCC/BCC, RTU/DCU, bay level or apparatus level. The priority shall always be on the lowest enabled control level. The station level contains the station-oriented functions, which cannot be realized at bay level, e.g. alarm list or event list related to the entire substation, gateway for the communication with remote control centers. Integration & testing of remote end LDR with RTU shall be in Scope of Bidder including the However, TPNODL shall provide necessary integration support at RTU end. Supply of supportive hardware (like Ethernet Switch, Communication cable etc.) and software if required.
4.4	Functional Requirements	The high-voltage apparatus within the station shall be operated from different places: • Remote control centers (MCC/BCC) • RTU/DCU • BCPUs/Main Protection Units (in the bays). Operation shall be possible by only one operator at a time. The operation shall depend on the conditions of other functions, such as interlocking, synch-check, etc.

		Select-Before-Execute: For security reasons the command is always to be given in two stages: selection of the object and command for operation under all mode of operation except emergency operation. Final execution shall take place only when selection and command are actuated. Command Time-Out: Command execution timer (configurable) must be available for each control level connection. If the control action is not completed within a specified time, the command should get cancelled and an alarm shall be generated to indicate the failure of command.
4.5	Communication Interface	The Data concentrator shall have the capability to support simultaneous communications with multiple independent remote master stations (8 nos. minimum). It would have 2 nos. of physical ports and each port would have the capability of communicating to minimum of 8 nos. of SCADA masters simultaneously. Data Concentrator shall have complete redundancy for both master and slave communication. The communication interface to the SAS shall allow scanning and control of defined points within the substation automation system independently for each control centre. The substation automation system shall simultaneously respond to independent scans and commands from TPNODL's control centres (MCC & BCC). The substation automation system shall support the use of a different communication data exchange rate (bits per second), scanning cycle, and/or communication protocol to each remote control centre. Also, each control centre's data scan and control commands may be different for different data points within the substation automation system's database
4.6	Communication Protocol	The communication protocol for gateway to control centre must be open protocol and shall support IEC 60870-5-104 and IEC 61850 for all levels of communication for sub-station automation. In addition the Data Concentrator is expected to have serial ports RS 485 for communication to auxiliary devices such as MFMs, Meters, NIDSs, DCDBs, APFCs and other IEDs Data Concentrator to Remote Control Centers (MCC/BCC): IEC 60870-5-104 Data Concentrator to BPCUs/LDR/TDR/Relays: IEC 61850-8-1 Data Concentrator and Transformer Monitoring Unit: IEC 61850-8-1 Data Concentrator to MFMs/DCDB/NIDS/APFC/Solar Logger: Modbus RTU or Modbus TCP/IP

		Between BCPUs/LDRs/TDRs/Relays and TMU: IEC 61850-8-1 *Converters (protocol/media/power supply) of any sort will not be permitted.
4.7	Response Time and IO Capabilities	The total I/O count in a major substation will become large and it must be ensured that the hardware and communication links have sufficient performance to ensure prompt processing of incoming data. Overload in this area can lead to one or more of the following: • undue delay in updating the system status diagrams/events log/alarm log in response to an incident • corruption of system database, so that the information presented to the operator is not an accurate representation of the state of the actual electrical system • system lockup As I/O at the bay level, both digital and analogue will typically be handled by intelligent relays or specialized IED's, it is therefore important to ensure that these devices have sufficient I/O capacity. If additional IED's have to be provided solely for ensuring adequate I/O capacity, cost and space requirements will increase. There will also be an increase in the number of communication links required. A practical specification for system response times is given in Tables below. Tables give a typical specification for the maximum I/O capacities of a substation automation system. Practical system response times for a substation automation scheme Typical I/O capacities for a substation automation system

Signal Type	Response Time to/from HMI
Digital Input	1s
Analogue Input	1s
Digital Output	0.75s
Disturbance Record File	3s

I/O Type	Capacity
Digital Input	8196
Digital Output	2048
Analogue Input	2048
Analogue Output	512

		The above are the minimum capacity which may change during detailed engineering of data concentrator. The Data concentrator should have the capability of expansion for I/O.
4.8	Errors in Communication	A significant problem to be overcome in the implementation of communication links is the possibility of electromagnetic interference. The low voltage levels that are used on most types of communication link may be prone to interference as a result. Careful design of the interfaces between the devices used and the communication bus, involving the use of opto-couplers is required to minimize the risk. Care over the arrangement of the communication cables is also required. It may also help to use a communication protocol that incorporates a means of error detection/correction. While it may not be possible to correct all errors, detection offers the opportunity to request re-transmission of the message, and also for statistics to be gathered on error rates on various parts of the system. An unusually high error rate on a part of the communication system can be flagged to maintenance crews for investigation. Error detail should be available/ archived in RTU/DC log/Archive, Archiving limit should be min 1000.
4.9	Data Concentrator (DC) or Remote Terminal Unit (RTU)	In general the RTU/DC design should aim to minimize power consumption and heat generation. It should be designed to work in an electrical installation by being of robust physical construction with immunity to electrical noise. The RTU/Data Concentrator shall be assembled from modular units, for example, power supply module, CPU and communications module, communication interface modules and modules for input/output purposes. I/O and serial cards shall be able to be arranged in the RTU rack in any order. The data concentrator shall be a product manufactured using industrial grade components and should be based on microprocessor technology and shall use numerical techniques for the calculation and evaluation of externally input analog and digital signals. Should provide following functionalities: • CPU should be of 32-bit Processor @ 350MHz Speed at least. • The Flash Memory should not be less than 2GB • There should not be more than 16 IEDs per Ethernet Port and 8 IEDs per Serial Port.

		• All the cards/modules of the RTU/DC must have conformal coating for protection against harsh environments. • The RTU/Data Concentrator should be designed for 10000 I/Os. • The RTU/ Data Concentrator should support min. of 4 SNTP Servers and broadcast the time sync to the IEDs at Bay level • The RTU/Data Concentrator should support IEC 61850, IEC 60870-5-101, IEC 60870-5-103, IEC 60870-5-104, Modbus RTU, Modbus TCP/IP, DNP3.0 Serial and DNP3.0 TCP/IP • There should be a provision to simulate the I/Os from the RTU • There should be option to download (RTU to Laptop) the existing configuration from the RTU/Data Concentrator • Provide a communication facility to the IEDs & Auxiliary Devices through Network Communication and/or Serial communication over RS485 • Data concentrator should support all the Data Types i.e, all Type Identifiers as specified in IEC 60870-5-104 for remote communication. • Should have an ability to collect data from all connected devices, regardless of protocol and make it available to the control centers & HMI using a LAN/WAN connectivity. • Should act as a protocol translator to ensure interoperability with the protocols defined in the communication principle section. • Should communicate to minimum 8 masters simultaneously on IEC 60870-5-104 protocol on a same CASDU • Should be compatible to integrate IEDs on both IEC 61850 Ed.1 and Ed.2 • Should be capable of handling real time data exchange services to publish or subscribe information for defined master and slave protocols.

		• Should provide of Hardware diagnostics, System initialization, Watchdog management functions • Should provide for time & millisecond synchronization function. • Provide for pass through access for remote maintenance of the automation devices connected • Should provide latest Microsoft Windows based maintenance and configuration tools. The tools should have functionality of both remote and local access. • Minimum functionalities to be provided through these tools are device configuration, security settings, log files, communication traces and system statistics. • Software, configuration tools and firmware updates/releases must be upgraded at free of cost for next 5 years after commissioning of the data concentrator(supplier should inform us for any updates in advance) • It should have complete redundant hardware design including CPU, Power Supply, Communication Modules and Bus Interface Unit/Card. • It should have enough RS485 ports to communicate with all Modbus devices taking into consideration that each Modbus loop will not have more than 6 devices. • Data Concentrator should support IEC 61131-3 with necessary license. • Data concentrator should have following the cyber security features i) Access Management ii) System Audit Logs iii) Events Management iv) System Hardening v) Secured connection via SSH/SFTP/SCP/HTTPS/TLS • Should support SNMP v1.0/2.0/3.0 (as Client and server both) feature.

