

TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED  
VIJAYAWADA- 520 004::ANDHRA PRADESH



*Tender No: **PMM 31 – e - 25 /2023***

**SUPPLY OF 220KV CONTROL & RELAY PANELS and other equipment**

(Supply, Testing & Commissioning Of above C & R Panels and Equipment)

|    |   |        |
|----|---|--------|
| 1. | 220/132KV Transformer C&R Panels with BCUs                              | 14 Nos |
| 2. | 220KV Feeder C&R Panels with BCU (Distance Protection)                  | 23 Nos |
| 3. | 220KV Feeder C&R Panels with BCU (Differential Protection)              | 7 Nos  |
| 4. | 220KV Bus Bar Protection Panels   | 9 Nos  |
| 5. | 220KV Bus Coupler C&R Panels with BCU                                   | 5 Nos  |
| 6. | GPS Equipment for Time Synchronization along with necessary accessories | 14 Nos |
| 7. | Testing & commissioning of C&R Panels                                   | 72 Nos |

**CHIEF ENGINEER / TRANSMISSION  
APTRANSCO**

Ground Floor, Vidyut Soudha,  
APTRANSCO, Gunadala, Vijayawada-520004.

Website(s): [www.tender.apecurement.gov.in](http://www.tender.apecurement.gov.in)

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## IMPORTANT NOTE TO BIDDERS

All Bidders are requested to note the following new provisions in the Tender Specification

### I) Purchase Preference

Preference for procurement of goods/services/works from 'Class –I local suppliers' under Public Procurement (Preference to Make in India) Order, 2017

In line with Public Procurement (Preference to Make in India) Order, 2017 issued by **Department for promotion of Industry and Internal Trade (DPIIT)**, Ministry of Commerce and Industry, Government of India vide order dated 15/06/2017, its revision dated **04/06/2020(PPP-MII Order)**,

***'Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Power Sector' order dated 28/07/2020 and 17/09/2020.***

As per Orders vide G.O.Ms.NO.9, Industries and Commerce (PROG-I) Department Dt.25.02.2021

and any subsequent modifications/Amendments, if any, **'Class –I local suppliers'** shall be eligible for purchase preference as follows:

- (i) For the purpose of purchase preference under the PPP-MII Order

*'Local Content' means the amount of value added in India which shall be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.*

***'Class –I local supplier' means a supplier or service provider, whose goods , services or works offered for procurement, has Local Content equal to or more than 50%'***.

***'Class –II local supplier' means a supplier or service provider, whose goods , services or works offered for procurement, has Local Content more than 20% but less than 50%'***.

**Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Power Sector, Revised Order No. A-1/2021-FSC-Part(5) dt. 16/11/2021 issued by Ministry of Power (MoP Order) in supersession of all the aforementioned orders the following has been decided:**

*As per Clause 3( ii), in procurement of all goods & Services of works in respect of which there is sufficient local capacity and local competition as in Annexure-I, only “Class-I –Local Suppliers” shall be eligible to bid irrespective of purchase value.*

*In Annexure-I of MoP Order No. A-1/2021-FSC-Part(5) vide dt.16.11.2021 of Govt of India in respect of **Power sector**, Sl.No.A(41), Class-I Local supplier for control and relay panels (including Digital /Numerical Relays) having **Minimum Local Content-50%**.*

Hence it is proposed to incorporate the same clause “**only Class-I –Local Suppliers has MLC is equal to more than 50% shall be eligible to bid**” in the tender specification.

- ii) *The lowest evaluated Price, in bid shall be denoted as L1.*
- (iii) The ‘**Class –I local supplier**’ shall give a self-certification in his bid in the given format, indicating the percentage of Local Content and certifying that the item offered meets the Local Content requirement for ‘Class –I local supplier’, as the case may be and shall give details of the location(s) at which the local value addition is made. Further, in case of procurement value above Rs. 10 Cr, the ‘Class –I local supplier’ shall provide a certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content.
- (iv) False declaration regarding Local Content by the bidder, will be in breach of code of Integrity under Rule 175(1) (i)(h) of General Financial rules for which a bidder or its successors can be debarred for up to two years as per Rule 151(iii) of General Financial rules along with such other actions as may be permissible under law.

## SECTION - I

### Notice Inviting Tenders (NIT)

|     |                                    |   |
|-----|------------------------------------|---|
| 1.  | Department Name                    | TRANSMISSION CORPORATION OF ANDHRA PRADESH LIMITED  |
| 2.  | Circle/ Division Name              | Chief Engineer / Transmission   |
| 3.  | Bid Notice No.                     | PMM 31- e- 25 /2023   |
| 4.  | Name of the material               | 1. 220/132KV Transformer C&R Panels with BCUs --14 Nos<br>2. 220KV Feeder C&R Panels with BCUs (Distance protection) --23 Nos<br>3. 220KV Feeder C&R Panels with BCUs (Differential protection) --7 Nos<br>4. 220KV Bus Bar Protection Panels (16 Bays) --9 Nos<br>5. 220KV Bus Coupler C&R Panels with BCUs -- 5 Nos<br>6. GPS Equipment for Time Synchronization along with necessary accessories --14 Nos<br>7. Testing & commissioning of C&R Panels - 72 Nos |
|     | Estimated Contract Value (ECV)     | <b>Rs. 13,83,59,614 /-</b> (Rupees Thirteen Crore Eighty Three Lakh Fifty Nine Thousand Six Hundred and Fourteen only)  |
| 6.  | Period of Contract                 | Delivery period + Twenty Four months guarantee period   |
| 7.  | Form of Contract                   | Supply, Testing & Commissioning Of above C & R Panels and Equipment under PSDF scheme   |
| 8.  | Bid Type                           | Open Competitive Bidding  |
| 9.  | Bid Category                       | Supply, Testing & Commissioning Of Equipment under PSDF scheme  |
|     | Bid Validity                       | 90 days from Scheduled Bid submission closing date. i.e.,<br><b>18 /10/2023</b>   |
| 10. | BID SECURITY                       | <b>Rs. 27,67,192 /-</b> with a validity to up to <b>17-12-2023.</b><br>(150 days Scheduled Bid submission closing date.)  |
| 11. | BID SECURITY Payable to            | Bank Guarantee in favour of Chief Engineer/Transmission, APTRANSCO, Ground Floor, Vidyut Soudha, Gunadala, Vijayawada-520004. or Online money transfer through NEFT/RTGS.   |
| 12. | Schedule Availability Date         | From 17:00 Hrs. on 22-06-2023   |
| 13. | Pre-bid meeting date               | 04-07-2023 at 11:00Hrs  |
| 14. | Schedule Closing Date & Time       | 15:00 Hrs. on 20-07-2023  |
| 15. | Bid Submission closing Date & time | 17:00 Hrs. on 20 -07-2023   |
| 16. | Bid Submission                     | Online  |

|     |  |  |
|-----|--|--|
| 17. | P.Q / Technical Bid Opening Date (Qualification and Eligibility stage) | At 17.30 Hrs on 20-07-2023   |
| 18. | Price Bid Opening Date & Time  | Will be opened on line.  |
| 19. | Officer Inviting Bids  | Chief Engineer / Transmission  |
| 20. | Address  | Ground Floor, Vidyut Soudha, APTRANSCO, Gunadala, Vijayawada-520004. |
| 21. | Contact Details/Telephone/Fax  | 0866-2429228 & 29. Extn. Nos. , 2034,2042, 2706                      |

## 1. Eligibility Criteria:

The bidder should be a manufacturer who must have designed, manufactured, tested, supplied and executed to power utilities, at least 40% of the quoted quantity of the goods/equipment of same or higher voltage class with same or superior class of Accuracy indicated in the "Schedule of Requirement" in one continuous period of 12 months in the last five years as on the date of opening of bid and its financial turnover during any one year of the last five years should have been equal or more than 100% value of Estimated Contract value. The Bidder should be a manufacturer of Main protective Numerical Relay.

At least 20% of the similar material offered against each item, as indicated in the 'Schedule of Requirements' (Section-IV) should be in successful operation in any Govt. Power Utility since 2 years as on the date of opening of the Bid.

**Note: Performance Certificates issued by an officer not below the rank of Executive Engineer or equivalent cadre of State Govt. Power utility/Government Organizations/ PSU only shall be furnished by the bidder without fail, in support of the above information.**

**"No clarifications shall be asked / entertained regarding Qualification Requirements (Supply, Performance and Financial Turnover). Tenders shall be evaluated with uploaded documents only in the e-procurement website."**

The detailed Qualifying requirements are indicated in Section-VI

**Responsibility for correctness of the information submitted in online bid lies with bidder. If any information furnished in the bid is proved to be false at a later date, the bid will not only be rejected but the bidder will be BLACKLISTED.**

**A) *Purchase preference shall be given to "Class-I local supplier" in procurement process.***

**B) In procurement of all goods, services or works in respect of which the Nodal Department has communicated that there is sufficient local capacity and local competition, only "Class I local supplier" as defined under the Order, shall be eligible to bid irrespective of purchase value.**

The Bidder shall in its bid submit a certificate in compliance to DoE order as per the given format. Further, the firm has to be a 'Class-I local supplier' as defined under Public Procurement (Preference to Make in India) Order, 2017 issued by Department for promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India vide order dated 15/06/2017, its revision dated 04/06/2020 (PPP-MII Order) read in conjunction with 'Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Power Sector' order dated 28/07/2020 and 17/09/2020 issued by Ministry of Power (MoP Order) and subsequent modifications/amendments if any Firms who are not 'Class-I local supplier shall not be eligible to bid.

C) Bidders shall also submit Affidavit of Self certification regarding Minimum Local Content, if applicable, duly signed and stamped on each page and Certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the details of percentage of Local Content, if applicable, duly signed and stamped on each page, in line with PPP-MII order and MoP Order.

2. **Officer Inviting Bids:**

Chief Engineer/ Transmission, APTRANSCO

3. **Address:**

Ground Floor, Vidyut Soudha, APTRANSCO, Eluru Road, Gunadala, Vijayawada-520004.

4. **Contact Details:**

Phone : 0866-2429231 Extn. Nos. 2034, 2042, 2706

5. **Procedure for bid submission:**

Procedure for Submission of Bids:-

a) The Bids should be in the prescribed form, which can be obtained from e-procurement platform from the date of electronic publication up to the time and date indicated in the Bid notice. The intending bidders would be required to enroll themselves on the e-procurement market place [www.tender.apecurement.gov.in](http://www.tender.apecurement.gov.in). Those contractors who register themselves in the e-procurement market place can download the Bid schedules free of cost. The bidder shall authenticate the bid with his digital certificate for submitting the bid electronically on e-procurement platform and the bids not authenticated by digital certificate of the bidder will not be accepted on the e-procurement platform following the G.O.Ms.No.6, I.T&C Department, dated 28-02-2005.

For enrolment and Registration APTS, Vijayawada is to be contacted.

b) Intending bidders can contact office of the Chief Engineer/Transmission, Ground Floor, Vidyut Soudha, APTRANSCO, Eluru Road, Gunadala, Vijayawada-520004 for any clarification/ information on any working day during working hours.

c) The bidders who are desirous of participating in e-procurement shall submit their technical bid, price bid etc. in the standard formats prescribed in the Bid documents, displayed at e-market place. The bidders should invariably upload the statement showing the list of documents uploaded in the e-market place in support of their technical bid. The bidder should upload scanned copies of the certificates, documents etc. as called for hereunder. The bidder shall upload all the statements, documents, certificates duly signed by him, owning responsibility for their correctness/ authenticity.

d) Technical bid evaluation of the bidders would be done on the certificates/ documents furnished by the bidder against the qualification criteria.

- e) The bidders shall invariably upload the scanned copy of Bid Security, either copy of online money transfer / Bank Guarantee. The successful bidder shall furnish the original of the same either personally or through courier or by post within the stipulated time specified by the purchaser.

The bidder shall invariably upload the following:

- i) Documentary evidence to establish the quantities supplied so far such as Invoices, Delivery Challans, Excise Duty documents etc. along with Purchase Orders against 40% quantity of supply and 20% quantity of satisfactory performance to meet the Qualifying Requirements.
- ii) Performance reports to meet QR-Performance.
- iii) Documents in respect of Financial Turnover of last five years.
- iv) Type test reports of past (7) Seven years.
- v) Guaranteed Technical Particulars (GTP), drawings etc.

The bidder shall furnish original of all documents/ certificates/ statements uploaded by him whenever sought by the Purchaser. The successful bidder shall furnish their company brochures, technical write-ups and printed materials if any.

**The bidder shall furnish the declaration that:**

- 1) They have not been blacklisted/ debarred by any department due to any reasons, as per the format enclosed.
- 2) They will agree to get disqualified themselves for any wrong declaration in respect of the above and get their Bid summarily rejected.
- 3) The soft copies uploaded by them are genuine.

Any incorrectness/ deviations noticed will be viewed seriously and apart from cancelling the contract, duly forfeiting the Bid security, criminal action will be initiated including suspension of business and/ or black listing.

**6. General Terms & Conditions:**

Bids are invited on the e-procurement platform for the above-mentioned procurement from the firms eligible.

- i) Bid security to be paid in the shape of online money transfer (or) Bank Guarantee issued from any Nationalized/Scheduled Bank to be valid for a period of 60 days over and above the validity of Bid i.e. **150 days** from the date of bid opening. Scanned copy of Demand Draft or Bank Guarantee towards Bid security shall be uploaded along with the Bids. Originals must be submitted by successful bidder to the purchaser through registered post/ courier/ in person before placing of the order. Bid Security shall be furnished for each Lot separately.
- ii) Exemption for payment of Bid security is not allowed in any case. The permanent Bid Security Bank Guarantee accepted earlier is deemed to have been withdrawn.

Permanent Bid Security Bank Guarantee is not accepted. Bid security extensions accorded earlier are deemed to have been withdrawn.

- iii) Bid schedules: Bid schedule can be downloaded free of cost from the web site [www.tender.apecurement.gov.in](http://www.tender.apecurement.gov.in)
- iv) The bidder is subject to be disqualified, if he is found to have mislead or furnished false information in the forms/ Statements/ Certificates submitted in proof of qualification requirements and any record of abandoning supplies, not fulfilling contractual obligations in earlier contracts, inordinate delays in completion of supplies, litigation history, Financial failures or participating in the previous Bidding for the same supply and quoting unreasonably high price.

Even while execution of the contract, if it is found that the bidder had produced false/fake certificates of experience, he will be black listed and the contract will be terminated and his Bid security will be forfeited and contract will be carried through other agency at his cost and risk..

- v) a) **Transaction fee** : The participating bidders have to pay transaction fee of 0.03% on Estimated Contract Value (ECV) with a cap of Rs 10,000/- (Rupees ten thousands only) for all tenders with ECV up to Rs.50.00 crore plus service charges @ 15% and Rs.25,000/- (Rupees Twenty Five thousand only) plus service charges @ 15% for tenders with Estimated Contract Value (ECV) above Rs.50.00 crore online payment gateway with any master/visa credit card issued by any Bank and through net Banking facility (direct debit) with AXIS/ICICI or HDFC Banks at the time of bid submission. Submission is mandatory as per G.O. Ms.No.13. Payment of transaction fee through DD will not be accepted".
- b) **Corpus Fund** : The successful bidder shall pay an amount equivalent to 0.04% of ECV (estimated contract value) with a cap of Rs. 10,000/- (Rupees Ten Thousand only) for all tenders with ECV up to Rs.50.00 Crore and Rs.25,000/- (Rupees Twenty Five Thousand only) for tenders with ECV above Rs.50.00 crore on e-Procurement platform, before entering into agreement/issue of purchase orders towards e-Procurement fund in favour of Managing Director, APTS, Vijayawada through the Agreement authority.
- vi) In case of discrepancy with Bid conditions in the Bid document and NIT, the condition in the Bid document prevails.
- vii) **Note:**
  - a) Any other condition regarding receipt of Bids in conventional method appearing in the Bid documents may please be treated as not applicable.
  - b) The contractors are to upload the information preferably in Zip format.
  - c) The contractors should upload the documents duly signing each and every paper.

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## SECTION-II (A)

### INSTRUCTIONS TO BIDDERS

The Chief Engineer/ Transmission, APTRANSCO invites bids on e-platform in two parts for the materials indicated in the “Schedule of Requirements” during the period, for which dates and time specified in the NIT, and will be opened by ( him) or his nominee at this office on the date and time mentioned in the NIT.

- 1.1 The intending Bidders would be required to enroll themselves on the ‘e’-procurement market place at [www.tender.apecurement.gov.in](http://www.tender.apecurement.gov.in)
- 1.2 The Bids should be in the prescribed form invited on e-procurement by the Chief Engineer/ Transmission, Ground Floor, Vidyut Soudha, APTRANSCO, Eluru Road, Gunadala, Vijayawada-520004. (as specified in NIT) that can be downloaded free of cost from the website [www.tender.apecurement.gov.in](http://www.tender.apecurement.gov.in)
- 1.3 The dates stipulated in the Bid notice i.e. NIT are firm and under any circumstances they will not be relaxed unless officially extended.
- 1.4 The Bidder should upload scanned copies as specified in checklist and all enclosures required for the schedules and Appendices. Bidders should produce the originals of Bid Security and all other documents for verification if asked for by the Competent Authority within 3 (Three) days.
- 1.5 **Transaction fee** : The Transaction fee at **0.03% on ECV (Estimated Contract Value) in total against which the Bidder has offered his Bid** with a cap of Rs.10,000/- for all procurements with ECV up to Rs.50.00 Crore and Rs.25,000/- for procurements with ECV above Rs.50.00 Crore, and **15 %** on transaction fees as GST. Transaction Fee & other charges shall be paid by either Credit Card or Debit Card. The Payment Gateway accepts all Master and VISA credit cards issued by any bank to conduct the transaction. The facility is mandatory for all bidders.
- 1.6 The successful bidder shall pay an amount equivalent to **0.04%** of Estimated Contract value against which contract is awarded with a cap of Rs.10,000/- (Rupees ten thousand only) for all works/supplies with ECV upto Rs.50.00 Crore and Rs.25,000/- (Rupees Twenty Five thousand only) for works/supplies with ECV above Rs.50.00 crore on e-procurement platform before entering into agreement/issue of purchase orders, towards e-Procurement fund in favour of Managing Director, APTS, Vijayawada through the Agreement authority.
- 1.7 The successful Bidder is expected to complete the supplies within the time period specified in the NIT/ Schedule of Requirement.
2. Bidders / Firms eligible to Bid :
- 2.0 The Bidders / Firms who

- i) Possess the valid registration as mentioned in the NIT and satisfies all the conditions therein.
- ii) Are not blacklisted or debarred or suspended by any **department** for whatever be the reason, prohibiting them not to continue in the contracting business
- iii) Have complied with the eligibility criteria specified in the NIT are the eligible Bidders /Firms.

**2.1 Bidders / Firms ineligible to Bid:**

- (i) A retired officer of the Govt. of AP or Govt. of India executing works/supplies is disqualified from Bidding for a period of two years from the date of retirement without the prior permission of the Government.
- (ii) The Bidder who has employed any retired officer as mentioned above shall be considered as an ineligible Bidder.
- (iii) The contractor himself or any of his employee is found to be Gazetted Officer who retired from Government Service and had not obtained permission from the Government for accepting the contractor's employment within a period of 2 years from the date of his retirement.
- (iv) The Contractor or any of his employees is found at any time after award of contract, to be such a person who had not obtained the permission of the Government as aforesaid before submission of the Bid or engagement in the Contractor's service.
- v) Contractor shall not be eligible to Bid for works/supplies in AP Transco where any of his near relatives are employed in the rank of Assistant Engineer or Assistant Executive Engineers and above on the Engineering side and Assistant Accounts Officer and above on the accounts side. The Contractor shall intimate the names of persons who are working with him in any capacity or are subsequently employed. He shall also furnish a list of Gazetted /Non-Gazetted State Government Employees related to him. Failure to furnish such information Bidder is liable to be removed from the list of approved contractors and his contract is liable for cancellation.

**Note: Near relatives include**

**Sons, step sons, daughters, and step-daughters.**

**Son-in-law, and daughter-in-law.**

**Brother-in-law, and sister-in-law.**

**Brothers and Sisters.**

**Father and Mother.**

**Wife / Husband.**

**Father-in-law and Mother-in-law**

**Nephews, nieces, uncles and aunts**

**Cousins and**

**Any person residing with or dependent on the contractor.**

### **3.0 Qualification Requirements of the Bidders :**

#### **3.1 The Bidder shall furnish the following particulars in the formats provided online and supported documentary evidence shall be uploaded :**

Attested copies of documents relating to the Registration of the firm, Partnership deed, Articles of Association, Commercial Tax Registration, Latest Income Tax Clearance certificate / latest IT return and PAN number from IT Department etc.

**Note:** The Partnership firms, which are registered as Contractors shall intimate the change in partnership deed, if any, as per GO Ms No.58, I & CAD, dt.23.4.2002 within one month of such change. Failure to notify the change to the registration authority in time will entail the firms to forfeit their registration and their Bid will be rejected. The intimation of change of partners if any and the acceptance by the Registration authority may be enclosed.

Availability of key personnel for administration/ site management and execution viz., technical personnel required for the work.

3.2 Bids from Joint Ventures / agents / consortiums are not acceptable.

3.3 Qualification criteria for opening of the price bid:

3.4 Even though the Bidders meet the above qualification requirements, they are liable to be disqualified / debarred / suspended / blacklisted if they have:

3.4.1 Furnished false / fabricated particulars in the forms, statements and/annexures submitted in proof of the qualification requirements and/or,

3.4.2 Not turned up for entering into agreement, when called upon within the time specified in the letter of acceptance,

3.4.3 Record of poor progress such as abandoning the work/supplies , not properly completing the contract, inordinate delays in completion, litigation history or financial failures etc.,

3.4.4 Participated in the previous bidding for the same work and had quoted unreasonably high Bid percentage and,

3.4.5 A history of criminal record in which the Bidder is involved if any.

3.4.6 Even while execution of the contract, if found that the contract was awarded to the Contractor based on false/fake certificates of experience, the Contractor will be blacklisted and contractor will be taken over invoking clause-61 of PS to APSS.

3.4.7 History of litigation with Govt. during the last 5 years in which the Bidder is involved.

3.4.8 Bidders should specifically indicate whether their firm has been banned/blacklisted/debarred by any Govt. department/undertaking or any power utility for non-performance/malpractice or due to any reason. Bids of bidders who are banned/black-listed/debarred will be treated as non-responsive.

### 3.5 **ELIGIBILITY CRITERIA:**

#### A) **PHYSICAL EXPERIENCE:**

The bidder should be a manufacturer who must have designed, manufactured, tested, supplied and executed to Power Utilities, at least 40% of the quoted quantity of the goods/equipment of same or higher voltage class with same or superior Class of Accuracy indicated in the “Schedule of Requirement” in one continuous period of 12 months in the last five years as on the date of opening of bid (The bidder is required to furnish the year wise supply of Material and the maximum quantity of Material supplied in one continuous period of 12 months of the last five years along with proof of supplies). The Bidder should be a manufacturer of Main protective Numerical Relay.

#### B) **PERFORMANCE:**

At least 20% of the similar material offered, as indicated in the ‘Schedule of Requirements’ should be in successful operation since 2 years in any Govt. Power Utility as on the date of opening of the Bid.

(The bidder is required to furnish evidence and certificates for the quantity of material which are in successful operation since 2 years as on the date of opening of the Bid.)

Note: The above eligibility criteria shall be fulfilled by the bidder against each lot separately for the lots the Bidder has quoted, in case of more than one lot.

**Note: Performance Certificates issued by an officer not below the rank of Executive Engineer or equivalent cadre of State Govt. Power utility/Government Organizations/ PSU only shall be furnished by the bidder without fail, in support of the above information.**

#### C) **FINANCIAL TURNOVER:**

1. Financial turnover during any one year of the last five years should have been equal or more than the estimated contract value. (The bidder is required to furnish the Financial Turnover of last five years).
2. Reports on financial standing of the Bidder such as profit and loss statement, balance sheets and auditor’s report for the past FIVE years, in support of financial turnover and Banker’s certificates regarding Bank limits.

**“No clarifications shall be asked / entertained regarding Qualification Requirements (Supply, Performance and Financial Turnover). Tenders shall be evaluated with uploaded documents only in the e-procurement website.”**

D) **TYPE TEST REPORTS:** The bidder shall furnish Type Test Reports. The type tests must have been conducted on the material offered as per the relevant IS in recognized laboratory as per the latest revision of the Technical Specification. **The date of type tests will not be earlier than SEVEN years as on the date of bid**

**opening.** If any change in design was made latest type tests shall be furnished along with approved drawing. The Bids received without type test reports will be treated as Non-Responsive. (Bidder is required to furnish the Year of Type Test Reports done for similar Material in the remarks column of technical particulars)

The bidder shall furnish type test certificates and IEC 61850 conformance test certificates (along with GOOSE publish & subscription) by KEMA / UCA / equivalent accredited laboratory for the offered relays along with the bid. The date of above certificates shall not be earlier than seven years period from the date of bid opening. The SAS Supplier shall be an ISO certified company to ensure the quality of system standard. Proof should be enclosed.

The detailed Qualifying Requirements are indicated at Section –VI

**Responsibility of correctness of the information submitted in online bid lies with bidder. If any information furnished in the bid is proved to be false at a later date, the bid will not only be rejected but the bidder will be BLACKLISTED.**

**The bids not complying with the stipulated completion period will be treated as non-responsive.**

While being equal or compatible in other aspects preference will be given to those bidders who have experience in erection of above works/supplies similar to that given in the specification or of higher voltages during the last five financial years.

IF A BIDDER QUOTING FOR THE BIDS IS HAVING POOR PERFORMANCE IN THE AND NOT COMMENSURATE WITH THE AGREEMENT IN THE PREVIOUS CONTRACTS, THE BID OF SUCH BIDDER WILL NOT BE CONSIDERED FOR AWARD OF CONTRACT.

#### **4.0 One Bid per Bidder:**

Each Bidder shall submit only one Bid. A Bidder who submits more than one Bid will cause dis-qualification of all the Bids submitted by the Bidder.

#### **5.0 Cost of Bidding :**

The Bidder shall bear all costs associated with the preparation and submission of his Bid and the Bid inviting authority will in no case be responsible and liable for those costs.

## SECTION –II (B) : CHECK LIST

The bidders shall invariably upload the information and records listed in the check list below on **e-procurement platform**, and also confirm by marking Yes or No. The same shall have to be furnished either personally or through courier or by post in the stipulated time, if asked by the Purchaser.

|    |  |          |
|----|--|----------|
| 1  | State whether the work / materials offered conforms to the relevant APTRANSCO's / ISS Specifications and drawings. (If not Specify the Deviations in Annexure)   | Yes / No |
| 2  | State whether Qualification and Performance particulars are uploaded along with necessary performance certificates in PDF formats.   | Yes / No |
| 3  | State whether copies of 'Tax Deducted at Source' certificates are uploaded with proper attestation in PDF formats.   | Yes / No |
| 4  | State whether copy of 'GST Registration Certificates' are uploaded with proper attestation in PDF formats.   | Yes / No |
| 5  | State whether copy of 'A-Grade license certificate' issued by CEIG is uploaded with proper attestation in PDF formats.   | Yes / No |
| 6  | State whether copy of 'Income Tax registration / PAN registration certificate' are uploaded with proper attestation in PDF formats.  | Yes / No |
| 7  | State whether complete Quantity is quoted. (Bidder must quote for 100% of quantities of all items)   | Yes / No |
| 8  | Whether copy of Original Bid Security BG / online money transfer or payment uploaded <b>for each Lot separately</b> ?  | Yes / No |
| 9  | Whether Transaction Fee is paid electronically or not. The copy of the receipt may be uploaded.  | Yes / No |
| 10 | Whether Guaranteed Technical Particulars (GTP) are uploaded  | Yes / No |
| 11 | Whether Proof of Turnover signed by Auditors are uploaded  | Yes / No |
| 12 | Whether Form-1 i.e. Q.R. and Performance statements uploaded   | Yes / No |
| 13 | Whether all the documents as proof to the Pre-Qualification Requirement i.e. 40% quantity of supply in 12 months from the utilities as called for, are uploaded  | Yes / No |
| 14 | Whether all the documents pertaining to the 2 years satisfactory performance, i.e., satisfactory performance certificates from the govt. power utilities with documentary proof with attestation, are uploaded | Yes / No |
| 15 | State whether Bank's Certificate for availability of Credit facilities are uploaded  | Yes / No |
| 16 | Whether Schedule of Deviations - Technical & Commercial are uploaded   | Yes / No |
| 17 | State whether Clause 1.0 of Section II Financial is accepted.  | Yes / No |
| 18 | State whether Bid Validity is offered as per specification.  | Yes / No |

|    |   |          |
|----|---|----------|
| 19 | State whether APTRANSCO's Payment Terms are accepted.   | Yes / No |
| 20 | State whether APTRANSCO's Penalty Clause is accepted.   | Yes / No |
| 21 | State whether APTRANSCO's Delivery Schedule / Completion period is accepted.  | Yes / No |
| 22 | Are you prepared to furnish Performance Security B.G. if order is placed?   | Yes / No |
| 23 | State whether APTRANSCO's Guarantee Clause is accepted.   | Yes / No |
| 24 | State whether Bid form uploaded   | Yes / No |
| 25 | State whether all the Schedules are uploaded.   | Yes / No |
| 26 | State whether the Guaranteed Technical Particulars for Section-2 to Section -6 of technical Specification are uploaded  | Yes / No |
| 27 | State whether copies of type test certificates for equipment/materials are uploaded.  | Yes / No |
| 28 | State whether all the clauses are accepted.   | Yes / No |
| 29 | State whether prices Schedule –A are uploaded. (Commercial schedules)   | Yes / No |
| 30 | Whether 'Declaration Form' uploaded   | Yes / No |
| 31 | Whether copies of Type Test Certificates uploaded   | Yes / No |
| 32 | Whether uploaded the Forms as per Section-VII of the Specification?   | Yes / No |
| 33 | Whether uploaded the undertaking informing that firm has not been banned/black listed/debarred by any Govt. Department / undertaking or any power utility for non-performance or malpractice? | Yes / No |
| 34 | Whether all the required forms (including Forms -13 to 15) are uploaded.  | Yes / No |
| 35 | <b>Whether 8 digits HSN Codes (GST) of all the quoted items in separate sheet</b> are uploaded.   | Yes / No |

*The Bidder shall indicate that all the forms and enclosures indicated in the checklist furnished are compiled with.*

**SIGNATURE OF THE BIDDER**

## SECTION – III

# GENERAL TERMS & CONDITIONS OF THE CONTRACT

## A. Introduction

### 1. Definitions

1.1 In this Contract, the following terms will be interpreted as indicated:

- (a) "The Contract" means the agreement entered into between the Purchaser and the Supplier, as recorded in the contract Form signed by the Parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- (b) "The Contract Price" means the price payable to the Supplier under the Contract for the full and proper performance of its contractual obligations.
- (c) "The Materials / equipment" means all of the material/ equipment, machinery, and/or other materials which the Supplier is required to supply to the Purchaser under the Contract.
- (d) "The Services" means those services ancillary to the supply of the material/ equipment, such as transportation and insurance, and any other incidental Services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Supplier covered under the Contract.
- (e) "GCC" means the General Terms and Conditions of Contract contained in the section.
- (f) "The Purchaser" means the organization purchasing the Materials / equipment.**
- (g) Vendor is a supplier for supply of material/ equipment.**
- (h) "The Supplier" means the firm supplying the Materials / equipment and Services under this Contract.
- (i) "Day" means calendar day.

### 2. Applicability

2.1 These General Conditions of contract will apply to the extent that they are not superseded by provisions of Salient features of the Bid.

### 3 (a) Standards:

The equipment/material supplied under this Contract will conform to the Standards mentioned in the Technical specifications, and, when no applicable standard is mentioned, the authoritative standards appropriate to the equipment/ material, i.e., BIS, such standards will be the latest. All material will be of the best class and will be

capable of satisfactory operation under tropical conditions without distortion or deterioration.

**3 (b) Interchangeability:**

All similar material and removable parts of similar equipment will be interchangeable with each other. A specific confirmation of this should be furnished in the bid.

**4. Scope of Work:**

This specification covers design, manufacture, testing and delivery FADS (Free at Destination Stores) of the equipment/ material described in Section-IV 'Schedule of Requirements' and Section-V 'Technical Specification'. And also Supply, Erection, Installation, Testing & commissioning Of above C & R Panels and Equipment.

**5. Eligible Bidders:**

Vendors for supply of the equipment/ material listed in section 'Schedule of Requirements' of Bid specification and meeting the Qualification Requirements described in section 'Qualifying Requirements' only need quote. Bids received from firms not meeting the above criteria will not be considered.

Any company/vendor/supplier/contractor that is blacklisted / debarred by any power utility is not eligible to participate in the tenders.

**B. THE BIDDING DOCUMENTS:**

**6. Contents of Bidding Document:**

6.1 The Material/ equipment required, bidding procedures, and contract terms are prescribed in the bidding documents as listed below:

1. Notice Inviting Tenders (NIT) – Section-I
2. Instruction to Bidders & Check List – Section-II
3. General Terms and Conditions of Contract – Section-III
4. Schedule of Requirements & Delivery Schedule – Section-IV
5. Technical Specifications – Section-V
6. Qualification Requirements – Section-VI
7. Sample Forms – Section-VII

(Qualification & Performance Statements, Bid Security form, Details to be furnished by Manufacturer, Performance Security form, Schedule of Deviations and Other forms to be duly filled-in & signed and up-loaded).

6.2 The Bidder is expected to examine all instructions, forms, terms and Technical specifications in the bidding documents. Failure to furnish all information required by the bidding documents, or to submit a bid not responsive to the

bidding documents in every respect will be at Bidder's risk and may result in the rejection of its Bid.

## **7. Clarification of Bidding Documents:**

Clarification of Bidding Documents: A prospective Bidder requiring any clarification of the bidding documents may notify the Purchaser in writing or by fax at the Purchaser's address. The Purchaser will respond in writing to any request for clarification of the bidding documents, which it receives no later than fifteen (15) days prior to the deadline for the submission of bids. Written copies of Purchaser's response (including an explanation of the query but without identifying the source of inquiry) will be put on e-procurement platform/ website of the purchaser.

## **8. Amendment to Bidding Documents:**

- 8.1 At any time prior to the deadline for submission of bids, the Purchaser, for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder, may modify the bidding documents by amendment.
- 8.2 All such amendments also would be made available on the e-procurement platform/ website of APTRANSCO and such amendments will be binding on the respective Bidders.
- 8.3 In order to allow prospective Bidders reasonable time in which to take the amendment into account in preparing their bids, the Purchaser, at its discretion, may extend the deadline for the submission of bids.

## **C. PREPARATION OF BIDS**

### **9. Language of Bid:**

The bid prepared by the Bidder including all correspondence and documents relating to the bid exchanged by the Bidder and the Purchaser, will be in English.

### **10. Cost Associated with Bidding:**

The Bidder will bear all costs associated with the preparation and submission of its bid, and the Purchaser, will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

- Bidders have to pay a transaction fee @ 0.03% of ECV (Estimated Contract Value) with a cap of Rs.10,000/- for all works/ supplies with ECV up to Rs.50.00 Crore and Rs.25,000/- for works/supplies with ECV above Rs.50.00 Crore, at the time of bid submission electronically.
- Transaction Fee & other charges shall be paid by either Credit Card or Debit Card.
- Bidders have to pay 'service tax' as levied by Government of India on transaction fee, electronic payment gateway charges.

**The successful bidder shall pay an amount equivalent to 0.04% of Estimated Contract value against which contract is awarded with a cap of Rs.10,000/- (Rupees**

**ten thousand only) for all works/supplies with ECV upto Rs.50.00 Crore and Rs.25,000/- (Rupees Twenty Five thousand only) for works/supplies with ECV above Rs.50.00 crore on e-procurement platform before entering into agreement/issue of purchase orders, towards e-Procurement fund in favour of Managing Director, APTS, Hyderabad through the Agreement authority.**

Bidders shall obtain digital certificates from APTS.

## **11. Documents Constituting the Bid :**

- a) The Bid comprises the following.
  - (i) Bid documents and Price Bid,  
[Available online at [www.tender.apecprocurement.gov.in](http://www.tender.apecprocurement.gov.in)]
  - (ii) Qualification information and supporting documents  
[to be uploaded by the Bidder]
- b) Documentary evidence establishing in accordance with Clause No.19 'Documents Establishing Bidder's Eligibility and Qualifications' that the Bidder is eligible to bid and is qualified to perform the contract if its bid is accepted.
- c) Documentary evidence establishing that the Materials/ equipment and ancillary services to be supplied by the Bidder are as per the Technical specification of the bidding documents,
- d) Bid Security in accordance with Clause No.20, and as indicated in the Bid Notification.
- e) Taxes and Duties clearance certificates
- f) Schedule of Deviations - a) Commercial & b) Technical

All the Schedules will be duly filled online with full details as called for in the schedules required for evaluation of bids. Bidders are expected to duly fill in all the schedules and sample forms and enclosed them to the Bid.

## **12. Commercial form**

The Bidder will complete the commercial form appropriately on e-procurement platform.

## **13. Bid Prices:**

- 13.1 The prices quoted shall be **Firm**. Bids will be called for with prices FADS inclusive of packing and forwarding GST and other legally permissible duties and levies wherever applicable, handling charges to cover the transport by road from destination railway station to site/stores, unloading at site/stores and insurance (transit and storage at site for 45 days).
- 13.2 Even though composite price is given the break-up for all the duties, taxes, freight, insurance, packing and forwarding etc., will be furnished. **Freight & Insurance shall be quoted separately. Quoting them 'inclusive'/'zero' will not be accepted.**

13.3 It is the responsibility of the Bidder to know the prevailing statutory taxes. APTRANSCO considers evaluation of bid price on the basis of prevailing tax rates as on the date of "Tender Calling Date".

**14. Variable prices & Price Variation basis: Not Applicable.**

**15. Taxes and Duties:**

15.1 A bidder will be entirely responsible for quoting the correct taxes and duties, other local taxes or levies if any, license fees, etc., he has to incur until completion of the contract. For the purpose of evaluation, the bidder should clearly indicate the GST with HSN Code of that item and any other taxes and levies payable in the respective columns provided in the Commercial form on e-procurement platform. Failure to furnish the details as prescribed in the price schedule will be loaded as indicated in the evaluation criteria.

15.2 If the rates of statutory levies assumed by the Bidder are less than the actual rates prevailing at the time of bidding, the Purchaser will not be responsible for such errors. If the rates of statutory levies assumed by the Bidder are later proved to be higher than the actual/ correct rates prevailing at the time of bidding, the difference will be passed on to the credit of the Purchaser.

15.3. Deemed Export Benefits: This is not applicable for local purchases with APTRANSCO funds.

**16. Statutory Variations:**

Any variation up or down in statutory levy or new levies introduced after calling tenders under this specification will be to the account of APTRANSCO, provided that in cases where delivery schedule is not adhered to by the supplier and there are upward variation/ revision after the agreed delivered date, the supplier will bear the impact of such levies and if there is downward variation / revision the APTRANSCO will be given credit to that extent.

Statutory variation if any allowed, it is allowed only once during delivery period, i.e. at the time of delivery of goods at factory".

In case of sub-vendor items, taxes & duties are inclusive in tender price and no statutory variation is applicable.

In cases where the bidder assumes less tax rates and become lowest, upward variation of taxes will not be considered. In case of the bought out items for which the prices are quoted all inclusive of taxes, statutory variation shall not be applicable.

**17. Bid Currencies:**

Prices will be quoted in Indian Rupees; and will be paid in Indian Rupees Only.

**18. Quantity to quote:**

Bidder shall quote 100% of the quantity of all items indicated in the “Schedule of requirements” in the bid specification on single responsibility basis. For awarding the bidder should meet aggregate qualification

Offers less than the prescribed quantity are liable for rejection.

## **19. Documents Establishing Bidder’s Eligibility and Qualifications:**

The Bidder shall furnish, as part of its bid, documents establishing the Bidder's eligibility to bid and its qualifications to perform the contract if its bid is accepted.

The documentary evidence of the Bidder's qualifications to perform the contract if its bid is accepted shall establish to the Purchaser's satisfaction:

- (a) that the Bidder has the financial, technical, and production capability necessary to perform the contract;
- (c) that the Bidder meets the Qualification criteria listed in Section-VI. In addition the Bidder may furnish full particulars regarding supply of the material in question made so far to APTRANSCO during the last 5 years and other reputed power utilities.

### **19.1 Documents Establishing Equipment/ material conformity to Bidding Documents :**

The Bidder will furnish as part of its bid, documents establishing conformity to the bidding documents of all Material/ equipment and services, which the Bidder proposes to supply under the Contract.

The documentary evidence of conformity of the material/equipment and the services to bidding documents may be in the form of literature, drawings, data, and will consist of:

- (a) a detailed description of the essential technical and performance characteristics of the materials/ equipment;
- (b) the bidder should specifically mention about furnishing the test certificates and a copy of test certificate should be uploaded along with the bid.
- (c) a list giving full particulars, including available sources and current prices of spare parts, special tools etc., necessary for the proper and continuing functioning of the Material/equipment following commencement of the use of the Material/ equipment by the Purchaser; and
- (d) an item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsive-ness of the equipment/ material and services to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications.

For purposes of the commentary to be furnished pursuant to above, the Bidder will note that standards for workmanship, material, and equipment, as well as references to brand names or catalogue numbers designated by the Purchaser in its Technical

Specifications, are intended to be descriptive only and not restrictive. The Bidder may substitute alternative standards, brand names, and/or catalogue numbers in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications.