		• Auxiliary power supply for the RTU/DC should have in the range of 24VDC or 48VDC depends upon Station DC Supply with tolerance of ±15%. • The processor shall monitor the health of the RTU with built in diagnostics, which are capable of remote interrogation including diagnostics for memory and bus errors, buffer overflows, local software routine health, communication ports status, input/output card health. Diagnostics shall also be supplied that shall permit complete testing of the RTU with a portable computer. Diagnostic checking of the communication ports shall be provided to permit checking by a portable computer. • The RTU shall possess memory to permit storage of a minimum of 2000 events (input changes) locally for subsequent transmission to the SCADA master station. A separate buffers shall be preferable for digital and analogue events. • The RTU shall have a real time clock, with a resolution of 1ms. It shall have the capability of time stamping events. The RTU clock is normally synchronized by the SCADA FEPs. In the advent that this does not occur, the RTU clock shall drift no more than 1 second in 24 hours. • PC based Gateway Solution is strictly not acceptable.
4.10	Ethernet Switch	The 61850 compliance Managed Ethernet Switch shall meet the demands of power system automation systems Auxiliary Power Supply: 24VDC or 48VDC (depending upon the Station DC Voltage) with ±15% tolerance, Dual Power Supply • Separate MCB with appropriate rating shall be used to power up the Switch • Operating Temperature: -5° to +85°C. • 19" Rack Mountable with Power Socket and Ports at rear side • Compliance to IEC 61850-3, IEEE 1613 Standards • Port Speed: 10Mbps/100Mbps for Station Bus and 1Gbps for Process Buss • Should support PTP • Each switch should have minimum of 24 Ports • LED indicators for link establishment and data transfer for each port

		• Should support remote user setting configuration. • Warranty for the switch must be 5 years. • It should own separate maintenance/console port • Latency shall be not more than 10ms. • Should support SNMP Server v1.0/v2.0/v3.0 • Should be KEMA Certified or equivalent • All the cards/modules of the Switch must have conformal coating for protection against harsh environments.
4.11	Fibre Optic Cable	Between Control Room and Switchyard/Switchgear Room: 4 Core, 62.5/125µm Multi-mode, Loose tube, Jelly filled, Armoured Fiber Optic Cable. Within Control Room: 2 Core, 62.5/125µm Multi-mode Fiber Optic Patch Chord
4.12	CAT – VI	4 Pairs, 23 AWG Solid Bare Copper Conductor, PE Insulation, Unshielded Twisted Pair (UTP) with separator and PVC Outer Jacket It should be designed to the ANSI/TIA-568-C.2 ǀ ISO / IEC 11801 Category 6 requirements and transmit data at 1000 Mbps (~1 Gigabit per second) with a frequency of 250 MHz and suitable for 10BASE-T, 100BASE-TX Fast Ethernet and 1000BASE-T / 1000BASE-TX (Gigabit Ethernet).
4.13	RS 485 Cable	1 Pair, 24 AWG Tinned Copper, PE Insulation, Overall Foil + Tinned Copper Braid (90%) Shield, PVC Outer Jacket
4.14	Maintenance Performance Requirements	It is a requirement that all RTUs require no routine or planned maintenance. Therefore, no fans or moving parts shall be used in the RTU to avoid any need for maintenance. To ensure this, the RTU should be constructed to resist the entry of dust. A single technician shall be able to remove and replace for repair purposes, without special tools and test equipment, all equipment involved in the operation of an RTU. Restoration of equipment to full operational use shall be possible within 15 minutes (nominally) of repairs being completed. It should not be necessary to dismantle (remove multiple pieces of) the RTU in order to replace a module.
4.15	Service Life	TPNODL prefers that the equipment shall be capable of complying with this standard, including performing its intended purpose, for a minimum of 15years from the date of supply. The supplier shall indicate the following: • The date at which the product was released for sale.

<table>
<tr><td></td><td></td><td>

- The anticipated date at which the product will be withdrawn from sale, but support will continue to be supplied.
- The anticipated date that product support will be withdrawn, i.e. spares will no longer be available and technical support is no longer provided.

</td></tr>
<tr><td>4.16</td><td>Inter-changeability</td><td>RTU parts shall be interchangeable individually, and as a whole RTU. Any such change or replacement shall not reduce the capability of the equipment to conform to the requirements of this specification.</td></tr>
<tr><td>4.17</td><td>Reliability</td><td>The equipment will normally remain in continuous service to provide SCADA facilities. Failure can result in the interruption of the operation of the Power System Control and a high level of reliability is therefore required.

The supplier shall provide the predicted mean time to failure and the mean time to repair of the equipment. Where insufficient historical data is available, the supplier shall state the methods used to determine the reliability performance.

Predicted availability of equipment supplied should exceed the following:
<table>
<tr><th>System Function</th><th>System Availability</th></tr>
<tr><td>Control and monitoring of any one breaker</td><td>99.99%</td></tr>
<tr><td>Monitoring of any one single alarm</td><td>99.99%</td></tr>
<tr><td>Monitoring of any one analogue input</td><td>99.99%</td></tr>
</table>
</td></tr>
<tr><td>4.18</td><td>Remote Monitoring and Maintenance</td><td>The vendor should provide a configuration and diagnostic software which should able to access the Data Concentrator and all the other IEDs using the TPNODL TCP/IP WAN network This software shall include facilities for:

- Monitoring of all inputs, control of all outputs and testing of calculation logic. Monitoring of all inputs and logic at card level, logic level and protocol level.
- Display of communications statistics and eavesdropping of communications channels, including Ethernet, IP, IEC 104, IEC 61850 and Modbus.
- Download & upload of RTU software, database configuration and calculations, upload the complete configuration from RTU to modify and then download to RTU.
- On-line help.
- Display current firmware, software and configuration running in the RTU

</td></tr>
</table>

		• Configuration and diagnostic software must run on latest Microsoft Windows. The diagnostic and configuration utility software shall be provided on a CD/DVD that is compatible with the laptop PC. The current version number of such software shall be provided.
4.19	Grounding	Grounding is required for all equipment. Control and data acquisition equipment shall not ground a floating power source. Care shall be exercised to ensure ground compatibility when grounded power sources are used. Separate 2 no. of pits required RTU panel connected separately which will be connected with the Grid Earthing mesh, supply of pits is not in manufacturer scope but connection to up to pits to be provided. Separate trench for cable laying for communication, automation & IED equipment shall be provided.
4.20	Device Grounding	Cabinets and device enclosures shall be grounded only at the same point that the electrical service or UPS neutral is grounded. All devices within one cabinet shall be grounded together by means of a ground cable or strap. Earthing Strip (Copper) shall be available in RTU panel for device earthing.
4.21	Signal or Instrumentation Grounding	The signal or instrumentation circuit ground shall be connected to an external ground at a single point so that ground loop conditions are minimized. The shielded wire, drain wire, and/or ground wire of input/output cables shall be terminated at one ground point in each cabinet or the device shall be insulated from the cabinet. These ground points shall be connected together and connected to the facility ground. Caution shall be used to prevent inadvertent ground paths from apparatus such as convenience outlets, conduit, structural metal, test equipment, and external interfaces. The manufacturer shall be consulted prior to selection of the cable end to be bonded as the optimal location is dependent upon the manufacturer's design choices. A special caution on filtering is worth noting. If the noise is shunted to the signal ground, then it becomes another source of signal reference corruption. Sometimes separate power, noise, digital, and analog ground buses are necessary. However, the NEC requirement for a single point safety grounding source shall always be met. A very important design rule is to keep all signal

		reference voltages, at all frequencies of operation, as close to zero as possible (i.e., at zero voltage signal reference).
4.22	Fibre Optic Grounding	Fibre optic circuits require no grounding unless the cable has a conductive element
4.23	Electrical Circuit Grounding	Where grounding is provided with the power source, safety grounding conductors shall be bundled with the power source conductors, but be insulated from the power conductors and from other equipment and wiring conduit. The ground conductor shall be terminated in the cabinet enclosure, and grounded only at the same point that the source of the electrical service to the cabinet or UPS neutral is grounded.
4.24	Extendibility in Future	Offered substation automation system shall be suitable for extension in future for additional bays. During such requirement, all the drawings and configurations, alarm/event list etc. displayed shall be designed in such a manner that its extension shall be easily performed by the employer. During such event, normal operation of the existing substation shall be unaffected and system shall not require a shutdown. The contractor shall provide all necessary software tools along with source codes to perform addition of bays in future and complete integration with SAS by the user. These software tools shall be able to configure IED, add additional analogue variable, alarm list, event list, modify interlocking logics etc. for additional bays/equipment which shall be added in future. Offered substation automation system including switches shall have minimum 20% spare port for future extendibility.
4.25	Power Supply	Power for the substation automation system shall be derived from substation 24V/48V DC system. In the event of Power failure, necessary safeguard software shall be built for proper shutdown and restart.
5.0	General Construction	RTU/DCU shall have separate Panel and shall complied to the following • RTU/DC Panel shall have simplex dust proof design with front and rear door, front door shall design with glass. • RTU/DC Panel shall have rack mounted arrangement. • RTU/DC panel shall have dual exhaust Fan system for heat dissipation. • RTU/DC panel shall have copper earthing strip. • RTU/DC Panel shall be placed properly in Communication Room • Doors shall have handles with either built-in locking facility or will be provided with pad-lock.