**20. Bid Security:**

- 20.1 The bidder shall furnish, as part of its bid, a bid security as mentioned in Section – I (NIT). The bidders may furnish a scanned copy of B.G. as per the proforma attached or receipt of on line money transfer through NEFT / RTGS. The scanned copy of BG or receipt of on line money transfer through NEFT / RTGS should invariably uploaded along with the bids.
- 20.2 Existing permanent bid security and existing exemptions for bid security have been withdrawn hence will not be accepted.
- 20.3 Submission of bid security by way of cheque, cash, money order, call deposit, existing permanent bid security and existing exemptions for bid security will not be accepted and will be considered as disqualification.
- 20.4 Requests for exemption from payment of bid security will not be entertained in any other cases.
- 20.5 Any bid not secured as above will be rejected by the purchaser.
- 20.6 The successful bidder's bid security original shall be furnished before placing of order and the same will be discharged after the award of contract and acceptance of performance security.
- 20.7 The Bid Security may be forfeited:
  - (a) **if a Bidder :**
    - i) Withdraws its bid or alters its prices during the period of bid validity specified by the Bidder, or
    - ii) Does not accept the correction of errors pursuant to Clause No.30.2; or
    - iii) Offers post Bid rebates, revisions or deviations in quoted prices and/ or conditions or any such offers which will give a benefit to the Bidder over others will not only be rejected outright but the original Bid itself will get disqualified on this account and the Bidder's BID SECURITY will be forfeited.
  - (b) In the case of a successful Bidder, if the Bidder fails:
    - i) To sign the contract in accordance with Clause No.38.
    - ii) To furnish performance security in accordance with Clause No.39.

20.8 Bids without Bid Security will be rejected and bidder will run the risk of being banned.

## **21. Period of Validity of Bids:**

21.1 Bids will remain valid for the period of **ninety (90)** days from the date of bid opening prescribed by the Purchaser. A bid valid for a shorter period will be rejected.

21.2 In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity. The request and the responses there to will be made in writing (or by Fax). The Bid Security Bank Guarantee provided under Clause No.20 shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid Security.

## **22. Tax Clearance Certificates:**

22.1 Copies of Income Tax, GST and Turnover Tax certificates for the latest period from the appropriate authority will invariably be enclosed to the bid. In the case of proprietary or partnership firm it will be necessary to produce the certificate/certificates for the proprietor or proprietors and for each of the partners as the case may be. If the Bidder has already produced the certificate during the calendar year in which the bid is made, it will be sufficient, if particulars are given.

## **23. Service Conditions:**

23.1 The equipment / materials offered will be entirely satisfactory for operation under the climatic conditions indicated below.

|     |  |   |  |
|-----|--|---|--|
| (a) | Location                                       | - | at various sub-stations in the state of Andhra Pradesh |
| (b) | Maximum ambient air temperature                |   | 55 °C  |
| (c) | Minimum ambient air temperature                |   | 5 °C   |
| (d) | Average daily ambient air temperature          |   | 35 °C  |
| (e) | Maximum relative humidity                      |   | 74 %   |
| (f) | Maximum altitude above mean sea level          |   | 1000 m   |
| (g) | Average number of thunder storm days per annum |   | 40 days  |
| (h) | Average number of rainy days / annum           |   | 90 days  |
| (i) | Average tropical monsoon condition per annum   |   | 3 months   |
| (j) | Average Annual Rain fall                       |   | 925 mm   |
| (k) | Maximum wind pressure                          |   | 200 kg/Sq.m.   |
| (l) | Isoceraunic level per annum                    |   | 50 days  |
| (m) | Seismic level (horizontal acceleration)        |   | 0.10 g   |

23.2 Due consideration will be given to any special devices or attachments put forward by the Bidder which are calculated to enhance the general utility and the safe and efficient operation of the equipment / materials.

24. Format & Signature of Bidder : Clause deleted.

#### **D. Submission of Bids :**

##### **25. Procedure for Submission of Bids :**

25.1 Bids should be in the prescribed form, which can be obtained from 'e-procurement' platform from the date of electronic publication up to the time and date indicated in the Bid notice. The intending bidders would be required to enroll themselves on the 'e-procurement' market-place [www.eprocurement.gov.in](http://www.eprocurement.gov.in). Those bidders who register themselves in the 'e-procurement' market place can download the Bid specification and the Bid schedules free of cost.

The bidder shall authenticate the bid with his digital certificate for submitting the bid electronically on e-procurement platform **and the bids not authenticated by digital certificate of the bidder will not be accepted on the e-procurement platform** following the G.O.Ms.No.6, I.T&C Department, dated 28-02-2005.

25.2 Intending bidders can contact office of the Chief Engineer/Transmission, Ground Floor, Vidyut Soudha, APTRANSCO, Gunadala, Vijayawada-520004 for any clarification/information on any working day during working hours.

25.3 The bidders who are desirous of participating in "e-procurement" shall submit their technical bids, price bids etc., in the standard formats prescribed in the Bid documents, displayed at "e" market place. The bidders should invariably upload the statement showing the list of documents etc., in the "e" market place in support of their Technical bids. The bidder should load scanned copies of all relevant certificates. **The bidder shall sign on all the statements, documents, certificates, uploaded by him, owning responsibility for their correctness/ authenticity.**

**If any bidder uploads the Bid without paying Bid security, he will be blacklisted. Similarly, if any of the certificates, documents etc., furnished by the Bidder are found to be false/fabricated/bogus, the Bidder will be blacklisted and bid security forfeited.**

25.4 The Bidder will invariably complete the Bid in full.

25.5 Telegraphic quotations and quotations by fax will not be entertained under any circumstances. Clarification, amplifications, and / or any other correspondence from the Bidder subsequent to the opening of bid will not be entertained.

**The Bidders are advised to ensure that their bids are uploaded in complete shape at the first instance itself.**

##### **26. Deadline for Submission of Bids**

The Purchaser may, at its discretion, extend this deadline for the submission of bids by amending the bidding documents in which case all rights and obligations of the

Purchaser and Bidders previously subject to the deadline will thereafter be subject to the deadline as extended.

**27. Modification and Withdrawal of Bids**

No bid may be modified after the deadline for submission of bids.

No bid may be withdrawn in the interval between the deadline for submission of bids and the expiration of the period of bid validity specified. Withdrawal of a bid during this interval may result in the forfeiture of its Bid Security.

**E. Opening and Evaluation of Bids**

**28. Opening of Bids by the Purchaser**

28.1 The Purchaser will open all the Pre-Qualification/ Technical bids meeting above criteria. In case the Technical, Financial & Pre-qualification requirements are found to be adequate and as required after the examination, Price Bids will be opened at later date.

28.2 If the Technical, Financial & Pre-Qualification requirements are found to be inadequate, the 'Price Bid' of such unqualified Bidders will not be opened.

**29. Clarification of Bids**

29.1 During evaluation of the bids, the Purchaser may, at its discretion, ask the Bidder for a clarification of its Bid. The request for clarification and the response will be in writing, and no change in the prices or substance of the bid will be sought, offered, or permitted.

**30. Preliminary Examination**

30.1 The Purchaser will examine the bids to determine whether they are complete, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order.

30.2 The Purchaser may waive any minor informality, nonconformity, or irregularity in bid which does not constitute a material deviation, provided such waiver doesn't prejudice or affect the relative ranking of any Bidder.

30.3 Prior to the detailed evaluation, the Purchaser will determine the substantial responsiveness of each bid to the bidding documents. For purposes of these Clauses, a substantially responsive bid is one, which conforms to all the terms and conditions of the bidding documents without material deviations. Deviations from, or objections or reservations to critical provisions, such as those concerning Bid Security, and Taxes and Duties will be deemed to be a material deviation. The Purchaser's determination of a bid's responsiveness is to be based on the contents of the bid itself without recourse to extrinsic evidence.

30.4 If a bid is not substantially responsive, it will be rejected by the Purchaser and may not subsequently be made responsive by the Bidder by correction of the nonconformity.

### **31. Evaluation and Comparison of Bids**

- 31.1 The Purchaser will evaluate and compare the Technical & Pre-Qualification Bids, which have been determined to be substantially responsive. In case the Technical, Financial & Pre-qualification requirements are found to be adequate and as required after the examination, Price Bids of the qualified bidders will be opened subsequently.
- 31.2 a) All the bids, which are opened and considered for evaluation, will be checked for qualification requirements in respect of technical and commercial aspects. Such of the bids, which do not meet the qualification requirements, will not be evaluated further. The bid is to be checked for its conformity to the technical specification. If it does not meet the technical specification, the Bid will not be evaluated further. However, if in the opinion of the purchaser the bidder has offered equipment/ material better than the technical specification the same may be considered.
- b) Further, the purchaser may enquire from the bidder in writing for any clarification of the bid. The response of the bidder will also be in writing. However no change in the prices or substance of the bid will be sought, offered or permitted.
- c) Bids will be examined for completeness and for any computational errors.
- d) It will be ensured that the required sureties have been furnished and that the documents have been properly signed.
- e) The bid may be rejected for the following reasons:
- i) Not in the prescribed form,
  - ii) Insufficient bid security or no proof of bid security,
  - iii) The bidder is a vendor who is banned from further business transactions and the period of ban is still in force.
  - iv) Bids of bidders whose delivery against the pending orders is not satisfactory are liable for rejection.
  - v) No Bid Security or Insufficient Value or Validity of Bid Security
  - vi) Insufficient Validity of the Bid.
  - vii) Non-uploading of the required documents, schedules, forms, supporting documents for Qualifying Requirement. Insufficient or illegible supporting documents, schedules, forms.
  - viii) Deviation from the Delivery schedule of the Specification.
  - ix) Deviation from the Payment terms of the Specification.
  - x) Deviation from the General terms and conditions
  - xi) Deviation from the Technical Specification.
  - xii) Non-Compliance with the Qualifying Requirements.

- xiii) Record of Poor Performance in the previous / on-going works. Record of poor progress i.e. abandoning the work, not properly completing the contract, inordinate delays etc.
- xiii) Record of Black listing in any other Power Utilities / Government Department.
- xiv) Record of financial failures if any.
- xv) History of litigation with Government/APTRANSCO during the last 5 years.
- xvi) History of criminal record in which the Bidder is involved.
- xvii) Non-uploading of the Price schedules. Insufficient or illegible Price Schedules. Change of Quantities / Description of the work / materials items in the Price Schedule uploaded by APTRANSCO.
- xviii) Furnishing of false / fabricated particulars in the forms, statements and annexure, submitted in proof of the qualification requirements.
- xix) Not turned up for entering into agreement, when called upon within the time specified in the letter of acceptance.
- xx) Any other deviations of clause mentioned in this specification.
- xxi) Evaluation of the prequalification bids based on the past performance of the contractors during the last five years as on the date of bid opening.
- xxii) Bids of bidders whose delivery against the pending orders is not satisfactory are liable for rejection.

The price bids of qualified bidders in the pre-qualification analysis will only be considered.

While being equal or compatible in other aspects preference will be given to those bidders who have good experience / proven performance, past experience is superior in terms of quality and timely completion in similar works.

**It is the sole discretion of APTRANSCO regarding finalization of the bids. Mere quoting and becoming of L1 (Lowest quoted) bidder shall not automatically entitle any rights for any bidder for award of contract. The past performance of the contractor and performance of the contractor in the ongoing works shall be taken in to account while finalizing the bids. The APTRANSCO reserves its right to reject any or all the bids and not to accept the lowest or any other without assigning reasons. The APTRANSCO reserves its rights to cancel the tender at any stage without assigning the reasons.**

- f) The purchaser's evaluation of a bid shall take into consideration one or more of the following factors.
- i. Qualifying Requirements in respect of the Supply, Performance, Financial, Type tests etc.
  - ii. Delivery schedule offered in the bid;
  - iii. Commercial & Technical deviations.
  - iv. The cost of components, mandatory spare parts, and service;
  - v. The availability of spare parts and after-sales services for the material offered in the Bid;
  - vi. The projected operating & maintenance costs during the life of the equipment/ material;
  - vii. The performance and productivity of the material/ equipment offered;
  - viii. Other specific criteria indicated in the Bidding documents.
- g) In addition the Purchaser's evaluation of a bid will take into account the net landed cost of the material at the final destination. For the purpose of evaluation net landed cost is arrived at by adding all elements of the basic price, allowable discount, GST & any other levies, packing & forwarding, freight charges, insurance (transit & storage) as quoted by the bidder, interest on advance if any, unloading at final destination, erection, servicing and other charges as called for, excluding GST.
- h) In addition any variation up or down in taxes and duties/ new levies introduced subsequent to bid opening and before award will be considered for comparison purposes.
- i) The following criteria may be adopted for taxes and duties for evaluation.
- i) It is the responsibility of the bidder to quote all taxes and duties correctly without leaving any column unfilled. Where taxes and duties are not applicable the bidder should enter 'NA' and if no duty/tax is leviable the same may be entered as 'NIL'. If any column is left blank or filled vaguely like "as applicable", the same will be loaded with the maximum of the other eligible Bids.
  - ii) Where there is an exemption of GST, the documentary evidence to that effect will be enclosed by the supplier.
- j) Prior to detailed evaluation, the responsiveness of each bid will be determined. A substantially responsive bid is one that conforms to all the terms and conditions of the bidding documents without material deviations. For this purpose superscription, qualification requirement, bid security, validity, delivery, payment term, price schedule, taxes and duties will be deemed to be the critical provisions and deviations in any one of these items will be deemed to be a material deviation.
- k) The purchaser may waive any minor informality, non-conformity or irregularity in the bid which does not constitute a material deviation, provided such waiver does not affect the relative ranking of any bidder. The purchaser will clearly indicate in the bid specification the methodology for evaluation of bids.

- i) Bid price, which will include all, costs of manufacture and services at manufacturing place as well as, Transportation to destination stores, packing and forwarding, unloading, insurance and all Taxes & other legally permissible duties & levies payable.
  - ii) Delivery schedule offered in the bid.
  - iii) Deviations in payment schedule from that specified in the general terms and conditions of the contract.
  - iv) The cost of components, mandatory spare parts, and service,
  - v) The availability of spare parts and after-sales services for the equipment offered in the Bid;
  - vi) The projected operating and maintenance costs during the life of the equipment;
  - vii) The performance and productivity of the equipment offered; and/or
  - viii) Other specific criteria indicated in the Bid Specification.
  - ix) Cost of recommendatory spares if any indicated in the relevant price schedule will not be considered for bid evaluation.
- l) “The bidders for supply and works shall invariably possess ‘TIN’ & ‘PAN’ Numbers” and the same should be furnished for Bids above Rs.5.00 Lakhs.

31.3 Any statutory variations of taxes and duties and new levies imposed after opening of the bid and before award of the contract will be taken into consideration for the purpose of evaluation.

31.4 A substantially responsive bid is one, which conforms to all the terms and conditions of the bidding documents without material deviations. For this purpose qualification requirement, bid security, validity, delivery, payment terms, price schedule, submission of [types test certificates](#), taxes & duties will be deemed to be the critical provisions and deviations in any one of these things will be deemed to be a material deviation.

## **32. Contacting the Purchaser.**

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

32.2 Any effort by a Bidder to influence the Purchaser in its decisions on bid evaluation, bid comparison, or contract award will result in the rejection of the Bidder's bid.

## **F. Award of Contract**

## **33. Post Qualification**

- 33.1 In the absence of pre-qualification, the Purchaser will determine to its satisfaction whether the Bidder that is selected as having submitted the lowest evaluated responsive bid is qualified to perform the contract satisfactorily.
- 33.2 The determination will take into account the Bidder's financial, and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualification submitted by the Bidder, as well as such other information as the Purchaser deems necessary and appropriate.

**34. Award Criteria:**

- 34.1 The Purchaser will award the contract to the successful Bidder / Bidders whose bid has / have been determined to be substantially responsive. However it is not binding on APTRANSCO to accept the lowest or any other Bid. It reserves the right to place orders on different Bidders.
- 34.2 In the opinion of the purchaser in case it is undesirable to depend on one supplier, quantity may be distributed among two or more suppliers adopting the same price.

**35. Purchaser's Right to vary Quantities at the time of Award**

- 35.1 The Purchaser reserves the right at the time of contract award to increase or decrease the quantity of Materials/ equipment and services originally specified in the 'Schedule of Requirements' without any change in unit price or other terms and conditions.
- 35.2 The purchaser reserves the right to vary the ordered quantity by  $\pm 50\%$  during the execution of the contract.

**36. Purchaser's Right to Accept Any Bid and to Reject Any or All Bids**

- 36.1 The Purchaser reserves the right to accept or reject any bid, and to annul the bidding process and reject all bids at any time prior to contract award, without thereby incurring any liability to the affected Bidder or Bidders. The Purchaser will inform the affected bidder/bidders of its reasons.

**37. Notification of Award**

- 37.1 Prior to the expiration of the period of bid validity, the Purchaser will notify the Successful Bidder in writing by registered letter or by fax, to be confirmed in writing by registered letter, that its bid has been accepted.
- 37.2 The notification of award will constitute the formation of the Contract.
- 37.3 Upon the successful Bidder's furnishing of the performance security, the Purchaser enters into contract with successful Bidder/ Bidders. The Purchaser will notify each unsuccessful Bidder and will discharge its Bid Security.
- 37.4 The supplier will have to predefine the Bank Account details after receipt of LOI and before entering into contract for electronic transfer of payment.

**38. Signing of Contract:**

The Purchaser notifies the successful Bidder that its bid has been accepted. Within 30 (thirty days) of receipt of notification of award of Contract, the successful Bidder will sign and date the contract. Failure to comply with this stipulation will entail cancellation of the contract besides forfeiture of the bid security.

**39. Performance Security:**

39.1 Within fifteen (15) days of receipt of notification of contract award, the successful Bidder will furnish to the Purchaser the performance security for an amount 10% of the contract value for proper fulfilment of the contract, which will include the warranty period, and completion of performance obligations including Warranty obligations. The Performance Security will cover 60 days beyond the date of completion of performance obligations including Warranty obligations.

In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected / replaced material will be extended to a further period of 18 months and the Performance Bank Guarantee for proportionate value will be extended 60 days over and above the extended warranty period.

**39.2 Additional Security:**

If the rate quoted by the bidder less than 10% of the APTRANSCO's total estimated cost will be considered as abnormally low rate. In the case of abnormally low quoted rates i.e. less than 10% additional security deposit (ASD) to be paid for the less percentage below 10% i.e. if the bidder quotes 20% below the total estimated cost then he has to pay ASD equivalent to 10% of the total estimated cost.

The Additional security may be made by Demand Draft on any approved Bank payable at Vijayawada in favor of Pay officer, APTRANSCO, Vijayawada or by way of Bank Guarantee from a Nationalized/ Scheduled Bank as per the list enclosed, in favour of tender inviting authority covering a period of 2 months over and above the completion period.

39.3 The proceeds of the performance security will be payable to the Purchaser as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

39.4 The performance security will be...

- (a) A Bank Guarantee issued by State Bank of India or its associate Banks/Nationalised Banks acceptable to the Purchaser, in the form provided in the bidding documents.
- (b) A banker's cheque or crossed DD or Pay Order payable at the head quarter of the Purchaser in favour of the Purchaser drawn on State Bank of India or its associate Banks/Nationalised Banks.

39.5 The performance security will be discharged by the Purchaser and returned to the Supplier not later than sixty (60) days after the expiry date.

- 39.6 Failure of the successful Bidder to comply with the above requirement will entail cancellation of the award and forfeiture of the Bid Security.
- 39.7 In case where the performance security is not yet paid, the bid security will be forfeited and the balance to makeup the performance security deposit will be deducted from pending payments any due to the bidder from APTRANSCO on other orders. In addition the company will also become liable for black listed by APTRANSCO.

**40. Corrupt or Fraudulent Practices :**

It is essential that the Purchaser as well as Bidder / supplier / contractor for the purposes of this provision, the terms set forth below as follows:

(i) "Corrupt practice" means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution, and

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

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

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

**41. Use of Contract Documents and Information:**

- 41.1 The Supplier will not, without the Purchaser's prior written consent, disclose the Contract, or any provision thereof, of any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the Purchaser in connection therewith, to any person other than a person employed by the Supplier in the performance of the Contract.

Disclosure to any such employed person will be made in confidence and will extend only so far as may be necessary for purposes of such performance.

- 41.2 The Supplier will not, without the Purchaser's prior written consent, make use of any document or information except for purposes of performing the Contract.
- 41.3 Any document, other than the Contract itself, will remain the property of the Purchaser and will be returned (in all copies) to the Purchaser on completion of the supplier's performance under the Contract if so required by the Purchaser.
- 41.4 The Supplier will permit the Purchaser or his authorized representative to inspect the Supplier's accounts and records relating to the performance of the Supplier and to have them audited by auditors appointed by the Supplier.