6.0	Name Plate & Marking	A sticker shall be fixed to each materials like RTU/DCU, IEDs, Ethernet Switches, Firewall, TMU and Energy Meters in a visible position and shall carry all the information as specified in the standards. The following information shall be mentioned on the Sticker. (i) Serial number (ii) Warranty/guarantee details (iii) Purchase order with date (iv) "PROPERTY OF TPNODL" A sticker shall be fixed on each MCBs/Fuses in a visible position and shall carry the information to which it feeds the power supply.
7.0	Tests	Factory Acceptance Test: The manufacturing phase of the SAS shall be concluded by the factory acceptance test (FAT). The purpose is to ensure that the Contractor has interpreted the specified requirements correctly and that the FAT includes checking to the degree required by the user. The general philosophy shall be to deliver a system to site only after it has been thoroughly tested and its specified performance has been verified, as far as site conditions can be simulated in a test lab. If the FAT comprises only a certain portion of the system for practical reason, Database shall be prepared completely as per actual site requirement and it will submit to TPNODL for validation. An integrated-FAT shall be conducted as per the TPNODL I-FAT Document (Annexure-III of this Technical Specification). If the complete system consists of parts from various suppliers or some parts are already installed on site, in such case supplier will arrange the intra-communication between RTU/DC and such IEDs to meet the requirement. Hardware Integration Tests shall be performed on the specified systems to be used for Factory tests when the hardware has been installed in the factory. The operation of each item shall be verified as an integral part of system. Applicable hardware diagnostics shall be used to verify that each hardware component is completely operational and assembled into a configuration capable of supporting software integration and factory testing of the system. The equipment expansion capability shall also be verified during the hardware integration tests. Integrated System Tests shall verify the stability of the hardware and the software. During the tests all functions shall run concurrently and all equipment shall operate a continuous 100 Hours period. The integrated

<table>
<tr><td></td><td></td><td>system test shall ensure the SAS is free of improper interactions between software and hardware while the system is operating as a whole.</td></tr>
<tr><td>8.0</td><td>Type Test Certificate</td><td>The bidder shall furnish the type test certificates of following tests as per the corresponding standards for RTU and Network Switches. Type tests should have been conducted in certified Test laboratories and shall not be more than 5 years old from the date of opening the bid. In the event of any discrepancy in the test reports, i.e. any test report not acceptable same shall be carried out without any cost implication to Purchaser.
<table>
<tr><th>Name of the Test</th><th>Standard</th><th>Equipment Status</th><th>Test Level</th><th>Passing Criteria</th></tr>
<tr><td colspan="5">Immunity Test</td></tr>
<tr><td>Electrostatic Discharge</td><td>IEC 61000-4-2
IEC 60870-2-1
IEC 60255-22-2</td><td>ON</td><td>8 kV air (level 3)
6 kV contact (level 3)</td><td>Performance criteria A</td></tr>
<tr><td>Radiated Radio-Frequency Electromagnetic Field</td><td>IEC 61000-4-3
IEC 60870-2-1
EC 60255-22-3</td><td>ON</td><td>10 V/m (level 3)</td><td>Performance criteria A</td></tr>
<tr><td>Electrical Fast Transient / Burst</td><td>IEC 61000-4-4
IEC 60870-2-1
IEC 60255-22-4</td><td>ON</td><td>2 kV (level 3)</td><td>Performance criteria A</td></tr>
<tr><td>Surge</td><td>IEC 61000-4-5
IEC 60870-2-1</td><td>ON</td><td>2 kV (level 3)</td><td>Performance criteria A</td></tr>
<tr><td>Conducted Disturbances induced by RF Fields</td><td>IEC 61000-4-6
IEC 60870-2-1</td><td>ON</td><td>10 V (level 3)</td><td>Performance criteria A</td></tr>
<tr><td>Power Frequency Magnetic Field*</td><td>IEC 61000-4-8
IEC 60870-2-1</td><td>ON</td><td>30/300 A/m (level-3)</td><td>Performance criteria A</td></tr>
<tr><td>Damped Oscillatory Magnetic Field*</td><td>IEC 61000-4-10
IEC 60870-2-1</td><td>ON</td><td>30 A/m (level-3)</td><td>Performance criteria A</td></tr>
<tr><td>Damped Oscillatory Wave*</td><td>IEC 61000-4-12
IEC 60870-2-1
IEC 60255-22-1</td><td>ON</td><td>2.5 kV (level 3)</td><td>Performance criteria A</td></tr>
<tr><td colspan="5">Insulation Tests</td></tr>
<tr><td>Power Frequency Voltage Withstand</td><td>IEC 60870-2-1</td><td>OFF</td><td>1 kV_{rms} for 1 minute</td><td>No break down or flashover shall occur</td></tr>
<tr><td>Impulse voltage Withstand</td><td>IEC 60870-2-1</td><td>OFF</td><td>2 kVp</td><td>No break down or</td></tr>
</table>
</td></tr>
</table>

						flashover shall occur
		Insulation Resistance		OFF	Measure Insulation resistance using 500V DC Megger before & after Power Frequency & Impulse Voltage Withstand Tests	
		Environmental Test				
		Cold Test	IEC 60068-2-1	ON	Continuous operation at 0^0C for 16 hours	Normal performance within the specified limits. No failure.
		Dry Heat Test	IEC 60068-2-2	ON	Continuous operation at 55^0C for 16 hours	Normal performance within the specified limits. No failure.
		Damp Heat Test	IEC 60068-2-38	ON	Continuous operation at 95% RH and 40^0C for 16 hours	Normal performance within the specified limits. No failure.
9.0	Pre-Dispatch inspection	Equipment shall be subject to inspection by a duly authorized representative of the Purchaser as detailed at Clause No.6.0. Inspection may be made at any stage of manufacture at the option of the purchaser and the equipment if found unsatisfactory as to workmanship or material, the same is liable to rejection. Bidder shall grant free access to the places of manufacture to Purchaser's representatives at all times when the work is in progress. Inspection by the Purchaser or its authorized representatives shall not relieve the supplier of his obligation of furnishing equipment in accordance with the specifications. Material shall be dispatched after specific MDCC (Material Dispatch Clearance Certificate) is issued by the Purchaser. Following documents shall be sent along with material : a) Test reports b) MDCC issued by TPNODL c) Invoice in duplicate d) Packing list e) Drawings & catalogue f) Guarantee / Warrantee card g) Delivery Challan				

		h) Other Documents (as applicable)
10.0	Inspection after receipt at Stores	Equipment/material received at TATA POWER-DDL's store shall be inspected by Stores Department and shall be liable for rejection, if found different from Pre-Dispatch Inspection Report. One copy of the Inspection Report shall be sent to the Plant Engineering and Automation Departments.
11.0	Guarantee / Warranty Details	Bidder shall stand guarantee towards design, materials, workmanship & quality of process/manufacturing of items under the 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 Company up to a period of 60 months from the date of commissioning supplier shall be liable to undertake to replace/rectify such defects at his own costs within the mutually agreed timeframe, and to the entire satisfaction of the Company, failing which the Company will be at liberty to get it replaced/rectified at supplier's risks and costs and recover all such expenses plus the Company's own charges (@ 20% of expenses incurred), from the supplier or from the "Security cum Performance Deposit" as the case may be. Bidder shall further be responsible for 'free replacement' for another period of three years from the end of the guarantee period for any 'Latent Defects' if noticed and reported by the Company
12.0	Packing	Bidder shall ensure that all equipment covered by 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.
13.0	Tender Sample	Not Applicable
14.0	Training	Contractor personnel who are experienced instructors and who speak understandable English shall conduct training. The contractor shall arrange on its own cost all hardware training platform required for successful training and understanding in India at manufacturer's work. The Contractor shall provide all necessary training material including configuration document in advance (before FAT or during FAT). Each trainee shall receive individual copies of all technical manuals and all other documents used for training. These materials shall be sent to Employer at least two months before the scheduled commencement of the particular training course. Class materials, including the documents sent before the training courses as well as class handouts, shall

		become the property of Employer. Employer reserves the right to copy such materials, but for in-house training and use only. Hands-on training shall utilize equipment identical to that being supplied to Employer. For all training courses, the travel (e.g., airfare) and per-diem expenses will borne by the participants. The schedule, location and detailed contents of each course will be finalized during Employer and Contractor discussions. *System Hardware Course* A computer system hardware course shall be offered, but at the system level only. The training course shall be designed to give Employer hardware personnel sufficient knowledge of the overall design and operation of the system so that they can correct obvious problems, configure the hardware, perform preventive maintenance, run diagnostic programs, and communicate with contract maintenance personnel. The following subjects shall be covered: • System Hardware Overview: Configuration of the system hardware. • Equipment Maintenance: Basic theory of operation, maintenance techniques and diagnostic procedures for each element of the computer system, e.g., processors, auxiliary memories, LANs, routers and printers. Configuration of all the hardware equipment. • System Expansion: Techniques and procedures to expand and add equipment such as loggers, monitors, and communication channels. • System Maintenance: Theory of operation and maintenance of the redundant hardware configuration, failover hardware, configuration control panels, and failover switches. Maintenance of protective devices and power supplies. • Subsystem Maintenance: • Theory of design and operation, maintenance techniques and practices, diagnostic procedures, and (where applicable) expansion techniques and procedures. Classes shall include hands-on training for the specific subsystems that are part of Employer's equipment or part of similarly designed and configured subsystems. All interfaces to the computing equipment shall be taught in detail. • Operational Training: Practical training on preventive and corrective maintenance of all equipment, including use of special tools and instruments. This training shall be provided on Employer equipment, or on similarly configured systems.

		System Software Course The Contractor shall provide a computer system software course that covers the following subjects: • System Programming: Including all applicable programming languages and all stand-alone service and utility packages provided with the system. An introduction to software architecture, Effect of tuning parameters (OS software, Network software, database software etc.) on the performance of the system. • Operating System : Including the user aspects of the operating system, such as program loading and integrating procedures; scheduling, management, service, and utility functions; and system expansion techniques and procedures • System Initialization and Failover : Including design, theory of operation, and practice • Diagnostics : Including the execution of diagnostic procedures and the interpretation of diagnostic outputs, • Software Documentation: Orientation in the organization and use of system software documentation. • Hands-on Training: One week, with allocated computer time for trainee performance of unstructured exercises and with the course instructor available for assistance as necessary. Application Software Course The Contractor shall provide a comprehensive application software courses covering all applications including the database and display building course. The training shall include: • Overview: Block diagrams of the application software and data flows. Programming standards and program interface conventions. • Application Functions: Functional capabilities, design, and major algorithms. Associated maintenance and expansion techniques. • Software Development: Techniques and conventions to be used for the preparation and integration of new software functions. • Software Generation: Generation of application software from source code and associated software configuration control procedures. • Software Documentation: Orientation in the organization and use of functional and detailed design documentation and of programmer and user manuals. • Hands-on Training: One week, with allocated computer time for trainee performance of unstructured exercises and with the course

instructor available for assistance as necessary.

Requirement of Training

The contractor shall provide training for a batch (maximum of 10 people) for five days on the following courses.

Name of Course

- System Hardware
- System Software
- Application Software

Day	First Half	Second Half
Day 1	PPT/Live demo based session on SAS Architecture, RTU Hardware Structure & details, details of existing developed supportive cards and devices, Firewall Switch & Manageable Ethernet Switch.	PPT/Live demo based session on SAS Architecture, RTU Hardware Structure & details, details of existing developed supportive cards and devices, Firewall Switch & Manageable Ethernet Switch.
Day 2	Theoretical PPT based session on Protocols, especially on IEC 61850, IEC- 104, IEC103, Modbus RTU/TCP/IP	Practice on live system as per first half given session (majorly Configuration of ICD/CID & SCD File and its configuration on BCPU/BPU)
Day 3	Theoretical PPT based session on RTU Database creation, configuration of ICD/CID/SCD file in RTU.	Practice on live system as per first half given session (Database Creation on all Protocols, configuration of ICD/CID/SCD file in RTU)
Day 4	Theoretical PPT based session on PLC Configuration, Cyber Security, SNMP, diagnostics, system log analyze.	Practice of first half given session on live system
Day 5	Practice on configuration of Firewall Switch & Manageable Ethernet Switch with data analysis on Wireshark or equivalent software.	Other Queries related discussion, Test/Examination and Certificate Distribution

15.0	Quality Control	The bidder shall submit with the offer, quality assurance plan indicating the various stages of inspection, the tests and checks which will be carried out on the material of construction, components during manufacture and after finishing, bought out items and fully assembled component and equipment including drives. As part of the plan, a schedule for stage and final inspection within the parameters of the delivery schedule shall be furnished. The purchaser's engineer or its nominated representative shall have free access to the manufacturer/sub-supplier's works to carry out inspections.
16.0	Minimum Testing Facilities	The Bidder shall have in house testing facilities for carrying out all routine tests and acceptance tests as per relevant international/Indian standards.
17.0	Manufacturing Activities	The successful bidder will have to submit the bar chart for various manufacturing activities clearly elaborating each stage, with quantity. This bar chart shall be in line with the Quality assurance plan submitted with the offer. The bar chart will have to be submitted within 15 days from the release of the order.
18.0	Services, Spares, Accessories and Tools	
18.1	Support & Services	Services to be included during guarantee period 1. Guarantee shall be for 60 months from the date of commissioning or 66 months from the date of supply. 2. Vendor shall conform in a signed SLA to the following guidelines to mitigate major failure rate. To mitigate major failure like Complete system failure, RTU,BCU,BCPU system instability, loss or failure of any major subsystem or system component such as to cause a significant adverse impact to system availability, performance, or operational capability a. Vendor shall report to site within 48 hours of receipt of reporting of the failure occurrence. b. Vendor shall provide replacement of the faulty equipment within 7 days after confirmation of the fact that the equipment can't be repaired at site. Failure to this clause may have some penalty reference on vendor. c. Vendor always will provide detailed analysis report of the faulty equipment within 30 days from the date of the site visit by BA d. Any spare Equipment replacement, testing and its commissioning to be done by vendor only without any cost implications. Any equipment, any software or any hardware to test the IEDs/RTU to be borne by vendor only.

		e. Any up gradation in application software and RTU (except hardware) will be informed to us and necessary up gradation to be carried out by vendor without any cost implications. Services to be included during tender 1. Tri- party agreement to be made to have protection against quitting of executing vendor. 2. Vendor to share Spare parts cost for RTU which will be valid for next 10 years. 3. Vendor need to provide life cycle support and supplies to ensure necessary support in terms of services and spares for next 15 years from date of Purchase Order. Vendor shall provide expected life of IEDs in writing.
18.2	Spares	The bidder is required to list the spares, which may be required for ensuring the availability during the guaranteed availability period. The final list of spares shall form part of scope of supply and accordingly the price thereof shall be quoted by the bidder and shall be considered in the evaluation of the bids. During the guaranteed availability period, the spare parts supplied by the Contractor shall be made available to the Contractor for usage subject to replenishment at the earliest. Thus, at the end of availability period the inventory of spares with the Employer shall be fully replenished by the Contractor. However, any additional spares required to meet the availability of the system (which are not a part of the above spares supplied by the Contractor) would have to be supplied immediately by the Contractor free of cost to the Employer. The list shall include the following: • Item identification • Recommended spares quantities • Base price • Procurement lead time Probability the required item is available given its MTBF based on recommended spares and procurement lead time. • Quantity of item held in Local office by Supplier as emergency spare parts • Quantity of item held in head office as an emergency spare part All spare parts shall be fully tested.

19.0	Drawing and Documents	Following drawings and documents shall be prepared on Purchaser's specifications and statutory requirements and shall be submitted with the bid: 1. Completely filled in Technical Particulars 2. General description of the equipment and all components including brochures 3. Bill of material 4. Type test certificates 5. System Architecture Drawing 6. Hardware Specification 7. Sizing Calculations of various components 8. Response Time Calculation 9. Functional Design Document 10. Power Distribution Schematic Diagrams for each RTU 11. Standard documentation per IED, according to IEC 61850 12. MICS document (model implementation conformance statement), 13. PICS (protocol implementation conformance statement), 14. Conformance test certificate, 15. ICD/CID Cite (IED capability description file) 16. SCD file (substation configuration description) 17. MIB Files of RTU and Ethernet Switches After the award of the contract four (4) copies of drawings, drawn to scale, describing the equipment in detail shall be forwarded for approval and 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.
20.0	Guaranteed Technical Particulars	Bidder shall submit separate sheet showing guaranteed technical particulars
20.1	RTU/DC	

S. No.	Guaranteed Technical Particular	Bidder Response

		1	All the cards/modules of the RTU/DC must have conformal coating for protection against harsh environments.	
		2	The RTU/Data Concentrator should be designed for 10000 I/Os.	
		3	The RTU/Data Concentrator should support IEC 61850, IEC 60870-5-101, IEC 60870-5-103, IEC 60870-5-104, Modbus RTU, Modbus TCP/IP, DNP3.0 Serial and DNP3.0 TCP/IP	
		4	There should be a provision to simulate the I/Os from the RTU	
		5	There should be option to download (RTU to Laptop) the existing configuration from the RTU/Data Concentrator	
		6	Data concentrator should support all the Data Types i.e, all Type Identifiers as specified in IEC 60870-5-104 for remote communication.	
		7	Should have an ability to collect data from all connected devices, regardless of protocol and make it available to the control centers & HMI using a LAN/WAN connectivity.	
		8	Should communicate to minimum 8 masters simultaneously on IEC 60870-5-104 protocol on a same CASDU	
		9	Should be capable of handling real time data exchange services to publish or subscribe information for defined master and slave protocols.	
		10	Should provide of Hardware diagnostics, System initialization, Watchdog management functions	
		11	Should provide for time & millisecond synchronization function.	
		12	Should provide latest Microsoft Windows based maintenance and configuration tools. The tools should have functionality of both remote and local access.	
		13	Minimum functionalities to be provided through these tools are device configuration, security settings, log files, communication traces and system statistics.	
		14	It should have complete redundant hardware design including CPU, Power Supply, Communication Modules and Bus Interface Unit/Card.	