## **42. Patent Rights**

42.1 The Supplier will indemnify the Purchaser against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Materials / equipment or any part thereof.

## **43. Places / Locations**

43.1 Particulars of site location to which the equipments / material have to be supplied will be given to successful Bidders. However, it may please be noted that the destinations for supply of materials will be Site/Stores any where in the state of Andhra Pradesh.

## **44. Delivery:**

44.1 **Delivery period will be reckoned from the date of issue of Letter of Intent.** The delivery quoted will be firm, definite, unconditional and on the basis of receipt of materials at destination in good condition without any bearing on the procurement of raw materials or any similar prerequisites. The commencement date and date of delivery will be indicted. The preferred delivery time, which is the essence of this specification, is indicated in the schedule. Final deliveries are however, subject to confirmation at the time of Contract. Delay in delivery of materials FADS (Free At Destination Store/site) due to non-availability of railway booking, non-allotment of wagons and any such reasons will not be considered. It is the responsibility of the supplier to make alternative arrangements for transporting the materials by road or rail so as to see that the material reaches the destination within the stipulated period. The Purchaser reserves its right to defer the delivery date at any time after orders are placed without any change in the conclusion of contract or other conditions of supply. The delivery period, which will be reckoned from the date of the Contract, will be guaranteed under penalty as in Clause 60.

## **45. Inspections and Tests**

- (i) The supplier will keep the Purchaser informed in advance of the time of the starting and the progress of manufacture of equipment/material in its various stages so that arrangement could be made for inspection. The accredited representative of the APTRANSCO will have access to the supplier's or his subcontractor's work at any time during working hours for the purpose of inspecting the materials during manufacturing of the materials/ equipment and testing and may select test samples from the materials going into plant and equipment. The supplier will provide the facilities for testing such samples at any time including access to drawings and production data at no charge to Purchaser. As soon as the materials are ready the supplier will duly send intimation to APTRANSCO by registered post and carry out the tests in the presence of the representative of APTRANSCO.
- (ii) The APTRANSCO may at its option get the materials inspected by the third party if it feels necessary and all inspection charges in this connection will be borne by the supplier.

- (iii) The dispatches will be effected only if the test results comply with the specification. The dispatches will be made only after the inspection by the APTRANSCO Officer is completed to the APTRANSCO satisfaction or such inspection is waived by the competent authority.
- (iv) The acceptance of any quantity of materials will in no way relieve the supplier of its responsibility for meeting all the requirements of this specification and will not prevent subsequent rejection if such materials are later found to be defective.
- (v) The supplier will give 15 days advance intimation to enable the Purchaser depute his representative for witnessing the acceptance and routine tests.
- (vi) Should any inspected or tested materials/ equipment fail to conform to the specification, the Purchaser may reject the materials and supplier will either replace the rejected materials or make alterations necessary to meet specifications requirements free of costs to the Purchaser.
- (vii) The To and fro travelling expenses and accommodation facility for inspection officers shall be borne by us (the supplier of material / Bidder) as per tender Specification.

**46. Name Plate:**

Equipment should be provided with name plate giving full details of manufacturer, capacities and other details as specified in the relevant ISS or other specification stipulated. The contract No. and date and year of supply and the words “APTRANSCO” must be etched on the name plate.

**47. Packing**

- 47.1 The Supplier will provide such packing of the Material/ equipment as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. The packing will be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing case size and weights will take into consideration, where appropriate, the remoteness of the Material/ equipment' final destination and the absence of heavy handling facilities at all points in transit.
- 47.2 The packing, marking, and documentation and outside the packages will comply strictly with such special requirements as will be expressly provided for in the Contract and in any subsequent instructions ordered by the Purchaser. The supplier will be required to make separate packages for each consignee, each package will be marked on three sides with proper paint / indelible ink with the following;

- 1. Contract Number
- 2. Supplier's name
- 3. Packing list reference number

- 47.3 The supplier, whenever dispatches material to a destination should prepare the following information in the form of packing slip in quadruplicate and send the same to the consignee and obtain his acknowledgement. The consignee will return to the supplier one copy of the packing slip with his remarks. The proforma of packing slip will be as follows:

PACKING SLIP

1. Contract No.& Date.
2. Quantity allotted to the stores.
3. Quantity so far supplied to the stores.
4. Quantity now supplied.
5. Total quantity supplied under the Contract with rates applied.
6. Programme for supplying the balance quantity to the Stores.

- 47.4 Each equipment/ material shall be packed securely & separately.

**48. Delivery Documents**

- 48.1 Delivery of the Materials / equipment will be made by the Supplier in accordance with the terms specified in the contract. The latest test certificates containing the result of the tests as per the relevant ISS or other specification stipulated must be submitted to the Chief Engineer and got approved by him.

- 48.2 Documents to be submitted by the Supplier are specified as under...

- (i) Insurance certificate;
- (ii) Supplier's certificate certifying that the defects if any pointed out during inspection have been rectified (3 copies).
- (iii) Manuals in Six sets along with a soft copy and drawings.

The Purchaser will receive the above documents soon after the dispatch of materials and if not received, the supplier will be responsible for any consequent expenses.

**49. Insurance**

- 49.1 The Materials / equipment supplied under the Contract will be fully insured against loss or damage incidental to manufacture or acquisition, transportation and delivery and also storage for 45 days at destination stores.

The insurance will be in an amount equal to 100% FADS value of Materials / equipment on all risks basis. The policy will have a provision for extension to cover further storage if necessary at destination stores / site at APTRANSCO cost. The beneficiary shall be APTRANSCO.

- 49.2 The Bidder shall a) Initiate and pursue insurance claim till settlement and b) Promptly arrange for repair and or replacement of any damaged items in full irrespective of settlement of insurance claim by the under writers. (c) All costs because of insurance liabilities covered under the contract will be to supplier's account. The supplier shall provide the Purchaser with a copy of all insurance

policies and documents taken out by him in pursuance of 'Contract'. Such copies of documents shall be submitted to the purchaser immediately after such insurance coverage. The supplier shall also inform the Purchaser in writing at least sixty (60) days in advance, regarding the expiry, cancellation and /or change in any of such documents and ensure revalidation/renewal etc., as may be necessary well in time.

The risks that are to be covered under the insurance shall be comprehensive and shall include but not limited to, the loss or damage in transit, storage, due to theft, pilferage riot, civil commotion, weather conditions, accident of all kinds, fire, flood, war risk (during ocean transportation) bad or rough handling etc., The scope of such insurance shall cover the entire contract value.

**49.3 The Bidder shall not quote insurance charges; the same will not be reimbursed**

**50. Transportation**

50.1 The Supplier is required under the Contract to transport the Materials / equipment to a specified place of destination defined as normally the district stores, transport to such place of destination, including insurance and storage, will be arranged by the Supplier, and the related costs will be included in the Contract Price only.

**51. Incidental Services**

51.1 The Supplier may be required to provide any or all of the following services, including additional services, if any.

- i. Performance or supervision of on-site assembly and/or start-up of the supplied Materials / equipment;
- ii. Furnishing of tools required for assembly and/or maintenance of the supplied Materials / equipment;
- iii. Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Materials / equipment;
- iv. Performance or supervision or maintenance and/or repair of the supplied Materials / equipment, during warranty period, provided that this service will not relieve the Supplier of any warranty obligations under this contract; and
- v. Training of the Purchaser's personnel, at the Suppliers' plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied material/ equipment.

**52. Spare Parts**

52.1 The Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier.

- (a) Such spare parts as the Purchaser may choose to purchase from the Supplier, provided that this selection will not relieve the supplier of any warranty obligations under the contract; and

- (b) In the event of termination of production of the spare parts:
- (c) Advance notification to the Purchaser of the impending termination.
- (d) Time to permit the Purchase to procure needed requirement; and following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings, and specifications of the spare parts, if requested.

### **53. Warranty**

- 53.1 The supplier will warrant for the satisfactory functioning of the material/ equipment as per specification for a minimum period of 24 months from the check-measurement date in Form-13 i.e. receipt of the material/ equipment at TLC Stores or site in good condition.
- 53.2 The Supplier warrants that the Materials / equipment supplied under the Contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The supplier further warrants that all Materials / equipment supplied under this Contract will have no defect, arising from a design and / or materials as required by the Purchaser's specifications or from any act of omission of the Supplier, that may develop under normal use of the supplied Materials / equipment.
- 53.3 All the material will be of the best class and will be capable of satisfactory operation in the tropics under service conditions indicated in clause-23.1 without distortion or deterioration. No welding filling or plugging of defective parts will be permitted, unless otherwise specified, they will conform to the requirements of the appropriate Indian, British or American Standards. (Where a standard specification covering the material in question has not been published, the standards of the American Society for testing of Materials should be followed).
- 53.4 The entire designs and construction will be capable of withstanding the severest stresses likely to occur in actual service and of resisting rough handling during transport.
- 53.5 Unless otherwise specified the warranty period will be 24 months from the date of acceptance of the Materials / equipment. The Supplier will, in addition, comply with the performance guarantees specified under the contract. If, for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the supplier will at its discretion either, make such changes, modifications, and/or additions to the Materials / equipment or any part thereof as may be necessary in order to attain the contractual guarantees specified in the contract at its own cost and expense and to carry out further performance tests as per the relevant standards.
- 53.6 The Purchaser will promptly notify the supplier in writing of any claims arising under this warranty.
- 53.7 "Upon receipt of such notice, the Supplier will within 30 days repair or replace the defective Materials/ equipment or parts thereof, free of cost at the ultimate destination.

The supplier will take over the replaced parts/ materials/ equipment at the time of their replacement. No claim whatsoever will lie on the Purchaser for the replaced

parts/ Materials/ equipment thereafter". In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected/replaced material will be extended to a further period of 18 months.

53.8 If the Supplier, having been notified, fails to remedy the defect(s) within the above period, the Purchaser may proceed to take such remedial action as may be necessary, at the Supplier's risk and expense duly deducting the expenditure from subsequent bills/ bank guarantee and without prejudice to any other rights which the Purchaser may have against the Supplier under the Contract.

53.9 Responsibility of the supplier for loss/ damage :

- a) The supplier is responsible for the safe delivery of the goods in good condition at the destination. He should acquaint himself of the conditions obtaining for handling and transport of the goods to destination and shall include and provide for security and protective packing of the goods so as to avoid damage in transit.
- b) External damages or shortages that are prima-facie the results of rough handling in transit or due to defective packing will be intimated. Internal defects, damages or shortages of any internal parts which cannot ordinarily be detected on a superficial visual examination though due to bad handling in transit or defective packing will be intimated separately.

In either case, the defective or damaged materials should be replaced by the supplier free of cost to the APTRANSCO. If no steps are taken in this regard, APTRANSCO may without prejudice to its other rights and remedies cause to be repair or rectify the defective material or replace the same and recover the expenditure incurred there for from the deposit such as Earnest Money, Security and Performance or other monies available with APTRANSCO or by resorting to legal action.

- c) For the purpose of any legal construction, the material shall be deemed to pass into APTRANSCO's ownership only at the final destination where they delivered and accepted.

#### **54. Payment**

54.1 (a) 80% payment towards the equipment cost will be arranged within 45 days for the material/ equipment supplied in complete shape subject to their delivery as per the schedule of work and on its receipt in good condition at the destination / stores in good condition (i.e., from check measurement date in Form-13). The supplier will have to predefine the Bank Account details after receipt of LOI and before entering into contract for electronic transfer of payment.

(b) 10% payment will be made after erection of equipment/ material.(or) 10% payment has to be released within 3 months from the date of receipt of material at site. (if the erection gets delayed)

(c) Balance 10% payment along with the total Testing & commissioning charges will be made after commissioning of equipment / material.

However payment in advance may be considered by APTRANSCO after availing a rebate/ discount @ 0.3% per week or part thereof for the advancement depending on

the availability of funds. For availing discount by the contractor/supplier, soon after submission of the document to the unit officer, a set of Xerox copy of invoice(s) along with requisition for availing discount should be submitted to the Purchaser.

54.2 The payments mentioned above is subject to submission of performance security as per Clause-39 by the supplier. The bank charges will be made to the account of the supplier an amount of Rs.50/- (Rupees Fifty only) will be recovered from the bill amount per each disbursement on LOA raised by unit offices.

54.3 The supplier should invariably submit test certificates and other documents, the purchaser specifies as soon as dispatch is made so that they can be checked and approved well in advance.

54.4 The performance guarantee to be executed in accordance with this specification will be furnished on a stamp paper of value Rs.100/-. The Bank Guarantee will be extended if required suitably in accordance with the provisions of Clause No.39.

54.5 If the supplier has received any over payments by mistake or if any amounts are due to the APTRANSCO due to any other reason, when it is not possible to recover such amounts under the contract resulting out of this specification, the APTRANSCO reserves the right to collect the same from any other amount and / or Bank Guarantees given by the company due to or with the APTRANSCO.

54.6 When the supplier does not at any time, fulfill his obligations in replacing/ rectifying etc. of the damaged/ defective materials in part or whole promptly to the satisfaction of the APTRANSCO Officers, the APTRANSCO reserves the right not to accept the bills against subsequent dispatches made by the supplier and only the supplier will be responsible for any demurrages, wharfages or damage occurring to the consignments so dispatched.

54.7 Freight & Insurance shall be reimbursed only on submission of documentary evidence/ proofs.

## **55. Prices**

55.1 Prices charged by the Supplier for Material/ equipment delivered and Services performed under the Contract will not vary from the prices quoted by the supplier in its bid, with the exception of any price adjustment authorized in the contract.

## **56. Change Orders**

56.1 The Purchaser may at any time, by a written order given to the Supplier make changes within the general scope of the Contract in any one or more of the following:

- (a) Drawings, designs, or specifications, where Materials / equipment to be furnished under the Contract are to be specifically manufactured for the Purchaser;
- (b) The method of shipment or packing;
- (c) The place of delivery; and/or
- (d) The Services to be provided by the Supplier.

## **57. Contract Amendments**

57.1 No variation in or modification of the terms of the Contract will be made except by written amendment by the Purchaser and accepted by the supplier.

## **58. Assignment**

58.1 The Supplier will not assign, in whole or in part, its obligations to perform under this Contract, except with the Purchaser's prior written consent.

## **59. Delays in Supplier's Performance**

59.1 Delivery of the Materials / equipment will be made by the Supplier in accordance with the time schedule prescribed by the Purchaser in the Schedule of Requirements.

59.2 If at any time during performance of the Contract, the Supplier should encounter conditions impeding timely delivery of the Materials / equipment, the Supplier will promptly notify the Purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Purchaser will evaluate the situation and may at its discretion extend the Supplier's time for performance, with or without liquidated damages, in which case the extension will be ratified by the parties by amendment of the Contract.

59.3 Except as provided under force majeure clause a delay by the Supplier in the performance of its delivery obligations will render the Supplier liable to the imposition of liquidated damages unless an extension of time is agreed upon without the application of liquidated damages.

## **60. Penalty for delay in supplies**

The time for and the dates for delivery mentioned in the contract will be deemed to be the essence of the contract. Subject to force majeure Clause No.64, if the Supplier fails to deliver any or all of the Materials / equipment or to perform the Services within the period(s) specified in the Contract, the Purchaser will, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated **damages, a sum equivalent to 0.5% per week on the undelivered portion subject to a maximum of 5% of the total value of the contract. Once the maximum is reached the Purchaser may consider termination of the contract.**

The Check Measurement date in Form-13 i.e., the date of receipt of materials at destination stores in good condition will be taken as the date of delivery. Material/ Equipment which are not of acceptable quality or are not conforming to the specification would be deemed to be not delivered. For penalty, the number of days would be rounded off to the nearest week and penalty calculated accordingly.

The penalty specified above will be levied and would be adjusted against subsequent pending bills.

## **61. Termination for Default**

61.1 The Purchaser, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the Supplier, may terminate this Contract in whole or in part:

- i. If the Supplier fails to deliver any or all of the Materials / equipment within the period(s) specified in the Contract, or within any extension thereof granted by the Purchaser.
  - ii. If the Supplier fails to perform any other obligation(s) under the Contract.
  - iii. If the Supplier, in the judgment of the Purchaser has engaged incorrupt or fraudulent practices in competing for or in executing the Contract.
- 61.2 In the event the Purchaser terminates the Contract in whole or in part, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Materials/ equipment or services similar to those undelivered, and the Supplier will be liable to the Purchaser for any excess costs for such similar Materials/ equipment or Services. However, the Supplier will continue performance of the Contract to the extent not terminated.

## **62. Termination for Insolvency**

- 62.1 The Purchaser may at any time terminate the Contract by giving written notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the supplier, provided that such termination will not prejudice or not affect any right of action or remedy, which has accrued or will accrue thereafter to the Purchaser.

## **63. Termination for Convenience**

- 63.1 The Purchaser, by written notice sent to the Supplier, may terminate the Contract, in whole or in part, at any time for its convenience. The notice of termination will specify the termination is for the Purchaser's convenience, the extent to which performance of the supplier under the Contract is terminated, and date upon which termination becomes effective.
- 63.2 However the Materials / equipment that are complete and ready for shipment within thirty (30) days after the supplier's receipt of notice of termination will be accepted by the Purchaser at the Contract terms and prices.

## **64. Force Majeure**

- 64.1 The Supplier will not be liable for forfeiture of its performance security, penalty for late delivery, or termination for default if and to the extent that its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
- 64.2 For purposes of this clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not restricted to, wars or revolutions, fires, floods, epidemics, quarantine restrictions, and freight embargoes.
- 64.3 If a Force Majeure situation arises, the supplier will promptly notify the Purchaser in writing of such condition and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier will continue to perform its obligations under the

Contract as far as is reasonably practice, and will seek all reasonable alternative means for performance not prevented by the Force Majeure event.

64.4 No price variance will be allowed during the period of force majeure.

**65. Settlement of Disputes :**

65.1 If any dispute or difference of any kind whatsoever will arise between the Purchaser and the Supplier in connection with or arising out of the Contract, the parties will make every effort to resolve amicably such dispute or difference by mutual consultation.

65.2 If, after thirty (30) days the parties have failed to resolve their dispute or difference by such mutual consultation, then either the Purchaser or the Supplier may give notice to the other party of its intention to commence arbitration, as hereinafter provided, as to the matter in dispute, and no arbitration in respect of this matter may be commenced unless such notice is given.

65.3 Any dispute or difference in respect of which a notice of intention to commence arbitration has been given in accordance with this Clause will be finally settled by arbitration. Arbitration may be commenced prior to or after delivery of the Materials / equipment under the Contract.

65.4 Arbitration proceedings will be conducted in accordance with the following rules of procedure. The dispute resolution mechanism will be as follows:

(a) In the case of a dispute or difference arising between the Purchaser and a Supplier relating to any matter arising out of or connected with this agreement, such dispute or difference will be settled in accordance with the Arbitration and Conciliation Act, 1996. The Arbitral Tribunal will consist of three Arbitrators one each to be appointed by the Purchaser and the supplier the Third Arbitrator will be chosen by the two Arbitrators so appointed by the parties and will acts as Presiding Arbitrator. In case of failure of the two Arbitrators appointed by the parties to reach upon a consensus within period of 30 days from the appointment of the Arbitrator appointed subsequently, the Presiding Arbitrator will be appointed by The Institution of Engineers (India).

(b) If one of the Parties fails to appoint its Arbitrator in pursuance of Sub-Clause (a) within 30 days after receipt of the notice of the appointment of its Arbitrator by The Institution of Engineers (India), will appoint the Arbitrator. A certified copy of the order of the Institution of Engineers (India), making such an appointment will be furnished to each of the parties.

(c) Arbitration Proceedings will be held at Purchaser's Headquarters, and the language of the Arbitration Proceedings and that of all documents and communication between the parties will be English.

(d) The decision of the majority of Arbitrators will be final and binding upon both parties. The cost and expenses of Arbitration Proceedings will be paid as determined by the Arbitral Tribunal. However, the expenses incurred by each party in connection with the preparation, presentation etc., of its proceedings as also the fees and

expenses paid to the Arbitrator appointed by such party or on its behalf will be borne by each party itself.

- (e) Where the value of the Contract is Rs.1.00 Crore and below, the disputes or differences arising will be referred to the Sole Arbitrator. The Sole Arbitrator should be appointed by agreement between the parties; failing such agreement, by the appointing authority namely The Institution of Engineers (India).

65.5 Notwithstanding any reference to arbitration herein,

- (a) The parties will continue to perform their respective obligations under the Contract unless they otherwise agree; and
- (b) The Purchaser will pay the Supplier any monies due the Supplier.

## **66. Jurisdiction**

66.1 All and any disputes or differences arising out of or touching this contract will be decided by the Courts or Tribunals situated in Purchaser's Headquarters only (i.e., in Vijayawada **Jurisdiction only**). No suit or other legal proceedings will be instituted elsewhere.

## **67. Notices**

67.1 Any notice given by one party to the other pursuant to this Contract will be sent to the other party in writing or by fax and confirmed in writing to the other party's address.

67.2 A notice will be effective when delivered or on the notice's effective date, whichever is later.

## **68. Foreign Exchange**

68.1 No Foreign Exchange is available or expected for this purchase. Offers which do not require release of F.E. or procurement of import license by APTRANSCO only will be considered. Where some of the components are to be imported the manufacturer will have to make their own arrangements for import license etc., and should not look for any assistance from APTRANSCO.

## **69. Blacklisting/ debarring:**

Any Company/ Vendor/ Supplier/ Contractor or their promoters who are blacklisted/ debarred by power utility is not eligible to participate in the tenders. No contract/order/ work will be awarded/ placed on any blacklisted/ debarred Vendor/ Supplier/ Contractor/ Company or their promoters. Bidders have to furnish a declaration/undertaking in this regard along with the bid. Bids without this declaration are liable for rejection.

70. The clauses in the purchase manual of APTRANSCO shall govern wherever the specification clauses are silent.

71. If any bidder is silent about any clause of specification it is deemed that the bidder is accepted the same.
72. The discount if any offered shall be indicated in the field provided in e-procurement only. Discount given in anywhere other than the discount field will not be considered for tender evaluation.
73. Reverse Tendering: As per G.O. MS No.79, dated 25-08-2020, instructions were issued by the Government of Andhra Pradesh for implementation of reverse tendering process for all tenders above 1 Crore ECV value. The reverse bidding process will be conducted with L1 quoted value and all bidders shall participate in the bidding process .

**SECTION – IV**  
**SCHEDULE OF REQUIREMENTS**

**Schedule-A**

| Sl. No. | Description   | Qty. (nos .) | Unit Ex-works price | Unit Freight charges | Unit FAD price | GST             | Unit landed price | Total price |
|---------|---|--------------|---------------------|----------------------|----------------|-----------------|-------------------|-------------|
|         |   | 1            | 2                   | 3                    | 4= 2+3         | 5 = (4)*%of GST | 6=4+5             | 7= 6*1      |
| 1       | 220/132KV Transformer C&R Panels with BCU                               | 14           |                     |                      |                |                 |                   |             |
| 2       | 220KV Feeder C&R Panels (Distance) with BCU                             | 23           |                     |                      |                |                 |                   |             |
| 3       | 220KV Feeder C&R Panels(Differential Protection) with BCU               | 7            |                     |                      |                |                 |                   |             |
| 4       | 220KV Bus Bar Protection Panels for 16 bays                             | 9            |                     |                      |                |                 |                   |             |
| 5       | 220KV Bus Coupler C&R Panels with BCU                                   | 5            |                     |                      |                |                 |                   |             |
| 6       | GPS Equipment for Time Synchronization along with necessary accessories | 14           |                     |                      |                |                 |                   |             |
| 7       | Testing & Commissioning of C&R Panels                                   | 72           |                     |                      |                |                 |                   |             |

**Note: 1. Prices shall be quoted on Firm basis**

1. Prices shall be free at destination site/stores anywhere in Andhra Pradesh.
2. Freight shall invariably be quoted separately. Quoting them as “inclusive” or “Zero” will not be accepted.
3. Freight will be reimbursed on submission of documentary proofs only.
4. Conditional discounts are not accepted.
5. Note: - testing and commissioning are under supplier scope only.
6. Operating and technical manuals of all IEDs are to be provided.
7. Submit all drawings in A3 sheets. Inter panel wiring between control and relay panels shall be provided.

8. **2 Nos. Special tools such as ABB/Sifang/other make relay extractors per panel are to be provided.**
10. **The Bidder shall not quote insurance charges; the same will not be reimbursed**

**Note:** 1). In case of discrepancy between 'unit Ex- works price' and 'Total', unit Ex-works price prevails.

2). GST Column shall not be blank, Zero, Including incase of Manufactured Items. If any tax/duty is exempted to that Firm it should be indicated.

4). Bidder shall quote GST for a particular item.

5). Copy of GST registration certificate shall be invariably submit for payment of taxes.

6). Percentage Duties and Taxes are applicable as on date of despatch.

7). **Bidder shall quote Freight separately in the tender.** Freight and shall be reimbursed upon production of Documentary proof only. However the payment shall be limited to the quoted price.

8). Bidders are requested to check the quantities with the original quantities specified in the specification before uploading of their bids.

9). Bidders are advised to arrive at the sum total of the value of all items with Taxes and Duties, Freight etc

10) Bidders shall indicate both % and amount for GST.

**11) Bidders shall indicate 8 digits GST Code of all the quoted items in separate sheet.**

**Chief Engineer  
Transmission**

**SECTION – IV**  
**SCHEDULE OF REQUIREMENTS**  
**COMPLETE PERIOD SCHEDULE-B (a)**

| Sl.No. | Description   | Qty. (nos.) | APTRANSCO delivery schedule  | Destination                 |
|--------|---|-------------|--|-----------------------------|
| 1.     | 220/132KV Transformer C&R Panels with BCU                               | 14          | <b>Supply of Equipment within five months from the date of issue of Letter of intent</b> | Any TLC Stores/Site in A.P. |
| 2.     | 220KV Feeder C&R Panels(Distance) with BCU                              | 23          |  |                             |
| 3.     | 220KV Feeder C&R Panels(Differential) with BCU                          | 7           |  |                             |
| 4.     | 220KV Bus Bar Protection Panels   | 9           |  |                             |
| 5.     | 220KV Bus Coupler C&R Panels with BCU                                   | 5           |  |                             |
| 6.     | GPS Equipment for Time Synchronization along with necessary accessories | 14          |  |                             |

**COMPLETE PERIOD SCHEDULE-B (b)**

| Sl.No. | Description                           | Qty. (Nos.) | APTRANSCO delivery schedule   |
|--------|---------------------------------------|-------------|---|
| 7.     | Testing & Commissioning of C&R Panels | 72          | The Engineer for testing & commissioning of CRPs will reach the site within 10 days from the date of receipt of intimation letter. Testing & Commissioning of C&R Panels along with Busbar shall be completed <b>within 2 Weeks</b> |

## **SECTION - V**

### **TECHNICAL SPECIFICATION**

**OF**

### **SUPPLY, ERECTION ,TESTING & COMMISSIONING OF CONTROL & RELAY PANELS and Equipment.**

|           |  |               |
|-----------|--|---------------|
| <b>1.</b> | <b>220/132KV Transformer C&amp;R Panels with BCU</b>                           | <b>14 Nos</b> |
| <b>2.</b> | <b>220KV Feeder C&amp;R Panels (Distance Protection) with BCU</b>              | <b>23 Nos</b> |
| <b>3.</b> | <b>220KV Feeder C&amp;R Panels (Differential Protection ) with BCU</b>         | <b>7 Nos</b>  |
| <b>4.</b> | <b>220KV Bus Bar Protection Panels</b>   | <b>9 Nos</b>  |
| <b>5.</b> | <b>220KV Bus Coupler C&amp;R Panels with BCU</b>                               | <b>5 Nos</b>  |
| <b>6.</b> | <b>GPS Equipment for Time Synchronization along with necessary accessories</b> | <b>14 Nos</b> |
| <b>7.</b> | <b>Testing &amp; Commissioning of C&amp;R panels</b>                           | <b>72 Nos</b> |

## TECHNICAL SPECIFICATION

### 1.0 SCOPE:

**1.1** This Specification provides for design, engineering, manufacture, assembly, shop testing, inspection and testing before dispatch, packing, forwarding and delivery at site CIP destination (in case of Indian Bidders) and CIF Indian Port at the discretion of the Purchaser (in case of Foreign Bidders) of Control, relay, alarm and annunciation panels for supply, erection & Commissioning of following Control & Relay Panels. (which includes Supply, Erection, Installation, Testing & Commissioning Of above new C & R Panels and Equipment)

1. 220/132KV Transformer C&R Panelswith BCU --14 Nos
2. 220KV Feeder C&R Panels (Distance Protection) with BCU --23 Nos
3. 220KV Feeder C&R Panels (Differential Protection) with BCU--07 Nos
4. 220KV Bus Bar Protection Panels - 09 Nos
5. 220KV Bus Coupler C&R Panels with BCU --05 Nos
6. GPS Equipment for Time Synchronization  
along with necessary accessories - 14 Nos
7. Testing & Commissioning of C&R Panels - 72 Nos

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

### 2.0 STANDARDS:

All equipment provided under this specification shall in general conform to the latest revision/amendment etc. of the following:

| Sl.No. | Standard  | Title   |
|--------|---|---|
| 1.     | IS 3231<br>IEC 255 Part I to III<br>BS 142        | Electrical relays for power system protection |
| 2.     | IS 1248<br>IS 2419<br>BS 89                       | Indicating instruments                        |
| 3.     | IS-13010,IS 722(Part I to IX)<br>IEC 521<br>BS 3T | Energy meters                                 |

- |     |  |   |
|-----|--|---|
| 4.  | IS 4237                                  | General requirement of switchgear and control gear for voltages not exceeding 1 kV                              |
| 5.  | IS 375                                   | Marking arrangement for switch gear, busbars, main connection and auxiliary wiring                              |
| 6.  | IS 8686<br>IEC-255Part V&VI<br>IEC 801-4 | Specification for static protective relays and tests.   |
| 7.  | IEC 337<br>IEC 337-1<br>IS 6875          | Control switches (LV switching devices for control and auxiliary circuits                                       |
| 8.  | IS 2516                                  | MCCB and load break switches having a break capacity of 30 kVA rms at 415 volts                                 |
| 9.  | IS 4047                                  | Fuse switching units  |
| 10. | IS 2208                                  | HRC fuse links  |
| 11. | IS 2705<br>IEC-185                       | Current Transformers  |
| 12. | IS 3156<br>IEC-186                       | Potential Transformers  |
| 13. | IS 8623                                  | Factory built assemblies of switch gear and control gear for voltages upto and including 1000V AC and 1200V DC. |
| 14. | IEC 439                                  | Low voltage switch gear and control gear assemblies   |
| 15. | IS 4237                                  | General requirement of switch- gear and control gear for voltages not exceeding 1000V                           |
| 16. | IS 2147                                  | Degree of protection provided by enclosures for low voltage switch gear and Control gear                        |
| 17. | IS 5082                                  | Aluminum alloy bars   |
| 18. | IS 1897                                  | Copper strips for electrical purpose  |
| 19. | IS 3618<br>IS 6005                       | Code of practice for phosphate treatment of iron and steel  |
| 20. | IS 4064                                  | Air break switches, air break dis-connectors, air break disconnectors and fuse combination units                |

for voltages not exceeding 1000V AC or 1200V DC

- 21. IS 9224 Part II HRC cartridge fuses
- 22. IS 5578 Guide for marking of insulated conductors.
- 23. IS 2032 Graphical symbols  
Ref- abbreviations

Name and Address

|     |   |            |
|-----|---|------------|
|     | Institution Electro Technical Bureau. Central de la<br>Electro Technique International. 1. Rue de verembe<br>Geneva Switzerland.  | commission |
| ISO | International Organisation for<br>Standardisation. Danish board of<br>standardisation. Danish<br>standardising sruat<br>Aurehoeqvaj - 12<br>DK - 2900, Heel prup<br>DENMARK |            |
| IS  | Indian Standard Bureau of India.<br>Standards Manak Bhavan,<br>9, Bahadur Shah Zafar Marg.<br>New Delhi - 110 002. INDIA  |            |

Equipment meeting with the requirements of other authoritative Standards, which ensure equal or better performance than the standards mentioned above, shall also be considered. When the equipment offered by the Bidder conforms to other standards, salient points of difference between standards adopted and the standards specified in this specification shall be clearly brought out in the relevant schedule. Four copies of such standards with authentic translation in English shall be furnished along with the offer.

**3.0 CLIMATIC CONDITIONS:**

**3.1** The equipment to be supplied under this specification shall be suitable for satisfactory operation under the following climatic conditions.

|      |   |                |
|------|---|----------------|
| i)   | Location  | Andhra Pradesh |
| ii)  | Max. ambient air temp. (deg.C)                  | 50             |
| iii) | Min ambient air temp. (deg.C)                   | 0              |
| iv)  | Average daily ambient air<br>temperature(deg.C) | 35             |
| v)   | Maximum Relative humidity (%)                   | 80             |
| vi)  | Average annual rainfall (mm)                    | 925            |
| vii) | Isoceraunic Level (Days/Annum)                  | 50             |

|       |   |                         |
|-------|---|-------------------------|
| viii) | Max. wind pressure (Kg/sq.m.)                             | 200                     |
| ix)   | Seismic level (Horizontal Acceleration)                   | 0.1g                    |
| x)    | Max. altitude above mean                                  | 1000 sea level (Metres) |
| xi)   | Average No. of thunder storms days/ annum.                | 40                      |
| xii)  | Average No. of rainy days/ annum.                         | 90                      |
| xii)  | Average No. of Months Tropical monsoon conditions/ annum. | 3                       |

**4.0 PRINCIPAL PARAMETERS:** The technical details of various equipments such as power transformers, circuit breakers and instrument transformers that will be associated with the control and relay panels in APTRANSCO are to be known by the bidder.

**5.0 GENERAL TECHNICAL REQUIREMENTS:**

**5.1.0 Control and Relay panels: Detailed description:**

The control and relay panels shall consist of a vertical front panel with equipment mounted thereon and having wiring access from the rear or front opening for control panel and front opening for relay panel. Swing type door shall be provided for the Relay Panel for mounting the equipment. (specification of front opening panels of C & R Panels with SAS are similar to recent panels of SAS CRP supplied to APTRANSCO). Back opening panels shall have double leaf door with lift off hinges at the back for panels of width more than 800 mm. Doors shall have handles with built-in locking facility. If back opening door is proposed for control panel, it should have front Perspex / glass door.

**5.1.1 Constructional Features:**

- a) Control and Relay panels shall be of Simplex type. It is the responsibility of the contractor to ensure that the equipment specified and such unspecified complementary equipment required for completeness of the protective/control schemes be 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.
- b) Panels shall be completely metal enclosed and shall be dust, moisture and vermin proof. The enclosure shall provide a degree of protection not less than IP-54 in accordance with IS:2147.
- c) Panels shall be free standing, floor mounting type and shall comprise structural frames enclosed completely 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 mm for sides, door top and bottom portions. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation and installation.

- d) All doors, removable covers and panels shall be provided with gasket all-round with neoprene gaskets. Ventilating louvers, if provided shall have screens and filters. The screens shall be made of either brass or GI wire mesh.
- e) Design, materials selection and workmanship shall result in neat appearance inside and outside with no welds, rivets or bolt heads visible from outside, with all exterior surfaces true and smooth.
- f) All necessary anchor bolts and other materials required for foundation of panels shall be supplied.
- g) **Cable entries to the panel shall be from the bottom. The plates of the panel shall be fitted with detachable cable-gland plates for fixing the cable glands. Necessary number of cable glands of required sizes to suit external cables to the panels shall be supplied by the bidder. The cable gland plates shall be pre-pressed and the holes shall be closed with rubber caps such that there is no need for drilling or cutting of the gland plate in the field while fixing the cable glands. Cable glands shall be screw type, and shall be suitable for PVC cables. Cable gland plate fitted in the bottom of the Panel shall be connected to the earthing Panel/Station through a flexible braided copper conductor rigidly.**
- h) Relay panels of modern, modular construction would also be acceptable.
- i) **The total height of the panel shall be 2250mm. The depth of the panel shall be 800 mm. The panels shall have suitable width 1000mm for mounting of all the equipments.**
- j) The panels shall match with the existing panels in APTRANSCO's substations, the details of which shall be obtained by the successful bidder. Matching includes height, depth of the panels, Colour and mimic and arrangement of equipment on the front side.
- k) Provision for blank plate for future Ethernet switch & LIU is to be provided.
- l) Any special tools are to be provided at free of cost with all the panels separately.

### **5.1.2 Mounting**

- a) All equipments and instruments used in panels shall be mounted and completely wired to the terminal blocks ready for external connection. The equipment on front side of the panel shall be flush- mounted.
- b) 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 shall be clearly visible.
- c) The contractor shall carry out cut-outs, mounting and wiring of the free accessories supplied by others, if any, which are to be mounted in this panel in accordance with the corresponding equipment manufacturer's drawings. Cutouts if any, provided for future mounting of equipment shall be properly blanked off.

- d) The center lines of switches, push buttons and indicating lamps shall be not less than 750mm from the bottom of the panel. The center lines of relays, meters and recorders shall be not less than 450mm from the bottom of the panel.
- e) The center 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.
- f) No equipment shall be mounted on the doors.
- g) All the equipment connections and cabling shall be designed and arranged to minimise the risk of fire and damage which may be caused by fire.
- g) The panels will be erected side by side on the cable duct and all the measuring instruments and equipment shall be visible to the operator on the front side only.

### 5.1.3 Panel Internal Wiring and other Accessory Equipment :

- a) Panels shall be supplied completely 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. These adjacent inter panel wiring shall be clearly indicated in the drawing furnished by the contractor.
- b) All wiring shall be carried out with 1100 V grade, **single core, stranded copper conductor wires with PVC insulation** and shall be heat resistant grade and vermin and rodent proof. The minimum size of the stranded copper conductor used for internal wiring shall be as follows:
  - i) CT & PT Circuits: 2.5 sq.mm per lead. R, Y, B & Black colour notation shall be followed for phase identification.
  - ii) AC Circuits: 2.5 sq.mm per lead. White Colour for identification shall be followed for identification.
  - iii) All other circuits shall be with multi strand 1.5 sq.mm flexible wires with Grey Colour for identification.
  - iv) The minimum number of strands per conductor shall be three.
  - v) **2 X 2.5 mm per lead for TVM PT circuits (multi strand wires)**
- c) All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Wiring gutters and troughs shall be used for this purpose.
- d) 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.
- e) Wire termination shall be made with solder less crimping type and tinned copper lugs which firmly grip the conductor and insulation. 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.

- f) All wires directly connected to trip circuit breaker or device shall be distinguished by the addition of red colored unlettered ferrule. Numbers 6 and 9 shall not be included for ferrule purposes.
- g) Longitudinal troughs extending throughout the full length of the panel shall be preferred for inter panel wiring. Interconnections to adjacent panel shall be brought out to a separate set of terminal blocks located near the slots or holes meant for taking the inter connecting wires. Arrangements shall permit easy inter connections to adjacent panels at site and wires for this purposes shall be provided by the supplier looped and bunched properly inside the panel.
- h) Supplier shall be solely responsible for the completeness and correctness of the internal wiring and for the proper functioning of the connected equipment
- i) There shall not be any break in CT Circuits.
- j) The following codes shall be used while wiring the control and relay panels.
  - C11, C31, C51 and C71 in the Backup O/L & E/L Relay circuits in PTR HV of 220kV Feeders Protection circuits.
  - C21, C41, C61 and C81 in the LV O/L & E/L circuits.
  - D11, D31, D51 and D71 in the 220kV feeder PTR HV metering circuits.
  - D21, D41, D61 and D81 in the PTR LV metering circuits.
  - A11, A31, A51 and A71 in the 220kV Main-1, distance relay circuits and PTR HV Differential Relay circuits.
  - A21, A41, A61 and A81 in the 220kV Main – 2 and PTR LV differential relay circuits.
  - B11, B31, B51 and B71 in Bus Bar Protection Main Relay circuit and B21, B41, B61 and B81 in the Check Relay circuit. Prefix Nos. may be added to know the feeder number like 1B11 for Feeder – 1 R Phase B/B Protection main relay circuit.
  - E11, E31, E51 and E71 in the metering PT circuit and E21, E41, E61 and E81 in the protection PT circuit. E91 and E92 for Open Delta Voltage circuit. Prefix may be added in case of 220kV Bus PTs. 1 for Bus – 1 PT and 2 for Bus – 2 PT. In case of CVT circuit, 3 may be added as prefix.
  - J1 and J2 for Main DC.
  - H1 and H2 for Main AC. In case of three phase AC, H1, H3, H5 for phases and H2 for neutral.
  - K1 & K2 in the Closing Circuit (+ve and –ve)  
K21 & K22 in the Trip coil-1 circuit (+ve and –ve)  
K51 & K52 in Trip coil-2 circuit (+ve and –ve)  
L1 & L2 in the indication circuit  
L101 & L102 in the Annunciation circuit  
K101 and K102 in the aux. supply to the Protection relays.

- K1R is +ve for Remote Close  
K21R is +ve for Remote Trip TC - 1  
K51R is +ve for Remote Trip TC – 2
- K15 is for Remote Close, K25 is for Remote trip TC-1, K55 for Remote Trip TC-2, K23 for protection TC-1, K53 for protection trip TC-2, K27 for pre close supervision TC-1 and K57 for pre close supervision TC-2. R, Y and B may be added as suffix in Trip circuits to indicate the phase **in case of 220kV circuits**.
- In case of PTR circuits, ferrule “1” may be added as prefix in HV Circuits i.e. 1K15 for remote close HV CB, 1K23 for protection trip TC-1 etc. Similarly ferrule “2” may be added as prefix in LV Circuits
- Annunciation DC shall be common for HV and LV circuits.
- Ferrule P may be provided instead of K in Bus Bar Protection circuits.
- Indication, Annunciation, controls shall be separate.
- Protection Trip and remote trip should not be clubbed.