		15	Data Concentrator should support IEC 61131-3 with necessary license.	
		16	Data concentrator should have following the cyber security features (a) Access Management (b) System Audit Logs (c) Events Management (d) System Hardening (e) Secured connection via SSH/SFTP/HTTPS	
		17	Should support SNMP v1.0/2.0/3.0 (as Client and server both) feature.	
		18	Auxiliary power supply for the RTU/DC should have in the range of 24VDC or 48VDC depends upon Station DC Supply with tolerance of ±15%.	
		19	The RTU shall have a real time clock, with a resolution of 1ms. It shall have the capability of time stamping events. The RTU clock is normally synchronized by the ADMS FEPs. In the advent that this does not occur, the RTU clock shall drift no more than 1 second in 24 hours.	
20.2	Ethernet Switch	S. No.	Guaranteed Technical Particular	Bidder Response
		1	19" Rack Mountable with Power Socket and Ports at rear side	
		2	Compliance to IEC 61850-3, IEEE 1613 Standards	
		3	Port Speed: 10Mbps/100Mbps for Station Bus and 1Gbps for Process Buss	
		4	Should have minimum of 24 Ports	
		5	LED indicators for link establishment and data transfer for each port	
		6	Should support remote user setting configuration.	
		7	Should own separate maintenance/console port	
		8	Should support SNMP Server v1.0/v2.0/v3.0	
		9	Auxiliary Power Supply: 24VDC or 48VDC (depending upon the Station DC Voltage) with ±15% tolerance, Dual Power Supply	
		10	All the cards/modules of the Switch must have conformal coating fo r p	

21.0 Schedule of Deviations

(TO BE ENCLOSED WITH THE BID)

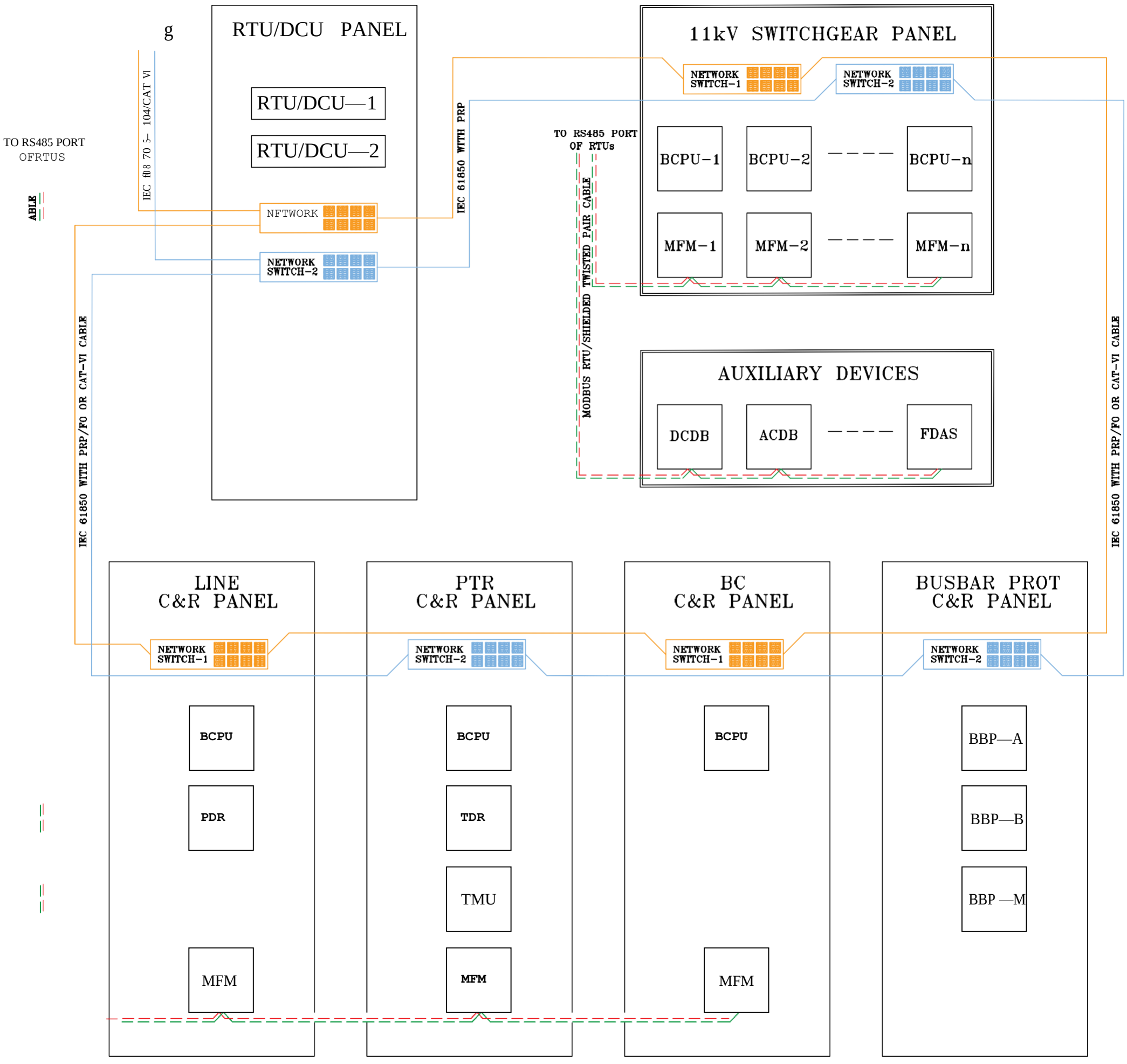
All deviations from this specification shall be set out by the Bidders, clause by Clause in this schedule. Unless specifically mentioned in this Schedule, the tender shall be deemed to confirm the purchaser's specifications:

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 — AUTOMATION SPECIFICATION FOR 33/ 1 IKV POWER SYSTEM NETWORK IN NEW GRID SUBSTATION ON IEC 61850 PROTOCOL



NOTE:

1. ARCHITECTURE SHOWN ABOVE IS TYPICAL ONE. BIDDER NEEDS TO SUBMIT ACTUAL SYSTEM ARCHITECTURE BY MEETING THE MINIMUM TECHNICAL REQUIREMENTS AS MENTIONED IN THIS SPECIFICATION.
2. THERE SHOULD NOT BE MORE THAN 8 DEVICES IN A SINGLE DAISY CHAIN LOOP
5. **BIDDER NEEDS TO USE DIFFERENT COLOUR CODED CABLES FOR NETWORK—A AND NETWORK—B**
4. BIDDER NEEDS TO CONSIDER 20 SPARE FO PATCH CHORDS, IF IEDS OFFERED ARE ON FO PORT.
5. SUPPLY, LAYING, LABELLING AND TERMINATION OF CAT—VI CABLE FROM RTU/DCU TO GRID ROUTER SHALL BE IN BIDDER'S SCOPE.
6. TERMINATION OF CAT—VI CABLE AT GRID ROUTER END SHALL BE DONE UNDER THE SUPERVISION OF TPNODL AUTOMATION/COMMUNICATION ENGINEER.
7. ARMOURED FIBER OPTIC CABLE SHALL BE USED FOR RING FORMATION BETWEEN THE NETWORK SWITCHES IN 33KV C&R PANEL, 11 KV SWITCHGEAR PANEL AND RTU PANEL.
8. BIDDER NEEDS TO CONSIDER, SUPPLY, INSTALL & COMMISSION THE LIUs AS PER THE ACTUAL REQUIREMENT IN SITE.

ANNEXURE-II - AUTOMATION SPECIFICATION FOR 33KV-11KV POWER SYSTEM NETWORK IN NEW GRID SUBSTATION BASED ON IEC 61850

SIGNAL DESCRIPTION	SIGNAL TYPE	STATE '0'	STATE '1'
CB STATUS	DPI	OPENED	CLOSED
CB TEST/SERVICE STATE	DPI	TEST	SERVICE
EARTH SWITCH STATUS	DPI	OPENED	CLOSED
ISOLATOR-1 STATUS	DPI	OPENED	CLOSED
ISOLATOR-2 STATUS	DPI	OPENED	CLOSED
11kV BS1 DC/IRF (11 KV IRF)	SPI	NORMAL	FAIL
11kV BS2 DC/IRF (11 KV IRF)	SPI	NORMAL	FAIL
50 EARTH FAULT	SPI	RESET	OPERATED
50 PHASE FAULT	SPI	RESET	OPERATED
51 EARTH FAULT	SPI	RESET	OPERATED
51 PHASE FAULT	SPI	RESET	OPERATED
BUCHLOZ RELAY	SPI	NORMAL	ALARM
BUCHLOZ RELAY	SPI	NORMAL	OPERATED
BUS PT MCB	SPI	OFF	ON
CABLE CHARGE STATUS	SPI	CHARGE	DEAD
CB SPRING CHARGE	SPI	DISCHARGE	CHARGE
DIFFERENTIAL RELAY	SPI	NORMAL	OPERATED
HV WTI HIGH	SPI	NORMAL	HIGH ALARM
HV WTI HIGH-HIGH	SPI	NORMAL	OPERATED
L/R - BCPU	SPI	INACTIVE	ACTIVE
L/R - PANEL SWITCH	SPI	LOCAL	REMOTE
LV WTI HIGH	SPI	NORMAL	HIGH ALARM
LV WTI HIGH-HIGH	SPI	NORMAL	OPERATED
MASTER TRIP 86 STATUS	SPI	RESET	OPERATED
OIL LEVEL LOW (MOLG)	SPI	NORMAL	LOW ALARM
OLTC MODE	SPI	-	IN REMOTE
OLTC MODE	SPI	-	IN LOCAL
OSR RELAY	SPI	NORMAL	OPERATED
OTI HIGH	SPI	NORMAL	HIGH ALARM
OTI HIGH-HIGH	SPI	NORMAL	OPERATED
OVER FLUXING RELAY	SPI	NORMAL	OPERATED
PRV RELAY	SPI	NORMAL	OPERATED
PT FUSE FAIL	SPI	NORMAL	FAIL
RESTRICTED EARTH FAULT RELAY	SPI	NORMAL	OPERATED
RTCC AUTO MODE	SPI	OFF	ON
RTCC IN OFF MODE	SPI	OFF	ON
RTCC MANUAL MODE	SPI	OFF	ON
RTCC MODE IN	SPI	-	FOLLOWER
RTCC MODE IN	SPI	-	MASTER
RTCC MODE IN	SPI	-	INDEPENDENT
RTCC MODE ON	SPI	OFF	ON
RTCC SCADA MODE	SPI	OFF	ON
TNC CLOSE	SPI	RESET	OPERATED
TNC OPEN	SPI	RESET	OPERATED
TRIP CIRCUIT SUPERVISION	SPI	FAULTY	HEALTHY
CIRCUIT BREAKER COMMAND	DCO		