#### **5.1.4 Terminal Blocks:**

- a) All internal wiring to be connected to the external equipment shall terminate on terminal blocks preferably vertically mounted on the side of each panel. Terminal blocks with stud type ELEMEX make CATM4 type shall be 1100V grade and have 10 amps continuous rating moulded piece complete with insulated barriers, stud type terminals, washers, nuts and lock nuts. Terminal block design shall include a white fibre markings strip with clear plastic slip-on/ clip-on terminal covers. Markings on the terminal strips shall correspond to wire number and terminal numbers on the wiring diagrams.
- b) Terminal blocks for current transformer and voltage transformer secondary leads shall be ELEMEX make CATDM4 type provided with test links and isolating facilities. Also current transformer secondary leads shall be provided with short circuiting and earthing facilities.
- c) At least 20% spare terminals shall be provided on each panel and these spare terminals shall be uniformly distributed on all terminal blocks.
- d) Unless otherwise specified, terminal blocks shall be suitable for connecting the following conductors of purchaser's cable on each side:
  - i) All the circuits: Minimum of two 2.5 sq.mm copper in case of AC Circuits and 1.5 Sq. mm Copper in case of other circuits.
  - ii) All CT circuits: minimum of two of 2.5 mm square copper and all PT circuits minimum of four of 2.5 sq.mm copper
- e) There shall be a minimum clearance of 250 mm between the first row of terminal blocks and associated cable gland plate. Also the clearance between two rows of terminal blocks shall be minimum, of 150 mm.
- f) Arrangement of the terminal block assemblies and the wiring channel within the enclosure shall be such that a row of terminal blocks is run parallel and in close proximity along each side of wiring duct to provide for convenient attachment of internal

panel wiring. The side of the terminal block opposite the wiring duct shall be reserved for purchaser's external cable connection. An adjacent terminal block shall also share this field wiring corridor. A steel strip shall be connected between adjacent terminal block rows at 450 mm intervals for support of incoming cables.

- g) The number and sizes of the Purchaser's multi-core incoming cable will be furnished to the Contractor after placement of the order. All necessary cable terminating accessories such as gland plates, packing glands, crimp type tinned copper lugs supporting clamps and brackets, wiring troughs and gutters etc., for purchaser's cable shall be included in contractor's scope of supply.

**Note: - 1) Recently remarks are received from filed engineers on some of the make TBs (in filed MOMs), those type of TBs are not acceptable.  
2) DAV / Nelster and other make TTBs (remarks received from filed engineers and that are mentioned in filed MOMs) are not acceptable.**

#### **5.1.5 Painting:**

- a) All sheet steel work shall be phosphated in accordance with the IS:6005 "Code of practice for phosphating iron and steel"
- b) Oil, grease, dirt and sweat shall be thoroughly removed by emulsion cleaning.
- c) Rust and scale shall be removed by picking with dilute acid followed by washing with running water rinsing with a slightly alkaline hot water and drying.
- d) After phosphating thorough rinsing shall be carried out with clean water followed by final rinsing with dilute dichromate solution and oven drying.
- e) 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.
- f) After application of the primer, two coats of finishing synthetic enamel paint shall be applied, each coat followed by stoving. The second finishing coat shall be applied after completion of tests. The exterior Colour of the paint shall be selected by the purchaser at a later date.
- g) Each coat of primer and finished paint shall be of a slightly different shade to enable inspection of the painting.
- h) A small quantity of finished paint shall be supplied for minor touching up required at site after installation of the panels.
- i) In case the bidder proposes to follow any other established painting procedure like electrostatic painting, the procedure shall be submitted along with offer/bid for purchaser's review and approval.

#### **5.1.6 Mimic Diagram:**

- a) Coloured mimic diagram and symbols showing the exact representation of the system shall be provided in the front of control panels.

- b) Mimic diagram shall be made preferably of anodized aluminum or plastic of approved fast Colour material which shall be screwed on to the panel and can be easily cleaned. Painted overlaid mimic is also acceptable. The mimic bus shall be 2 mm thick. The width of the mimic bus shall be 10 mm for bus bars and 7 mm for other connections.
- c) Mimic bus Colour will be decided by the Purchaser and shall be obtained from the Purchaser by the successful Bidder.
- d) Indicating lamp, one for each phase for each bus shall be provided on the mimic to indicate bus charged condition.
- f) Indicating lamps for breaker, Isolators open & close status, CB troubles, CVT R, Y & B phases healthy, DC & AC fail are to be provided.
- g) AC & DC fail test & accept buttons are to be provided.

#### **5.1.7 Name Plates and Markings:**

- a) 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 name plates shall be provided for circuit/feeder designation.
- b) All front mounted equipment shall be also provided at the rear with individual name plates engraved with tap numbers corresponding to the one shown in the panel internal wiring to facilitate easy tracing of the wiring. The name plates shall be mounted directly by the side of the respective equipment in a visible manner and shall not be hidden by the equipment wiring.
- c) Name plates shall be made of non-rusting metal or 3 ply lami-coid. Name plates shall be black with white engraving lettering. The name plates inscription and size of name plates and letters shall be submitted to the Purchaser for approval.
- d) Each instrument and meter shall be prominently marked with the quantity measured e.g. kV, A, MW, etc. All relays and other devices shall be clearly marked with manufacturer's name, manufacturer's type, serial number and electrical rating data.
- e) Each switch shall bear clear inscription, identifying its function eg. "BREAKER" "52 A" "AMMETER" "SYNCHRONISING" etc., similar inscriptions shall also be provided on each device whose function is not otherwise 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 indicating eg. "TRIP-NEUTRAL-CLOSE", "ON-OFF", "R-Y-B-N-OFF" etc.
- f) Rating of the Ammeter Selector Switch shall be not less than 25A. No. of positions shall be 6 (OFF-R-Y-OFF-B-N). Rating of the Volt Meter Selector Switch shall be not less than 25A. No. of positions shall be 6 (RY-YB-BR-RN-YN-BN). Rating of the TNC Switch shall be not less than 25A with provision for NAC & N Contacts for utilization in the Auto Trip Indication and Annunciation Circuits.

#### **5.1.8 Miscellaneous Accessories and Supporting Steel:**

- a) Plug point- 230 Volts, single phase, 50 Hz AC plug point shall be provided in the interior of each cubicle with "ON-OFF" Switch for connection of hand lamps.

- b) Interior lighting: Each panel shall be provided with a fluorescent lighting fixture rated for 230 volts, single phase, 50 HZ supply for the interior illumination of the panel during maintenance. The fittings shall be complete with switch fuse unit and switching of the lighting shall be controlled by the respective panel door switch. Toggle Switch shall be provided in addition to the Door Limiting Switch.
- c) ON/OFF Switch shall be provided in addition to Thermostat in the Space Heater Circuit.
- d) Exclusive Fuse Protection shall be provided in the PS Circuit (6A HRC Fuse & Link), Panel Lighting Circuit (2A HRC Fuse & Link) and in the Space Heater Circuit (2A HRC Fuse & Link) in addition to MCB in the Incoming AC Circuit.
- e) Each control panel shall be provided with necessary arrangements for receiving, distributing, isolating and fusing of DC and AC supplies for various control signaling, lighting and space heater circuits. MCBs for the incoming circuits and fuses for sub-circuits shall be provided. Selection of the main and sub-circuit fuse rating shall be such as to ensure selective clearance of sub-circuit faults. Potential circuit for relaying and metering shall be protected by fuses. All fuses shall be HRC cartridge type conforming to IS:2208 mounted on plug-in type fuse bases. All accessible live connection to fuse bases shall be adequately shrouded. Fuses shall have operation indicators for indicating blown fuse condition. Fuse carrier base shall have imprints of the fuse rating and voltage.
- f) Exclusive Fuse Protection shall be provided in the Circuit Breaker Closing, TC-1 & TC-2 Circuits. Fuse Link may be provided just before DC Hooter, DC Bell and AC Bell.
- g) Supporting steel: All necessary foundation anchor bolts and other parts of supporting and fastenings, of the panels shall be supplied by the contractor.
- h) For All AC sub circuits like cubicle lightning, space heater and etc. shall have individual MCBs

#### **5.1.9 Earthing:**

- a) All panels shall be equipped with an earth bus securely screwed. 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 atleast 25 x 3 mm copper flat.

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 contractor. Provision shall be made for extending the earth bus bars to future adjoining panels on either side.

- b) Provision shall be made on each earth bus bars of the panels for connecting Purchaser's earthing grid. Necessary terminal clamps and connectors for this purpose shall be included in the scope of supply of contractor. The wire or screens should be clearly bonded and earthed at the gland plate.

- c) All metallic cases of relays, instruments and other panel mounted equipment shall be connected to the earth bus preferably by independent copper wires of size not less than 2.5 sq.mm. The colour code of earthing wires shall be green. Earthing wire shall be connected on terminals with suitable clamp connectors and soldering shall not be permitted.
- d) Looping of earth connections which would result in loss of earth connection to other devices where the loop is broken shall not be permitted. Looping of earth connections between equipment to earth bus shall not be permitted.
- e) 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.

#### 5.1.10 Instruments and Meters:

- a) All instruments, meters, recorders and transducers shall be enclosed in dust proof and moisture resistant cases which shall be suitable for tropical use. They shall be calibrated to read directly the primary quantities. They shall be accurately adjusted and calibrated at works and shall have means of calibration, check and adjustment at site. All accessories including test switches and test plugs, where applicable shall be furnished. Their elements shall be shock resistant and shielded from external magnetic fields.

Indicating Instruments: Digital instruments shall have digital display of not less than 25mm (height)

- i) Unless otherwise specified all electrical indicating instruments shall be of 144 mm X 144 mm size. They shall be suitable for flush mounting. All the meters are digital meters with necessary Transducers.
  - ii) Auxiliary supply to the instruments: 220V, DC, **shall withstand +/- 20% voltage variations.**
  - iii) Instruments shall conform to IS:1248 and shall have accuracy class of 1.0 or better. The design of the scales shall be such that it can read  $t \pm 3\sigma$  a resolution corresponding to 50% of the accuracy class index.
  - iv) Instrument covers shall be of shadow proof design, utilising all available light. The indicating instruments shall have red marks on the dial corresponding to rated values of the associated primary equipment.
  - v) Ammeters and current coils of WATT meters and VAR meters shall continuously withstand 120% of rated current and 10 times the rated current for 0.5 sec. without loss of accuracy. Voltmeters and potential coils of watt meters and var meters shall withstand **120% of rated voltage for 0.5 seconds without loss of accuracy.**
  - vi) Output contact spare) shall be brought from MW and MVAR Transducer to spare Terminal Blocks to use in SCADA works (Output: 4-20mA).
- b) Indicating Instruments: Multi Function Meters ( instruments) shall have digital display of not less than 25mm (height)

- i) Unless otherwise specified all electrical indicating instruments shall be of 144 mm X 144 mm size. They shall be suitable for flush mounting. All the meters are digital meters with necessary Transducers.
- ii) Auxiliary supply to the instruments: 220V, D.C.
- iii) Instruments shall conform to IS:1248 and shall have accuracy class of 0.2 or better. The design of the scales shall be such that it can read  $\pm 3\sigma$  a resolution corresponding to 50% of the accuracy class index.
- iv) Instrument covers shall be of shadow proof design, utilising all available light. The indicating instruments shall have red marks on the dial corresponding to rated values of the associated primary equipment.
- v) Ammeters and current coils of WATT meters and VAR meters shall continuously withstand 120% of rated current and 10 times the rated current for 0.5 sec. without loss of accuracy. Voltmeters and potential coils of watt meters and var meters shall withstand 120% of rated voltage for 0.5 seconds without loss of accuracy.
- vi) Output contact spare) shall be brought from MW and MVAR Transducer to spare Terminal Blocks to use in SCADA works (Output: 4-20mA).

**c) Metering Instruments**

**Note: - High Brightness LED Display type meters are to be provided.**

**1. Ammeters:**

All ammeters shall be of digital type and provided with direct reading triple range scale. Scale value of ammeters shall be equal to 1 to 1.3 times the rated primary current of the current transformer feeding it. The rated current shall be 1.0 Amp. Accurate reading of ammeter shall be possible at the lowest limit of 5% of the rated current.

**2. Voltmeter:**

Voltmeter shall be digital type. Rated voltage shall be 110 Volts. Maximum value of voltage scale shall be 20% in excess of the normal voltage.

**3. Wattmeters and Varmeters:**

These meters shall be suitable for indicating flow of power in both directions and shall be of 3 element type for use in 3 phase 4 wire unbalanced system. Current coil shall be rated for 1A and the voltage coil for 110 volts.

- 220 kV Feeder Panel Meters with CT Ratio: 800/1A
- 220/13233kV PTR HV Meters with CT Ratio: 500-300/1A
- 220/13233kV PTR LV Meters with CT Ratio: 800-500/1A
- 132/33kV PTR HV Meters with CT Ratio: 200-300-500/1A
- 132/33kV PTR LV Meters with CT Ratio: 800-1200-2000/1A

**Note: (i) DIGITAL PANEL METERS SHOULD BE PROGRAMMABLE BY USER FOR MULTIPLICATION FACTORS FOR DIFFERENT CT/PT RATIOS.**

**(ii) DIGITAL DISPLAY METERS OF MAKE AE & MECO SHOULD BE AVOIDED AS THESE METERS CAUSING FREQUENT PROBLEMS IN THE SITE.**

**(iii) All MFM are of Rishabh make with 3430 model shall be supplied**

#### **4 . Energy Meters:**

Electronic Trivector meters shall be electronic type conforming to IEC 687 and suitable for bi-directional power flow and for CT, CVT or IVT connection. The static meter shall measure active and reactive energy both import and export, by 3 phase 4 wire principle suitable for balanced/unbalanced 3phase load and AMRI Compatible. Accuracy of meter shall be 0.2S for active energy and 0.5 for reactive energy. The active and reactive energy shall be directly computed in CT & PT primary values and stored in 8 different registers as KWH(E), KVARH-Lg(E), KVARH-Ld(E), KVAH(E), KWH(I), KVARH-Lg(I), KVARH-Ld(I) & KVAH(I) along with a plus sign for export and minus sign for import. CT secondary is 1 A, PT secondary and CVT secondary is 110/√3V Meters shall compute the energy sent out/received, from/to the station bus bar during each successive 15 minute block and store in the respective registers. Meter shall display on demand the energy sent out/received. Further the meter shall continuously integrate the energy readings of each register upto that time. All these readings shall be displayed on demand. Cumulative reading of each register shall be stored in non-volatile memory. **There shall be 40 days data available in the meter from the current date and time. The data shall be purged on first-in first-out basis.** The electronic meter shall have built in clock and calendar having an accuracy of 1 minute per month or better. Date/time shall be displayed on demand. Meter shall have communication interface via (i) optical port conforming to IEC 1107 Protocol/ANSI/PACT (ii) RS-232 for data retrieving through Common Meter Reading Instrument (CMRI) and (iii) RS 485 Port for remote communication. **The meter manufacturer shall provide the necessary software required for (i) downloading on to a MRI / Base Computer station and (ii) to read / Display the downloaded data in graphical / report form.** The meters shall have minimum 8 load survey parameters as below with 15 minutes integration period and minimum 40 days storage data. (MDI of TVMs is of 15 Minutes)

- |    |                   |    |                  |
|----|-------------------|----|------------------|
| a. | KW(E)             | b. | KW (I)           |
| c. | KVA (E)           | d. | KVA (I)          |
| e. | KVAR lead @ KW(I) | f. | KVAR lag @ KW(I) |
| g. | KVAR lead @ KW(E) | h. | KVAR lag @ KW(E) |

$$\text{KVARH} = \text{KVARH(lead)} + \text{KVARH(lag)}$$

The trivector meter shall have both Trivector and Availability Based Tariff (ABT) features.

Each meter shall have a unique identification code and shall be marked permanently on the front and also on the non-volatile memory. The voltage monitoring of all the three voltages shall be provided. **The meter shall be projected type.**

The meter shall normally operate with power drawn from VT supplies. Power supply to the meter shall be healthy even with a single phase VT supply. An automatic back up shall be provided by a built in life time battery and shall not need replacement for at least ten years with a continuous VT interruption of even two years. Date and time of VT interruption and restoration shall be automatically stored in non-volatile memory. **The meter shall have an optical port, one No. RS-232 Port and one No. RS-485 Ports at the front of the meter for data collection by a hand held device for interconnection and remote communication.** The meter shall conform to open protocol for remote communication. The meter shall have pulse outputs to test accuracy and for connecting it to time of day tariff equipment. The meter manufacturer shall give the necessary support for integrating with other equipment or drawal of data electronically or for taking any reports or for communication purpose or for automation.

The Trivector meters shall be fixed as projected type with 30 mm diameter hole on the panel at the terminal cover area to bring the CT & PT wiring outside the panel to terminate at Tri vector meter. RS485 communication cables of TVMs are to be wired up to TBs.

#### **5.1.11 Relays:**

a) All relays shall conform to the requirements of IS:3231 or other applicable approved standards. Relays shall be suitable for flush mounting on the front with connections from the rear. Relays shall be rectangular in shape and shall have dust tight, dull black or egg shell black enamel painted cases with transparent cover removable from the front. All relays (including main protections like distance, transformer differential, bus bar protection and individual function relays like over fluxing protection, back-up over current and earth fault protection, under frequency relays with df/dt feature) shall be conforming to IEC 61850 protocol and have communication port for SCADA / Substation Automation purpose. **The Bids of Bidders whose relays doesn't conform to IEC 61850 protocol or doesn't have communication port will be rejected.** There shall be a communication port on the front side of the relay for programming purpose and another port on the rear side for connecting a Fiber optic for SCADA purposes.

b) All protective relays shall be in draw-out or plug-in type/ modular cases with proper testing facilities. The testing facilities provided on the relays shall be specifically stated in the bid. Necessary test plugs shall be supplied loose and shall be included in Contractor's scope of supply. Test block and switches shall be located immediately below each relay for testing. As an alternative to test block and test plug arrangements the Bidder shall also quote alternative testing facility of protective relays by providing a push button which when pressed connects the testing equipment to the relay coils and injects current in the coil and automatically disconnects the trip circuits and on operation of relay gives a signal that the equipment and the circuits are correct. The above tests shall be carried-out without short circuiting the CT secondary connections. The Purchaser reserves the right for accepting any one of the above two testing facilities. Unless otherwise specified all auxiliary relays and timers shall be supplied in non-draw out cases/plug in type modular cases.

c) All AC relays shall be suitable for operation at 50Hz AC supply. The PT/CT/CVT operated equipment shall be suitable for the ratings specified against them in the annexure. DC auxiliary relays and timers shall be designed for 220 V DC voltage and shall operate

satisfactorily between 70% and 120% of rated voltage. Voltage operated relays shall have adequate thermal capacity for continuous operation.

d) The protective relays shall be suitable for efficient and reliable operation of the protection scheme described in the specification. Necessary auxiliary relays and timers required for interlocking schemes for multiplying of contacts/suiting contact duties of protective relays and monitoring of control supplies and circuits, lockout relay monitoring of circuits etc., and also required for the complete protection schemes described in the specification shall be provided.