MASTER TRIP 86 RESET COMMAND	SCO		
ACTIVE POWER IN MW	MF		
CURRENT B IN A	MF		
CURRENT R IN A	MF		
CURRENT Y IN A	MF		
FAULT CURRENT B IN KA	MF		
FAULT CURRENT N IN KA	MF		
FAULT CURRENT R IN KA	MF		
FAULT CURRENT Y IN KA	MF		
FREQUENCY IN HZ	MF		
POWER FACTOR	MF		
REACTIVE POWER IN MVAR	MF		
VOLTAGE B-R IN KV	MF		
VOLTAGE R-Y IN KV	MF		
VOLTAGE Y-B IN KV	MF		
ACTIVE ENERGY (EXPORT) IN MWH	MF/IT		
ACTIVE ENERGY (IMPORT) IN MWH	MF/IT		
REACTIVE ENERGY (EXPORT) INMVARH	MF/IT		
REACTIVE ENERGY (IMPORT) IN MVARH	MF/IT		

Annexure – III

Automation Specifications for 33kV/11kV Power System Network in New Grid Station based on IEC-61850 Protocol

INTEGRATED FACTORY ACCEPTANCE TEST PROCEDURE

(NAME OF THE PROJECT)

PROJECT REFERENCE: (TPNODL PO No.)

FOR

M/s. TATA POWER NORTHER ODISHA DISTRIBUTION LIMITED

BALASORE, ODISHA.

BY

(BA NAME & ADDRESS)

TABLE OF CONTENTS:

1.1 Scope of this Document

The current state of the art in substation design is based on a master-slave relationship between Intelligent Electronic Devices (IEDs). As such, communication between networked IEDs is very deterministic – the master requests an action and the slave executes the response in a prescribed manner. IEC 61850 introduces mechanisms to operate networked IEDs in a peer-to-peer relationship. For example, IEC 61850 introduces the use of a state change message that notifies all listening IEDs that one or more of the IED's functions has changed state. It is the responsibility of the receiving IED to respond in an appropriate manner. The purpose of this report is therefore to provide TPNODL's technical support staff an overview of the functional testing of IEC 61850 based systems. IED OEMs and system integrators should use this document to ensure that their products and services provide the capabilities needed to execute the functional test plans and procedures tailored for TPNODL's 61850 based system configuration.

1.2 Project Overview

This document is intended to describe the Factory Acceptance Test(s) to be performed on
(IED Model Nos.) provided for M/s. TPNODL, for their *(Name of the Grid Substation)*, Delhi.

(BA Name) will conduct and manage the FAT at
(Location) (BA Address & Contact Details)

The Customer will provide FAT line item approval as described in this FAT Procedure and associated FAT Documents.

System will be tested internally by (BA Name) before commencement of FAT. The internal test reports shall be provided at the time of raising inspection call for review /references of the inspecting engineer.

It is the intent of this FAT to verify that the equipment matches the bill of material list and operates according to the referenced drawings and specifications and also the integrity of the FAT point database and SLD's.

Project Name: *(Name of the Project)*

Customer : M/s. TATA Power Northern Odisha Distribution Ltd., New Delhi

End User : M/s. TATA Power Northern Odisha Distribution Ltd.

TPNODL PO No.: (XXXXXXXXXX)

1.3 Test Framework

The number of protection and automation applications based on IEC 61850 and the functional test scenarios is only limited to the imagination of the substation protection and automation engineer design team. In effect, there is no limit to the number of applications and test cases that can be envisioned.

2.0 References

One set of following documents/drawings, whichever applicable shall be made available for reference irrespective of approval/information category with latest applicable revision during FAT.

(i) Approved GTP & Drawings
(ii) Datasheet of all IEDs and accessories
(iii) Hardware Design Manual
(iv) Approved Technical Deviations, if any
(v) All necessary and associated Software & License
(vi) Factory Acceptance Test Procedure

3.0 FAT Completion Certificate

The FAT will be considered finished when the following signatures are recorded on this document. This certifies that the system was duly inspected in accordance with the agreed Factory Acceptance Test Procedure. Observations and action items in the form of various test records/punch points need to be attached herewith.

M/s TATA Power Northern Odisha Distribution Limited		
Full Name	Signature	Date

M/s (BA Name)		
Full Name	Signature	Date

4.0 Material Dispatch Clearance Certificate

Upon successful completion of FAT, sign-off and acceptance of this documentation by Customer/Customer's representative constitutes acceptance of all parts of the detailed tests as per various sections of this document.

MDCC shall be issued after submission of

- I-FAT Checklist
- Punch Points List
- SCL File of the Substation
- ICD/CID Files of each IEDs
- MIB Files of each IEDs including Switches
- MOM signed off at the time of FAT

5.1 Test Equipment

Test Equipment will include, but not limited to, the following:

- Configuration Tool
- Simulation Tool (for IEDs and MFMs)
- Virtual Simulation Tool (for IEDs and MFMs)
- Evaluation Tool
- Network Management System (NMS with SNMP Server)
- Relay Testing Kit
- DC Power Supply
- AC Analog Source (3-ph Voltage and 3-ph Current)
- Dual Coil Latching Relay with 2NO/NC Contacts
- Tool Kit – Screw Driver Set, Precision Multi-meter, etc.

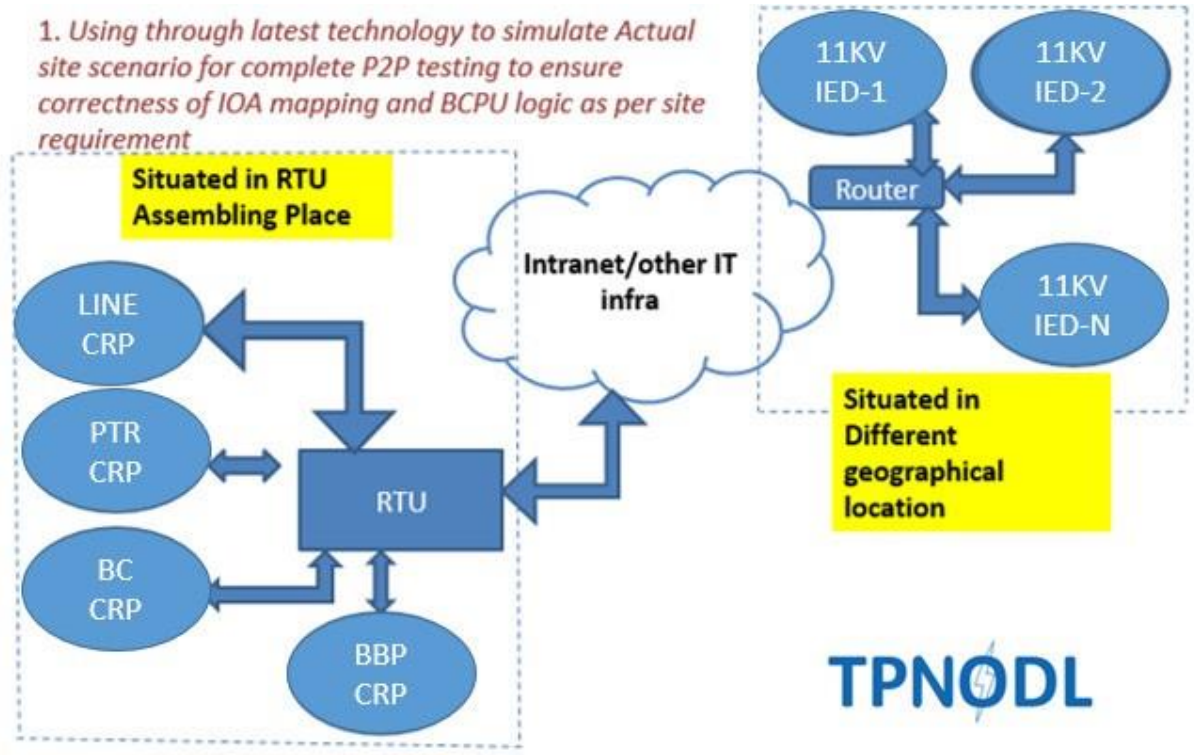
5.2 Name of the Tools

Mention the Name and Version of the tools used to perform the FAT

S. No.	Tool Description	Name of the Tool	Tool Version
1	Configuration Tool of RTU		
2	Configuration Tool of Protection IEDs		
3	Simulation Tool for IEDs		
4	Virtual Simulation Tool for IEDs		
5	Evaluation Tool for RTU/DCU		
6	Evaluation Tool for Protection IEDs		

5.3 Test Configuration and Setup

The Test Configuration as shown in the System Architecture Diagram (to the extent possible) of approved to be shown in the FAT. All approved IEDs will be connected and integrated in RTU/DCU with actual IO signal as required at site. If any IEDs placed at different geographical location then it will have integrated through best possible communication infrastructure (VPN, Vendor Intranet etc.) A dedicated person of TPNODL will be deputed at that location for witnessing the Integration and simulation of the signals. Dual coil latching relay shall acts as a Circuit Breaker and shall be connected to BCPUs for the simulation of CB Command at the time of testing C&R Panel.



5.4 Test Conditions

1. Bay Level IEDs are energized and connected to Simulation, Evaluation & NMS Tools on IEC 61850-8-1 & SNMP Protocols respectively.
2. RTU/DCU is energized and connected to the Simulation Tool as well as the Evaluation Tool, minimum of 4 Master on single CASDU, through Router on IEC 60870-5-104 protocol.
3. Ensure RTU/DCU, IEDs, Virtual Simulation Tools on same LAN and Evaluation Tool should be on different LAN.
4. If IEDs are placed in different geographical location then it will have connected through VPN or Intranet connection with RTU/DCU.

5.5 Test Files

The Master FAT test files shall be prepared as per the actual site requirement and it should be complete configuration of all IEDs and feeders. The Master FAT test files shall be stored on a project server and backed up with DVD medium. Any changes to the FAT test files shall be recorded in the FAT Punch Points. All changed files shall be backed up on a daily basis.

5.6 Safety Precautions

Electrostatic discharge precautions must be observed at all times while working on any IEDs. Manufacturer recommendations must be followed when working on any component of the IEDs.

5.7 FAT Schedule

A FAT schedule will be created that lists test activities and estimated interactive time to the complete each activity step. Broadly the FAT will start with Hardware/Software Verification and then further continuation with Loop checks, Software Functionality checks and System Functionality checks and complete P2P testing will conducted as per the site requirement.

6.0 Factory Acceptance Test

The factory acceptance testing (FAT) is normally a complete test of an integrated system at the vendor facility, with application functions, data base, HMI, displays and logs performed on a specific utility system. Before performing these tests, all the wiring interconnecting the different panels and devices must be completed. During these tests, all specified functions included in the client specification shall be tested. Any malfunction detected must be repaired.

The FAT must include the verification of the vertical messages, from the IEDs to the substation level equipment, as well as the horizontal messages, from one IED to the others. The performance of the specified functions must also be verified during the FAT.

6.1 RTU/DCU Panel Construction Test

Objective: Inventory check and inspection for general construction, cabling and connections of RTU and other associated accessories, drawing conformance and labeling.

Procedure:

1. Verify the completeness of hardware and software documentation and drawings.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Verification of the entire material, including spares as per the approved BOM for RTU/DCU.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Ensure whether the RTU/DCU is properly cleaned and are free from dust and foreign materials (cable cut outs, solder droppings, lugs, etc.).

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

4. Visually inspect the individual modules and its associated accessories for any damage and/or improper mounting.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

5. Verification of panel dimensions as per the approved drawings.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

6. Ensure that all modules and accessories have proper identification labels as per the approved drawings.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

7. Verification of all modules for proper jumper and/or dip switch settings as per the customized configuration, if any

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

8. Verify that the RTU/DCU Panel is equipped with separate earth bars.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

9. Ensure that proper earthing is provided for all modules and its associated accessories.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

10. Ensure that the RTU/DCU is equipped with proper firmware and software applications.

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

11. Ensure that the RTU/DCU is configured with proper database.

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

12. Ensure that the RTU/DCU is configured for proper point capacity as per the approved drawings.

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

13. Ensure that the RTU/DCU is properly communicating with local maintenance terminal.

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

14. Name plate marking of the Panel as specified in the Tender Specification

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Passing Criteria: Successful demonstration of all the above tests.

Overall Test Results:

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.2 C&R Panel Construction Test

Objective: Inventory check and inspection for general construction, cabling and connections of RTU and other associated accessories, drawing conformance and labeling.

Procedure:

1. Verify the completeness of hardware and software documentation and drawings.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Verification of the entire material, including spares as per the approved BOM for C&R Panel.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Ensure whether the IEDs are properly cleaned and are free from dust and foreign materials (cable cut outs, solder droppings, lugs, etc.).

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

4. Visually inspect the individual modules and its associated accessories for any damage and/or improper mounting.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

5. Verification of panel dimensions as per the approved drawings.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

6. Ensure that all modules and accessories have proper identification labels as per the approved drawings.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

7. Verify that the C&R Panel is equipped with separate earth bars.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

8. Ensure that proper earthing is provided for all modules and its associated accessories.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

9. Name plate marking of the Panel as specified in the Tender Specification

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Passing Criteria: Successful demonstration of all the above tests.

Overall Test Results:

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.3 INTEGRATION OF BCPUs WITH RTU/DCU ON IEC 61850 PROTOCOL

Objective: To ensure functionality of BCPUs and its interoperability with RTU/DCU on IEC- 61850 Protocol.

Procedure:

1. Simulate all inputs, one by one, as per provided IO lists in BCPUs. The BCPU, RTU/DCU and Evaluation tool shall need to receive the simulated inputs from the tested BCPU with the timestamp of Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Simulate CB Close and Open Commands to BCPU from RTU/DCU and Evaluation Tool. Check for the successful execution of Command from Bay Level IEDs/RTU/DCU/Evaluation Tool. Each successful execution of command should be realized with positive feedback from the BCPU.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Feed current and voltage waveforms to simulate different network conditions such as high current faults or low current minimum load conditions on to the testing BCPU. The Evaluation tool and RTU/DCU shall need to receive the analog values from the tested BCPU. This should be test under both Cyclic CoT and Spontaneous CoT with RTU/DCU and Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

4. Issue LED Reset Command from the Evaluation Tool, RTU/DCU and BCPU Push Buttons and all LEDs including Master Trip Relay, if considered in the project scope should get reset in a single command.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Note: Ensure the following while performing simulating aforesaid scenarios.

a. Check for the Bay/Feeder SLD in the Graphical Display Unit of the BCPU. Each simulation shall also get reflect in the Graphical Display Unit
b. Check for the Unit/Multiplication Factor of Current should be in A (Ampere), Voltage in kV (Kilo Volt), Active Power & Energy, Reactive power & Energy in Mega like MW, MWh, MVAr & MVArh and observe the change in RTU/DCU & Evaluation Tool.
c. Simulate all kinds of faults as specified in the Signal List of BCPU and simulated faults need to be received in the Evaluation Tool from the tested BCPU.
d. Check for the fault current recorded in BCPU, RTU/DCU & Evaluation Tool.
e. Check the cycle time of status and measurement values updating in the RTU/DCU and Evaluation Tool

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.6 INTEGRATION OF LINE DIFFERENTIAL RELAY WITH RTU/DCU ON IEC 61850 PROTOCOL

Objective: To ensure functionality of LDRs and its interoperability with RTU/DCU on IEC- 61850 Protocol.

Procedure:

1. Simulate all inputs, one by one, as per provided IO lists in LDR. The LDR, RTU/DCU and Evaluation tool shall need to receive the simulated inputs from the tested LDR with the timestamp of Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Feed current and voltage waveforms to simulate different network conditions such as high current faults or low current minimum load conditions on to the LDR. The Evaluation tool and RTU/DCU shall need to receive the sampled analog values from the tested LDR. This should be test under both Cyclic CoT and Spontaneous CoT with RTU/DCU and Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Issue LED Reset Command from the Evaluation Tool, RTU/DCU and LDR Push Buttons and all LEDs including Master Trip Relay, if considered in the project scope should get reset in a single command.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

4. Disconnect the connectivity (both channels, one by one) between both the LDR and Line Differential Protection Function should get disabled in the LDR

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Note: Ensure the following while performing simulating aforesaid scenarios.

a. Check for the Unit/Multiplication Factor of Current should be in A (Ampere), Voltage in kV (Kilo Volt), Active Power & Energy, Reactive power & Energy in Mega like MW, MWh, MVAr & MVArh and observe the change in RTU/DCU & Evaluation Tool.
b. Simulate all kinds of faults as specified in the Signal List of LDR including CB Inter Trip and simulated faults need to be received in the Evaluation Tool from the tested LDR.
c. Check for the fault current recorded in LDR, RTU/DCU & Evaluation Tool.
d. Check the cycle time of status and measurement values updating in the RTU/DCU and Evaluation Tool

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.7 INTEGRATION OF TRANSFORMER DIFFERENTIAL RELAY WITH RTU/DCU ON IEC 61850 PROTOCOL

Objective: To ensure functionality of TDRs and its interoperability with RTU/DCU on IEC- 61850 Protocol.