All protective relays shall be provided with **at least 20% of spare potential** free isolated output contacts and wired to spare Terminal Blocks for future use/ to use in timer while periodical testing of relays. Auxiliary relays and timers shall have pairs of contacts as required to complete the scheme. Contacts shall be silver faced with spring action. Relay cases shall have adequate number of terminals for making potential free external connections to the relay coils and contacts including spare contacts. Relay case size shall be so chosen as not to introduce any limitations on the use of available contacts on the relay due to inadequacy of terminals. Paralleling of contacts, if any shall be done at the terminals on the casing of the relay.

e) All protective relays, auxiliary relays and timers except the lock out relays and interlocking relays specified shall be provided with self-reset type contacts. All protective relays and timers shall be provided with externally hand reset positive action operation indicators, provided with inscription, subject to purchaser's approval. All protective relays which do not have built in hand reset operation indicators shall have additional auxiliary relays with operating indicators for this purpose. Similar separate operating indicator (auxiliary relays) shall also be provided both in non trip and trip circuits of protections located outside the board such as buchholz relays, temperature protection, fire protection etc. Auxiliary Relays shall also be provided for the **purpose Circuit Breaker Trouble Alarms like SF6 Gas Pressure Low, SF6 Gas Pressure Lock out, CB Tripped on CTD.**

f) Timers shall be of the electromagnetic or solid state type. Pneumatic timers are not acceptable. Short time delays in terms of milliseconds may be obtained by using copper slugs on auxiliary relays. In such case it shall be ensured that the continuous rating of the relay is not affected. Time delay in terms of milliseconds obtained by the external capacitor resistor combination is not acceptable.

g) No control relay which shall trip the power circuit breaker when the relay is de-energized shall be employed in the circuits. **No control Relay should energize trip coil directly instead it should be through a Master Trip relay.**

h) Provision shall be made for easy isolation of trip circuits of each relay for the purpose of testing and maintenance.

i) All relays shall withstand a test voltage of 2.5 kV, 50 Hz, RMS voltage for one second.

j) Auxiliary seal-in-units provided on the protective relays shall preferably be of shunt reinforcement type. If series relays are used the following shall be strictly ensured:

- i) The operating time of the series seal-in-unit shall be sufficiently shorter than that of the trip coil or trip relay in series with which it operates to ensure definite operation of the flag indicator of the relay.
- ii) Seal-in-unit shall obtain adequate current for operation when one or more relays operate simultaneously.
- iii) Impedance of the seal-in-unit shall be small enough to permit satisfactory operation of the trip coil on trip relays when the DC supply voltage is minimum.
- k) All protective relays and alarm relays shall be provided with two extra isolated pair of contacts wired to terminals exclusively for Purchaser's use.
- l) All the auxiliary relays that are supplying to automation sub stations are also to be supplied to these panels (like trip relays with both electrical and manual reset type, .... Etc). The panel shall be like automation CRP panel with BCU and along with Annunciator and can be readily configurable to SAS SCADA with additional EFS & Patch cables (EFS & Patch cables are not in present supply scope).
- m) 20% spare DI, DO & AI contacts are made available in all IEDs and 20% spare contacts are made available in trip, auxiliary and other relays & equipments after meeting drawing remarks.
- m) The following requirements shall be met with, by the relays:
  - i) The printed circuit cards shall be of fiberglass type and the contact shall be gold plated. All connections with the connector plugs shall be through wire wrapping. All solder joints on the printed circuit boards shall be encapsulated or covered with varnish.
  - ii) The components shall be rated to carry at least twice the normal expected loads. The resistors shall be of carbon composition or metal oxide type and the capacitors shall be plastic film or tantalum type. Stringent measures including shielding of long internal wiring should be taken to make relays immune to voltage spikes. The relays must withstand the requirements of IEC 255-4 appendix-E class III regarding HF disturbance tests; IEC 255-4 regarding impulse test at 5 kV and fast transient test as per IEC 801-4. Insulation barriers shall be provided to ensure that transients present in CT & VT connections due to extraneous sources do not cause damage to static circuits.
  - iii) All relays shall be designed for satisfactory performance under tropical and humid conditions specified in the specification. Special mention shall be made in the technical deviations schedule of the bid for those relays, if any, that Bidder proposes to use which differ from specified requirements.
  - iv) All devices required for correct operation of each relay shall be provided by Contractor without any extra cost.
  - v) The contractor shall ensure that the terminals of the contacts of the relays are readily brought out for connections as required in the final approved scheme. The

type of relay case size offered shall not create any restrictions on the availability of the contact terminals for wiring connections.

- vi) DC/DC converter **shall not be** acceptable for the protective relays. Provision of DC cells in the protective relays as reliable standby power supply will however not be acceptable.
- vii) The relays shall be stable and suitably protected against transient/induced over voltages and noise signals. The Bidder shall state clearly in his bid special requirements, if any, for DC input arrangement or cabling considered necessary for satisfactory operation of relays offered.
- viii) All equipment shall be of modular construction and the modules and sub units shall be of plug in type for easy replacement. The design shall permit fast recognition of defects and facilitate easy repair.
- ix) The bidder shall include in his bid a list of installations where the relays quoted have been in satisfactory operation.
- x) The bidders shall be a manufacturer of at least the main protective relay (as detailed below) for which he has quoted viz.,
  - a) Numerical Distance relay.
  - b) Numerical Over Current & Earth Fault Relays (Backup protection).

**Note: The bids of other than the relay manufacturers will not be considered and rejected.**

- xi) The bidder shall provide the necessary support for commissioning / trouble-shooting / repair within a reasonable time and cost for next 15 years from the date of supply.
- xii) Breaker tripping relays shall be provided with minimum of 20% potential free contacts wired to the Terminal Blocks for SCADA or for future O&M purpose.

#### **5.1.12 Annunciation System:**

- a) Alarm annunciation system shall be provided for the control board by means of visual and audible alarm in order to draw the attention of the operator to the abnormal operating conditions or the operation of some protective devices. The annunciation equipment shall be suitable for operation with 220 V DC voltage.
- b) 220V DC Bell in trip alarm and 220V DC Hooter in non trip alarm circuit is to be provided. **Multi tone Electronic Buzzer will not be accepted.** If the contact rating of the contact meant for this purpose in the Annunciator is not sufficient, then Aux. Relay (Bell Relay) may be used.
- c) The annunciator facia shall be provided with translucent plastic window for alarm point with minimum size of 35 mm x 50 mm. The facia plates shall be engraved in black lettering with respective inscriptions which will be furnished to the Bidder by the Purchaser.

Alarm inscriptions shall be engraved on each window in not more than three lines and size of the lettering shall not be less than 5mm.

- d) Facia windows shall be illuminated with LEDs. Each annunciation window shall be provided with two white lamps in parallel to provide safety against lamp failure. Long life lamps shall be used. The lamp circuit shall include series resistor of adequate rating. The cover plate of the facia windows shall be flush with the panel and shall be capable of easy removal to facilitate replacement of lamps. The transparency of cover plates and wattage of the lamps provided in the facia windows shall be adequate to ensure clear visibility of the inscriptions in the control room having high illumination intensity (500 Lux), from the location of the Operator's desk.
- e) TRIP AND NONTRIP facia shall be differentiated. All TRIP shall have red colour and all NONTRIP facia shall have white colour.
- f) Sequence of operation of the annunciator shall be as follows:

| Alarm condition                       | Fault contact | Visual Annunciation | Audible Annunciation |
|---------------------------------------|---------------|---------------------|----------------------|
| 1. Normal                             | Open          | Off                 | Off                  |
| 2. Abnormal                           | Close         | Flashing            | On                   |
| 3. Acknowledge push button is pressed | Close/Open    | Steady on           | Off                  |
| 4. Reset push button is pressed       | Open          | Off                 | Off                  |
| 5. Lamp test push button pressed      | Open          | Steady on           | Off                  |

- g) Visual and audible annunciation for the failure of DC supply to the annunciation system shall also be provided and this annunciation shall operate on 240 volts AC supply with separate fuses. On failure of the power supply to the annunciation system for more than 3 secs. (adjustable setting) an indicating lamp shall light up and a bell shall sound. A separate push button shall be provided for cancellation of this audible alarm alone but the indicating lamp shall remain steadily lighted till the supply to the annunciation system is restored. The sound of the audible alarm (bell) provided for this annunciation shall be different from the audible alarm provided for the annunciation system.
- h) A separate voltage check relay shall be provided to monitor the failure of supply (230 V AC) to the scheme mentioned above. If the failure of supply exists for more than 2 to 3 secs. this relay shall initiate visual and audible annunciation. The annunciation system described above shall meet the following additional requirements:

- i. The annunciation system shall be capable of catering to all simultaneous signals at a time.
- ii. One self resetting push button shall be provided on each panel for testing the fascia window lamps. Push buttons for testing flasher and audible alarm circuit of annunciation supply failure monitoring circuit shall also be provided. These testing circuits shall be so connected that while test is being done it shall not prevent the registering of any new annunciation that may land during the test.
- iii. One set each of the following push buttons shall be provided on each panel
  - a) Accept push button for annunciation system
  - b) Reset push button for annunciation system
- iv. The annunciation shall be repetitive type and shall be capable of registering the fleeting signal. Minimum duration of the fleeting signal registered by the system shall be 15 milli secs.
- v. The annunciator shall be suitable for operation with normally open fault contacts which close on a fault. For fault contacts which open on a fault, it shall be possible at site to change annunciators from "close to fault" and vice versa.
- vi. Micro Processor based alarm and annunciation **relay schemes are to be provided.**

#### 5.1.13 Switches:

- a) Control and Instrument switches shall be rotary operated type with 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. Handles of different shapes and suitable inscriptions on switches as per clause 6.8 shall be provided as an aid switch identification.
- b) The selection of operating handles for the different types of switches shall be as follows:
  - a) Breaker and isolator switches : Pistol grip, black
  - b) Selector switches : Oval or knob, black
  - c) Instrument switches : Round, knurled, black
  - d) Protecting transfer switch : Pistol grip, lockable and black
  - e) Synchronising switches : Oval, Black, keyed handle

All switches shall be heavy duty type.

- c) The control switch of breaker and isolator shall be of spring return to neutral type. The spring return type shall be provided with target which shall indicate the last operation of the switch. The control springs shall be strong and robust enough to prevent inadvertent operation due to light touch. The spring return type switch shall have spring return from close and trip positions to "after close" and "after trip" positions respectively.
- d) 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 secondaries when changing the position of the switch. They shall be

of 6 position type viz OFF-R-Y-OFF-B-N. Voltmeter transfer switches for AC shall be suitable for reading all line-to-line and line-to-neutral voltages. **The Ammeter Selector Switches and Volt meter Selector Switches shall be robust and meant for Heavy duty and rating of the switch shall be not less than 25A.**

- e) Synchronising switches shall be maintained contact (stay put) type. These switches shall be arranged to connect the Synchronising equipment when turned to the "ON" position. One contact of each switch shall be connected in the closing circuit of the respective breaker so that the breaker cannot be closed until the switch is turned to the "ON" position.
- f) Lockable type of switches which can be locked in particular positions shall be provided where specified. The key locks shall be fitted on the operating handles.
- g) The contacts of all switches shall preferably open and close with snap action to minimise arcing. Contacts of switches shall be spring assisted and contact faces shall be with rivets of pure silver. Springs shall 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 |          |
|----------------------------------|------------------------|----------|
|                                  | 220 V DC               | 240 V AC |
| a) Make and carry continuously   | 10                     | 10       |
| b) Make and carry for 0.5 sec.   | 30                     | 30       |
| c) Break                         |                        |          |
| i) Resistive load                | 3                      | 7        |
| ii) Inductive load with L/R = 40 | 0.2                    | 7        |

**5.1.14 Indicating Lamps:**

- a) Indicating lamps shall be panel mounting type with rear terminal connections. LEDs having sufficient illumination shall be used as indicating lamps.
- b) The LEDs shall withstand 120% of rated voltage on a continuous basis.
- c) The LEDs shall be of long life.
- d) For displaying the colours, colour LEDs shall be used as detailed below.
  - Red for CB ON indication
  - Green for CB OFF indication
  - Blue for CB Spring Charge Indication
  - White for Trip circuit healthy indication.

Amber for Auto trip indication.  
Red for DC fail indication (AC indication)  
White for AC fail indication (DC indication)  
R,Y and B colours in CVT, PT and LT AC supply circuits.

**Note:** **High Speed** Contact multiplication relays (with base) with 2 NO & 2 NC, in series with the indication circuit of breaker ON/OFF (2 Nos.) and Isolator ON (2 Nos.) and connect to the spare terminal blocks to use in SCADA works.

#### 5.1.15 Position Indicators:

Removed

#### 5.1.16: Synchronising Equipments:

- a) 1 No. Synchronising switch and 1 No. 12 pin Synchronising socket is to be provided on 220 / 132 kV feeder control panels and shall be supplied along with panels. Depending on the actual requirement, either Synchronising switch or Synchronising sockets or both will have to be mounted and wired on the panel.

#### 5.1.17: Trip circuit Supervision Relays:

- a) **Trip circuit shall be supervised by means of external relays.** The scheme shall continuously monitor each trip coil in both pre-close and after-close of the breaker. The scheme shall detect. i) Failure of DC supply to each trip coil. ii) Open circuit of trip circuit wiring and iii) Failure of mechanism to complete the tripping operation. **Spare contacts are made available in all Trip circuit Supervision Relays.**
- b) Also 2 Nos. indicating lamps to act in conjunction with trip circuit supervision relays for healthy trip indication of 2 sets of trip coils shall be supplied.
- c) Necessary external resistors for trip circuit supervision relays shall be supplied.
- d) 220V DC contactors may be provided for multiplication of Circuit Breaker Auxiliary Contacts, Isolator aux.contacts and protection contacts to use in the SCADA circuits. Wiring shall also be done and brought to the Terminal Blocks in the panels. A minimum of two potential free contacts shall be given for ON / OFF.

#### 5.1.18 High speed tripping relay shall

- i. be instantaneous (operating time not to exceed 10 milli seconds)
- ii. be DC operated
- iii. have adequate electrical and hand resetting type contacts, preferably operated by push button. The resetting time shall be within 20 milli seconds for self resetting relays.
- iv. have necessary supervisory relays
- v. be provided with operation indicators for each element/coil.
- vi. have adequate contacts to meet entire requirement of the scheme, with 20% spare contacts (NO & NC).

### 5.1.19 Flag relays shall have

- i. Self Reset Coil and hand reset flag indication
- ii. two elements
- iii. have necessary NO/NC contacts for each element/coil to meet scheme requirements.

### 5.2.0. Detailed Description of Protections:

The protection, auxiliary relay and timers and other equipment that are required to be provided are included in the detailed equipment schedule of panels vide Annexure of this specification. The detailed description of each protection and the associated equipment is described below:

The setting ranges of relays given in specification are indicative. The setting ranges of the equipment offered, if different from the ones specified, shall also be acceptable if they meet the functional requirements.

The bidder shall quote the protection equipment meeting the following requirements.

Separately the bidders may also quote for any additional protections or relays of their own make, considered necessary by him for providing complete, effective and reliable protection. These equipment shall be quoted separately as an addition to the main offer stating the price in the price schedule only. The acceptance or otherwise of this alternative/additional equipment shall be with the Purchaser.

**In case of 220kV PTR panels, control wiring shall be carried-out with a provision of having two voltage supplies from selected Bus – PT-I & II. The user shall be able to switch between these two with PT selection relays (operate as per Bus PT-I & II Isolator Positions).**

**In case of 220kVfeeder panels, control wiring shall be carried-out with a provision of having two voltage supplies, one with selected Bus – PT and the other with CVT. The user shall be able to switch between these two with PT selection relays (operate as per Bus PT-I & II Isolator Positions). This provision shall be made for both Main I & Main II distance relays and BCU/TVM. PT selection relays are to be provided for selection of Bus-I & II PT Voltages according to bay isolator position. Selected bus PT / CVT selection switches are to be provided for Main-I & II and BCU/TVM separately with sync voltage provision. Control should be through 6 Nos. DOs of BCU in parallel with 3 Nos. 6A selector switches (positions: - selected bus PT – Neutral – Line CVT)(for manual operation). 75A,75B 75C,D, 75E,F & 75G, H shall be provided with pushbuttons.**

**Multilin series of M/s GE relays are not accepted for protection.**

**All trips shall be wired through test switch only so as to isolate during testing. All main relays shall have two test switches.**

**When test switch is inserted all signals shall be isolated along with relay DC Supply.**

**Contact utilization of all devices used in the scheme shall be shown at the end of the drawings with clear cross referencing.**

**All drawings must be submitted in A3 size sheet in a clear grid matrix (marked on X axis and Y axis)**

**Note:** -All IEDs shall have Fault recorder, Disturbance Recorder, event recorder, Trip Value recorder and LED Indications. Disturbance recorder shall be finalized during detailed engineering, all the files shall be comtrade complaint.

### **5.2.1 Item 1: 220 TRANSFORMER C&R PANELS**

#### **Protections:**

#### **a. Numerical Differential protection(87T):**

It shall have

- i. triple pole high speed percentage biased differential type and shall have zero sequence stabilization.**
- ii. an operating time of not more than 30 milli secs at 5 times operating current setting of 20%.
- iii. three instantaneous high set over current units
- iv. second harmonic restraint feature and fifth harmonic by pass /restraint feature and also be stable under normal over fluxing conditions
- v. an operating current setting of 20% or less
- vi. suitable for rated current of 1 Ampere
- vii. adjustable bias setting range from zero to 50%
- viii. three bias windings and three windings per phase
- ix. stable on heavy through faults
- x. include necessary separate interposing CTs for angle and ratio correction or have internal features in the relay to take care of angle and ratio correction.
- xi. three element relay suitable for three winding transformer to be provided.**
- xii. with 24 DI & 32 DO (Minimum)**

20 to 24 BI/DI Minimum & 16 to 24 BO/DO Minimum  
and both Total BI & BO shall have minimum 40 Nos

#### **b. Numerical phase segregated REF Protection (64T) with 12 current elements**

- i) Shall be numerical and using Bushing CTs of equal ratio and equal knee point voltage. It is 3 element High impedance Restricted Earth Fault relay.

- ii) Be of current / voltage operated high impedance circulating type with a suitable setting to cover at least 90% of winding.
- iii) Have a current setting range of 10-40% of 1Amp and have suitable voltage setting range.
- v) Be tuned to the system frequency.
- vi) Have a suitable adjustable non-linear resistor to limit the peak voltage to 1000 Volts.
- vii) Have alarm and trip output contacts.
- viii) Have a high speed operation of 10-25 ms to trip.
- ix) Inbuilt function of any other relay will not be accepted. It is preferred to have 64T & 87 are similar.
- x) Three element relay suitable for three winding transformer to be provided.

Shall have disturbance recording feature to record graphic for instantaneous values of current in all three windings

- xii) Each 220/132/33KV (YNao d11) Auto Transformer is proposed to be provided with identical Bushing Current Transformers for REF Protection (64T) in the following manner.
  - i) 3 Nos. on H.V. bushing (one No. Per phase) - 2 sets (6 Nos.)
  - ii) 3 Nos. on I.V. bushing (one No. per phase) - 2 sets (6 Nos.)
  - iii) 3 Nos. on Neutral bushing (before star formation)- 2 sets (6 Nos.)

The Bushing CTs are equal turns, equal knee point voltage, equal accuracy and equal ratio.

It shall have inbuilt features of over flux (two stages with different characteristics (definite time and inverse time), frequency protections, over current & earth fault (with different characteristics (IEC & IEEE)), stub, LBB, differential, thermal over load etc..It shall have minimum of 24DI & 32DO contacts. It shall have default features of 81, 59, 27, 50z, 67, over flux etc..

Note: - Identical type of relays for 87T & 64R are to be provided. This relays must be interchangeable.

Transformer HV B/U Protection and LV B/U Protection both shall have all features i.e 67+51+50 part of BCPU is acceptable.

**c. Numerical Over Fluxing Protection (99THV) and (99TLV):**

A separate numerical relay/ built-in feature of main transformer differential protection is to be offered for Over fluxing protection on HV side.

A separate numerical relay/ built-in feature of main transformer REF protection is to be offered for Over fluxing protection on LV side.

Over fluxing relay protection shall have

- i. operate on the principle of voltage to frequency ratio
- ii. inverse time characteristics compatible to transformer over fluxing withstand capability
- iii. provide an independent alarm with the time delay continuously adjustable between 0.5 to 60 seconds at a value of V/F adjustable between 100% to 125% of rated value.
- iv. tripping time shall be governed by V/f vs time characteristic of the relay
- v. an accuracy of operating time better than +10%
- vi. resetting ratio of 95% or better
- vii. have a set of characteristics for various time multiplier settings. Maximum operating time for the relay shall not exceed 3 and 1.5 seconds at V/f values of 1.4 and 1.5 times rated value, respectively.
- viii. for 220/132 kV Transformer protection over fluxing relay shall be provided both on HV and LV side of the transformer.

**d. Backup Over Current and Earth fault protection on Transformer HV side:**

Triple pole (settable for directional and non-directional ) 3 Sec. IDMT over current relay with instantaneous high set unit shall be provided for backup over current protection on the HV side. The high set instantaneous units shall have suitable settings. For faults on the HV side involving heavy fault currents the high set units shall clear the faults instantaneously. 3 Sec. IDMT E/F relay ( settable for directional and non-directional ) with high set instantaneous unit with suitable settings shall be provided for backup protection on the HV side. Alternatively 4-pole relays with over current and earth fault functions can be offered. For all the Transformer Control and Relay Panels and Feeder Control and Relay Panels the over current and earth fault relays shall have self supervision and event recorder in addition to the above. (part of HV BCPU is acceptable)

**e. Backup Over Current and Earth fault protection on Transformer LV side:**

Triple pole non-directional 3 Sec. IDMT over current relay with instantaneous high set shall be provided for backup over current protection on the LV side of the transformer.

Non directional IDMT E/F relay with high set instantaneous unit shall be provided for back up protection on the LV side of 132/33kV transformer. Alternatively 4-pole relays with O/C and E/F functions can be offered. Separate high speed trip relay shall be provided for LV protection. (part of LV BCPU is acceptable)

Note: - 1) BCUs are to be wired with metering class CT and PTs and BCPUs are to be wired with protection class CT and PT.