Procedure:

1. Simulate all inputs, one by one, as per provided IO lists in TDR. The TDR, RTU/DCU and Evaluation tool shall need to receive the simulated inputs from the tested TDR with the timestamp of Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Feed current and voltage waveforms to simulate different network conditions such as high current faults or low current minimum load conditions on to the testing LDR. The Evaluation tool and RTU/DCU shall need to receive the sampled analog values from the tested TDR. This should be test under both Cyclic CoT and Spontaneous CoT with RTU/DCU and Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Issue LED Reset Command from the Evaluation Tool, RTU/DCU and TDR Push Buttons and all LEDs including Master Trip Relay, if considered in the project scope should get reset in a single command.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Note: Ensure the following while performing simulating aforesaid scenarios.

a. Check for the Unit/Multiplication Factor of Current should be in A (Ampere), Voltage in kV (Kilo Volt), Active Power & Energy, Reactive power & Energy in Mega like MW, MWh, MVAr & MVArh and observe the change in RTU/DCU & Evaluation Tool.
b. Simulate all kinds of faults as specified in the Signal List of TDR including CB Inter Trip and simulated faults need to be received in the Evaluation Tool from the tested TDR.
c. Check for the fault current recorded in TDR, RTU/DCU & Evaluation Tool.
d. Check the cycle time of status and measurement values updating in the RTU/DCU and Evaluation Tool

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.8 INTEGRATION OF TMUs WITH RTU/DCU ON IEC 61850 PROTOCOL

Objective: To ensure functionality of TMUs and its interoperability with RTU/DCU on IEC- 61850 Protocol.

Procedure:

1. Simulate all inputs, one by one, as per provided IO lists in TMU. The TMU, RTU/DCU and Evaluation tool shall need to receive the simulated inputs from the tested TMU with the timestamp of Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Feed voltage waveforms to simulate different network conditions such as under voltage and over voltage conditions on to the testing TMU. The Evaluation tool, and RTU/DCU shall need to receive the sampled analog values from the tested TMU. TMU should give Tap Raise/ Tap Lower Command in Auto Mode and observe the variation in the voltage waveforms. This should be test under both Cyclic CoT and Spontaneous CoT with RTU/DCU and Evaluation Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Keeping TMU in Remote & Auto Mode, issue Manual Command from the Evaluation Tool, RTU/DCU to the TMU and perform Tap Raise/Tap Lower Operation from the Evaluation Tool & RTU/DCU

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: ☐ **Conditional Pass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.9 INTEGRATION OF BUS BAR PROTECTION UNIT WITH RTU/DCU ON IEC 61850 PROTOCOL

Objective: To ensure functionality of Bus Bar Protection Unit and its interoperability with RTU/DCU on IEC-61850Protocol.

Procedure:

1. Feed current and voltage waveforms to simulate different network conditions such as high current faults or low current minimum load conditions on to the testing BBPU. The Evaluation tool, RTU/DCU & BBPUs shall need to receive the sampled analog values from the tested BBPU. This should be test under both Cyclic CoT and Spontaneous CoT with RTU/DCU and Evaluation Tool.

   Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

2. Issue LED Reset Command from the Evaluation Tool, RTU/DCU and BBPU Push Buttons and all LEDs including Master Trip Relay, if considered in the project scope should get reset in a single command.

   Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.10 INTEGRATION OF MFM/ENERGY METER WITH RTU/DCU ON MODBUS PROTOCOL

Objective: To ensure smooth integration of Multi-Function Meters/Energy Meters with RTU/DCU on Modbus protocols.

Procedure:

1. Feed current and voltage waveforms to simulate different network conditions on to the testing MFM/Energy Meter. The Evaluation tool RTU/DCU shall need to receive the analog values from the tested MFM/Energy Meter and compare the individual values with the values coming from the Simulation Tool.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

Note: Ensure the following while performing simulating aforesaid scenarios.

a. Check for the Unit/Multiplication Factor of Current should be in A (Ampere), Voltage in kV (Kilo Volt), Active Power & Energy, Reactive power & Energy in Mega like MW, MWh, MVAr & MVArh in RTU/DCU & Evaluation Tool.

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.11 TIME SYNCHORIZATION TEST

Objective: To ensure time synchronization between

a. FEP (Evaluation Tool) and RTU
b. RTU and IEDs in Station Level

Procedure:

1. Set the time of the testing RTU/DCU with difference of more than ±30 minutes from the Simulation Tool. RTU/DCU shall get the time synchronization signal from the FEP Server (Evaluation Tool) over IEC 60870-5-104 protocol automatically.

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Set the time of the testing RTU/DCU with difference of more than ±30 minutes from the Simulation Tool. RTU/DCU shall get the time synchronization signal from the FEP Server (Evaluation Tool) over IEC 60870-5-104 protocol after issuing Time Sync Command from the Evaluation Tool.

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Set the time of the testing RTU/DCU with difference of more than ±30 minutes from the Simulation Tool. IEDs in the Station Level should receive the same time that was set in the RTU/DCU.

Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.12 RTU/DCU FUNCTIONALITY TEST

Objective: To check the functionalities of RTU/DCU

Initial Conditions: Connect the RTU/DCU with the machine carrying its configuration tool through its maintenanceport

Procedure:

1. Communication with RTU/DCU Local Maintenance Port: Engineer should be able to logon to the RTU from the configuration tool through RTU/DCU Local Maintenance Port by entering his/her login credentials in the configuration tool.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

2. Downloading/Uploading of RTU Configuration: Engineer should be able to download (Machine to RTU) and upload (RTU to Machine) the configuration/database using the configuration tool or web based interface.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

3. Monitoring of IED Status, Data Points, Events and Error/System Logs: The Engineer should be able to monitor all device status, data points, alarms, events and error/system logs running in the RTU through the configuration tool.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

4. Communication with Multiple Master on same CASDU: Simulate the digital inputs and analog values from the simulation tool of the IEDs. RTU/DCU should be able to send those data points to multiple master on same CASDU.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

5. Command from Multiple Master: Issue command from multiple master to the RTU/DCU. The RTU/DCU should process the command initiated first and ignore the remaining command request.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

6. RTU/DCU Redundancy: Switch OFF and/or disconnect the communication of one of the RTU. Perform the similar test with second RTU. Communication between RTU/DCU and FEP (Evaluation Tool) should not get affected in the both the case

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

7. RTU/DCU Power Supply Redundancy: Switch off DC Source-1 of RTU/DCU. RTU/DCU should remain powered ON. Similarly, switch on DC Source-1 and switch off DC Source-2 of RTU/DCU. RTU/DCU should remain powered ON.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

8. Dual Star Redundancy Check: Disconnect the communication cable of both RTU, one by one. Communication between RTU/DCU & FEP (Evaluation Tool) and RTU/DCU & IEDs should remain unaffected.

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass : ☐ **ConditionalPass:** ☐ **Fail :** ☐

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

6.13 SECURITY AND NETWORK MANAGEMENT

Objective: To ensure data security and network management of the Grid Substation

Initial Conditions:

1. Separate Role based access control IDs need to be configured for the each individual Engineers and Technician of Protection and Automation Team.
2. All IEDs not limited to RTU/DCU, BCPUs, LDRs, TDRs, TMUs & BBPUs shall be connected to Network Management Tool

Procedure:

1. Login with authorized and unauthorized user credential in each of the IEDs. Only authorized user shall be able to logon and unauthorized user shall not be logon the devices.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

2. Login with individual role based user credential in each of the IEDs. Check for the each privileges assigned in the credential.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

3. Simulate all inputs, one by one and multiple inputs at a time, in the IEDs. Observe the CPU loading, health and performance of each IEDs in the Network Management Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

4. Feed current and voltage waveforms to simulate different network conditions such as high current faults or low current minimum load conditions on to the testing IED. Observe the CPU loading, health and performance of each IEDs in the Network Management Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

5. Connect/Disconnect the CAT-VI/FO Cables, one by one and both at a time, of each IEDs. Check for the reporting of Communication Up/Fail Signal in the RTU/DCU & in the Evaluation Tool and Communication Up/Fail or Port Up/Down Signal in the Network Management Tool.

   Pass : ☐ **Conditional Pass:** ☐ **Fail :** ☐

6. Connect/Disconnect the CAT-VI/FO Cables of GPS Server, one by one and both at a time. Check for the reporting of Communication Up/Fail or Port Up/Down Signal of GPS Server in the Network Management Tool.

Pass :		**Conditional Pass:**		**Fail :**	

7. Connect/Disconnect the Antenna of GPS Server, one by one and both the Servers.. Check for the reporting Signal Lost/Restored Event of GPS Server in the Network Management Tool.

Pass :		**Conditional Pass:**		**Fail :**	

Passing Criteria: Successful demonstration of all the above tests.

Test Results:

Pass: **ConditionalPass:** **Fail :**

Comments and Observations:

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

7.0 PUNCH POINT FORMAT

S. No.	Bay/Panel Name	Punch PointDescription	Affected IED	Responsibility	Expected Date of Closure

M/s. (BA Name)	M/s. TPNODL
Tested by:	Witnessed by:
Signature with Date:	Signature with Date:

**** End of Document ****