2) zero sequence voltage shall be internally derived or achieved, no external transformer are allowed for **all Backup Over Current and Earth fault protections.**

3) **all** over current & earth fault shall have different characteristics (IEC & IEEE).

**f. Auxiliary Relays for Transformer Protection Devices:**

Auxiliary relays required for buchholtz trip, tap changer buchholtz trip, HV winding temperature trip, LV winding temperature trip, oil temperature trip and PRV trip shall be provided. Each auxiliary relay shall have 2 pairs of contacts and one hand reset flag indicators. The auxiliary relays may be of non-draw out type. **Auxiliary Relay shall be provided for Transformer non trip functions also.**

**Auxiliary Relay shall be provided for Transformer troubles trip and Alarm shall be placed on front side of panel .**

**g. Inter Tripping Relays:**

1 No. inter-trip relay to trip HV and LV breakers of the transformer and to isolate the transformer from supply shall be supplied. The inter trip relay shall be of high speed and shall be provided with electrical and hand reset operation indicator and 6 N/O + 2 N/C electrical and hand reset contacts for 132 kV breaker and 15 N/O + 3 N/C electrical and hand reset contacts for 220 kV breaker.

**Note: - all trip relays should be of both electrical and hand reset type. (flag only are of hand reset type)**

**h. Numerical Under Voltage Relay Scheme:**

It shall be offered as a separate relay or built in feature.

- i. Transformers are provided with tap changers having tap variation upto +5 to -25 % on HV side. This 25% variation is necessary for meeting system demand. In case of sudden throw off of load or due to inadvertent operation of OLTC other equipment in the substations may be subjected to 25% over voltage. Hence necessary interlock and protection features are required for avoiding such a situation.
- ii. The transformer OLTC gear shall be prevented from raising further beyond 15% tap if the LV bus voltage is normal i.e. at 132 kV. Necessary interlocking circuits, to prevent operation of tap changer will be provided on tap changer panel by using a N/C contact from 15% tap point.

- iii. Necessary under voltage relay to by-pass the above interlocking, if the 132 kV and 33 kV bus voltage is less than normal shall be provided on 220/132 kV and 132/33 kV Transformer relay panel.
- iv. The under voltage relay shall have high drop-off / pick-up ratio. The relay shall be suitable for 110 V bus PT and shall have a setting of 60 % to 90% of nominal voltage in steps of 5 %. The relay shall be provided with 4 pairs of self reset contacts (N/C contact).

The bidder may furnish their comments on the protection scheme indicated above.

**i. Numerical Under Frequency Relay Scheme with df/dt feature:**

- i. df/dt relay shall act only in frequency falling conditions only.
- ii. Under frequency relay scheme shall consist of one number under frequency relay, one number timer relay and one number trip relay with 7 N/O + 7N/C Contacts of Electrical & hand reset type.
- iii. Under frequency relay shall be suitable for operation with 110 V bus P.T. Secondary rating between phases and 220 V DC supply. The relay shall have continuously adjustable setting range of 47 to 50 HZ with an accuracy 0.1 to 10Hz per second in steps of 0.1 Hz per second. The relay shall not mal operate due to any abrupt change in supply voltage from P.T. secondary.
- iv. Each frequency relay shall have 4 N/O contacts. One for alarm and other for energizing the timer relay.
- v. The timer relay shall have timing range of 0.1 to 0.5 seconds adjustable in steps of 0.05 secs. The timer relay shall have 4 N/O contacts. One N/O contact will be utilized to energize the trip relay. The other 3 N/O contacts will be utilized for tripping 3 Nos. 33 kV feeders directly.
- vi. The trip shall have electrical and hand reset type 6 N/O and 6 N /C. contacts for tripping 6 Nos. feeders.
- vii) A separate numerical relay is to be provided for under frequency relay scheme with df/dt feature. This shall not combine with other protection function. or (part of any relay with different stages (alarm & trip with time delay) is acceptable
- viii) The numerical under frequency relay shall have memory to store fault data.

***Schedule of Detailed Equipment:-***

**160 / 100 MVA, 220/132 kV TRANSFORMER CONTROL, RELAY, ALARM AND ANNUNCIATION PANELS.**

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| Quantity | Description of Equipment |
|----------|--------------------------|
|----------|--------------------------|

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160 / 100 MVA, 220/132 kV Transformer HV & LV control, relay and Alarm and Annunciation panels (suitable for double / Single bus arrangement) equipped and wired with the following equipment to be mounted on 2 separate panels).

**Panel Dimensions:**

Control Panel: WDXH = 1000mm x 800mm x 2250mm (including base frame and the anti vibration pad)

Relay Panel: WDXH = 1000mm x 800mm x 2250mm (including base frame and the anti vibration pad)

- 1 No. Circuit indication label
- 3 Nos. PVC circuit label suitably engraved in white letters.
- 2 Nos. Digital Ammeters, scaled suitably one for the HV side with CT ratio 300/1A and one for the LV side with CT ratio 500/1A. Class of accuracy. 0.5 (A-HV & A-LV)
- 2 Nos. 6 position Ammeter selector switches. OFF-R-Y-OFF-B-N positions (Raing: 16A) (ASS-HV & ASS-LV)
- 2 Nos. Digital MFM (96x144 mm or 144x144 mm, LED type, 3 or 4 line, 25mm digit size) which can show MW, MVAR, PF (incase of 3 line, frequency also to be included in 4 line display- MFM-1) and MW, MVAR, Frequency (incase of 3 line, PF also to be included in 4 line display- MFM-2) suitable for 3 phase, 4 wire system scaled suitably, class of accuracy 0.5 or 0.2.
- 2 Nos. **HV BCU** (with 110 DI, 40 DO & 8 or 10 AI (4-20 mA card, either in HV or **LV BCU** acceptable)) and **LV BCU** (with 64 DI, 32 DO)
- 2Nos Electronic Trivector meter of 0.2S class accuracy for both export and import of MWH & MVARH and ABT features to be provided on LV side of PTR; with TTB suitable for above. CT ratio: 500/1A, PT ratio: 132kV Root 3/110V/Root 3. – **HV TVM** & TVM – LV.
- 1 No. Painted and over laid mimic diagram representing bus bars, connections, symbols and layout.
- 2 No. **Circuit Breaker control switches, 3 position 22 way with pistol grip handle**, lockable pattern for the remote control of HV and LV Breakers. Rating of the Control Switch shall be not less than **32A**. NAC & N contacts also shall be provided for utilization in Auto trip Indication and Annunciation (152CS-HV & 252CS-LV)
- 4 Nos. Auxiliary Relay for Close/Open operation of HV & LV Circuit Breakers (152CX, 152TX, 252CX & 252TX)

- 3 Nos. facility 3 position, 8 way spring return to neutral type isolator control switch with lock for 2 Nos. HV isolators and 1 No. LV Isolator (CS-189A, CS-189B & CS-289A)
- 6 Nos. Auxiliary Relay for Close/Open operation of 2 Nos. HV & 1 No. LV Isolators along with push buttons in parallel with BCU DO contacts (189A-CX, 189A-TX, 189B-CX, 189B-TX, 289A-CX & 289A-TX)
- 18 Nos. LED type Indicating lamps for the following indications:
- a) 2 Nos. for HV & LV Breaker close indication (Red colour)
  - b) 2 Nos. for HV & LV Breakers open indication (Green colour)
  - c) 2 Nos. for HV Breaker Trip circuit healthy indication (White colour)
  - d) 2 Nos. for LV Breaker Trip circuit healthy indication (White colour)
  - e) 2 Nos. for HV & LV breaker Spring charge/breaker close permissible indication (Blue Colour)
  - f) 3 Nos. for HV/LV isolators Close indication (Red colour)
  - g) 3 Nos. for HV/LV isolators Open indication (Green colour)
  - h) 2 Nos. for HV & LV breaker Auto Trip Indication (Amber Colour)
- 6 Nos. Trip circuit supervision relay scheme for continuous supervision (both pre-close & after close supervision) for individual supervision of 3 phases of HV breaker having 2 sets of trip coils (total 6 coils, 2 Nos. for each phase of breaker) (195R-HV, 195Y-HV, 195B-HV, 295R-HV, 295Y-HV & 295B-HV). (with spare contacts)
- 2 Nos. Trip circuit supervision relay scheme for continuous supervision (both pre-close & after close supervision) for LV breaker having 2 sets of trip coils. LV circuit breaker pole limbs are gang operated (195-LV & 295LV). (with spare contacts)
- 1 No. 230V 10A Rating AC MCB (with N/C contact for alarm) for AC supply control
- 2 Nos. 220V 16A Rating DC MCBs (with N/C contact for alarm) for DC supply control in HV circuits (DC1-HV & DC2-HV)
- 2 Nos. 220V 10A Rating DC MCBs (with N/C contact for alarm) for DC supply control in LV circuits (DC1-LV & DC2-LV)
- 4 Nos. DC Supply Change Over Relays in DC-1 & DC-2 Circuits of HV & LV Circuits (DCSCOR1-HV, DCSCOR2-HV, DCSCOR1-LV & DCSCOR2-LV)
- 1 No. 87T - Instantaneous, Biased numeric Differential protection relay scheme with 2<sup>nd</sup> Harmonic Restraint features for differential protection of HV & LV

winding of Transformer as described in Technical Specification. (3 element for 3 windings PTR)  
(20 to 24 BI/DI Minimum & 16 to 24 BO/DO Minimum and both Total BI & BO shall have minimum 40 Nos)

1 No. 64R - Instantaneous, High Impedance 3 Element Restricted Earth Fault Relay as described in Technical Specification. (3 element for 3 windings PTR)  
(20 to 24 BI/DI Minimum & 16 to 24 BO/DO Minimum and both Total BI & BO shall have minimum 40 Nos)

1 No. 67RYBN-HV: Numerical Four pole IDMT Non-directional over current relay & Directional E/F Relay with high set instantaneous features for backup protection of HV side of transformers. (Part of HV BCPU acceptable)

1 No. 67RYBN-LV: Numerical Four pole IDMT Non-directional over current relay & Directional E/F Relay with high set instantaneous features for backup protection of LV side of transformers. (Part of LV BCPU acceptable)

1 Set 50Z: Numerical Local breaker backup protection scheme with timer and auxiliary relays for transformer HV breaker.

2 Nos. 99-HV & 99-LV: Over fluxing relay schemes to isolate the transformer by tripping the HV & LV breaker and ratio of voltage by frequency exceeds a predetermined setting as described in technical specification. (Part of main protection relay is acceptable)

1 No. 27: Under voltage relay scheme as per technical specification. (part of BCPU / main protection relay is acceptable)

1 No. 81: Under frequency relay scheme with rate of change of frequency as per technical specification. (part of BCPU / main protection relay is acceptable)

8 Nos. DC operated Auxiliary Relays each element provided with 2 pairs of contacts and hand reset operation indicator for the following functions.

- a) Buchholz trip – 30A
- b) HV winding temperature trip -30B
- c) LV winding temperature trip – 30C
- d) Oil temperature trip – 30D
- e) OLTC Buchholz Trip – 30E
- f) Main Tank PRV trip - 30F
- g) OLTC PRV Trip – 30G & 1 No. Spare – 30H

These relays shall be provided irrespective of the availability of these features in the Differential Relay or in some other protection relay.

8 Nos. DC operated Auxiliary Relays each element provided with 2 pairs of contacts

and hand reset operation indicator for the following functions.

- a) Buchholz Alarm – 30J
- b) HV winding temperature Alarm – 30K
- c) LV winding temperature Alarm – 30L
- d) Oil temperature Alarm – 30M
- e) Low oil level Alarm (MOG Alarm) – 30N
- f) Air Cell Puncture Alarm – 30P & 2 Nos. Spare – 30Q & 30R

These relays also shall be provided irrespective of the availability of these features in the Differential Relay or in some other protection relay.

- 10 Nos. DC operated Auxiliary Relays each element provided with 2 pairs of contacts and hand reset operation indicator for the following functions.
- a) HV CB SF6 Gas Pressure Low Alarm – 152A
  - b) HV CB SF6 Gas Pressure Lock Out – 152B
  - c) HV CB Air Pressure Low Alarm – 152C
  - d) HV CB Tripped on CTD – 152D
  - e) HV CHV CB Tripped on Pole Discrepancy – 152E
  - f) LV CB SF6 Gas Pressure Low Alarm – 252A
  - g) LV CB SF6 Gas Pressure Lock Out – 252B
  - h) HV CB Air Pressure Low Alarm – 252C
  - i) LV CB Tripped on CTD – 252D
  - j) Spare – 252E
  - k) LA counter alarm
- 1 No. and High speed tripping relay (86-LV) with 8 N/O + 2 N/C contacts with electrical and hand reset operation for LV Backup Protection trip
- 1 No. High Speed Inter trip relay (86-IN) with 16 NO + 4 NC contacts with electrical and hand reset operation indicator for inter tripping of HV side and LV side breakers of Transformers.
- 1 No. High Speed Tripping Relay (86-HV) with 16 NO + 4 NC contacts with electrical and hand reset operation indicator for HV Backup Protection trip
- 1 No. High Speed Tripping Relay in LBB Circuit (86-LBB) with 16 NO + 4 NC contacts with electrical and hand reset operation indicator for HV
- 1 No. High Speed Tripping Relay in df/dt Circuit (86-df/dt) with 10 NO + 10 NC contacts with electrical and hand reset operation indicator
- 5 Nos. Trip Relay Coil Supervision Relays for the above 5 Nos. Tripping Relays (95/86-LV, 95/86-IN, 95/86-HV, 95/86-LBB & 95/86-df/dt)
- 2 No. Bus PT Voltage selection relay for selection of 220kV Bus-1 PT and Bus-2 PT supply for metering and protection (75A & 75B)

- 2 Nos. Digital Voltmeters for indicating 220 kV & 132 kV Bus Voltages. Class of accuracy 0.5 (V-HV & V-LV)
- 2 Nos. Voltmeter selector switches, 6 way for the above. (16 Amps. Rating) RY-YB-BR-RN-YN-BN positions) (VSS-HV & VSS-LV)
- 1 No. Digital Power factor meter. (Part of MFM acceptable)
- 1 No. Digital Frequency meter. (Part of MFM acceptable in all bay panels, but Frequency Meter is required only on the Bus Coupler Panels seperately)
- 2 Nos. MW and MVAR 4-20 mA transducers are to be provided for SCADA purpose.
- 1 Set Micro Processor based 32 way Annunciation scheme comprising of the following:
- a) Annunciation windows for 32 ways.
  - b) Push button switches for alarm Accept, Reset, Lamp test and Alarm test facilities.
  - c) Alarm bell for trip alarm.
  - d) Hooter for non-trip alarm.
- 1 Set. DC fail Annunciation scheme comprising of following:
- a) Indicating lamps for DC fail indication
  - b) Push button for DC fail Alarm accept and test facility
  - c) Alarm Relay ( 2 Pole relay one AC pole and other DC pole) for DC fail Alarm scheme.
  - d) Low tone AC Bell for DC fail alarm.
  - e) AC Relay for DC fail alarm.
- 1 Set AC fail annunciation scheme as per clause 5.1.13
- 1 Set Name plates for all the equipment mounted on panel front side inside.
- 1 No. Door operated cubicle illumination with lamp
- LS Terminal Blocks disconnecting type in CT, PT, Main DC and Main AC circuit and stud type terminals and 20% spare terminals.
- 1 Set Fuses in AC and DC and PT circuits.
- 1 Set Cable Glands
- 1 Set Space Heater with thermostat control and switch.
- 1 No. 3 pin plug socket with switch control for AC supply
- 2 Nos. Contact multiplying relays with base (High speed Change Over Relays) with 7 NO & 7 NC Potential free contacts for multiplying the HV Isolators Auxiliary contacts to use in Indication, Bus PT selection, Bus Bar Protection and SCADA circuits (189AX & 189BX)

- 3 Nos. Contact multiplication relays (High speed Change Over Relays) with 7 NO & 7 NC Potential free contacts for multiplying 152, 252 & 289A Auxiliary Contacts (152X, 252X & 289AX)
- 1 No. 25x6 mm Copper Earth Bus
- 1 No. blank plate for rack mounted Ethernet Switch
- 1 No. blank plate for Line Interface Unit

**Item 2&3 : 220 kV Feeder Protection C&R Panels(Distance/Differential):**

The line protection relays are required to protect the line and clear the faults on line within shortest possible time with reliability, selectivity and full sensitivity to all type of faults on lines. The general concept is to have primary and back up protection having equal performance requirement except for in respect of time of operation of basic relay without carrier facilities as provided by two main protections called Main-I and Main-II. **The Main I and Main II Numerical Distance /Differential Protection Relays of two different makes should be provided.**

**The technical requirements are similar for Main-I and Main-II distance relays and they should be of different make.**

**Note:- Schneider make Micom/ Esergy and Alstom T&D/GE T&D Make Micom/Agile cannot be treated as different make/Manufacturer. (Both relays are from M/s. AREVA)**

The maximum fault current could be as high as 40 kA near power station but the minimum fault current could be as low as 20% of rated current.

The starting and measuring relays characteristics should work satisfactorily under these extremely varying conditions.

The protective relays shall be suitable for use with capacitor voltage transformers having non-electronic damping and transient response as per IEC/IS 3156. It should be ensured that there is no additional delay in relay operating time created intentionally to have stable operation. The power supply unit if provided as an integral part of relay scheme shall be fully rated with liberal design in capacity.

The DC supply for the relay shall be from DC/DC converters and these shall be amply and fully rated for all operating conditions in service. These DC/DC converters should be adequately rated and shall be suitable for operation from 180 V to 260 V DC.

Insulation barriers shall be provided to ensure that transients present in CT & VT connections due to extraneous sources do not cause damage to static circuits. The circuits must comply with IEC recommendation for impulse withstand values. Adequate measures shall be taken to ensure that equipment is protected against voltage spikes occurring in Aux. DC supply.

The detailed description for the Main-I and Main-II protections for 220 kV feeder is given hereunder

**Main-I: Numerical distance protection shall be non switched type suitable for use with permissive under reach and over reach transfer tripping. The Relay shall have continuous self monitoring and diagnostic feature.**

Main-II: Numerical distance protection. The Main I and Main II Numerical Distance Relays should be of different make with same technical requirements. The bidder/Supplier should be responsible for coordinating for commissioning, testing, trouble shooting, replacement etc., to the Main I/ Main II Numerical Distance Relays for the different make of relay (manufacturer)

(A) Main I Protection :

**a) The operating characteristic of numerical distance protection scheme shall be of quadrilateral characteristic with independently settable R&X values for phase to phase faults and phase to earth faults.**

- i) The numerical distance protection shall have all the functional and operational requirements as given for the distance protection scheme specified hereafter.
  - ii) The scheme shall have input transformation modules, analogue and digital filters, processing units A/D and D/A converters, DC supply modules etc. The sampling rate of analogue inputs, the processing speed and processing cycle of digital values shall be selected so as to achieve the operating time specified. Display on demand of various measured parameters, alarms, clock, relay identification, settings etc. during normal as well as fault conditions on individual phase basis shall be provided.
  - iii) The offered scheme shall have continuous self monitoring and cyclical test facilities. The clock of this system shall be synchronized through time synchronising system wherever it is available.
  - iv) The system shall include supply of MMI (Man Machine Interface) and serial/parallel ports for remote communication for each protective relay.
  - v) Facilities shall be available through the MMI for setting alteration, display of all settings, scheme logics and any other requirements as per the software and hardware configuration of the system other than the menu driven alarms, visual indication by means of LEDs or tristable relays shall be provided for major trip alarms like phase and zone of operation. Power swing blocking/trip, SOTF, A/R block etc.
  - vi) The contractor shall be responsible for complete engineering of the carrier aided protection scheme, and all the relays, devices etc., shall be provided.
- b) Distance protection scheme shall:

- i) have high speed non switched distance relays for 3 phase systems to clear all types of line faults with in the set reach of the relay. Have 6 non switched measuring elements for each zone of protection (3 for phase to phase faults and 3 for phase to earth faults).
- ii) be modular in construction
- iii) The basic scheme (without considering carrier protection features) shall have Zone-I operating time up to trip impulse to breaker (complete protection time including the trip relay operating time) of not more than 40 Milli Seconds.
- iv) Operate on carrier blocking principle and or carrier inter trip (with facility to change over to carrier inter trip at site)
- v) Protect 100% of the line section.
- vi) Suitable shaped characteristic to prevent relay operation during maximum load conditions without reducing the reach of relays.
- vii) Shall be suitable for operation with either bus PT or line CVT supply. Quick change over facility for changing over of potential supply from line VT to bus PT or vice versa shall be provided.
- viii) Have two independent continuously variable time setting range of 0-3 seconds for Zone-2 & 0-5 seconds for Zone-3 and Zone-4. The measuring relay shall have wide setting ranges and the reach of relay for Zones 1,2,3 and 4 should be able to cover line lengths of 0.5 KM to 200 KM.
- ix) Have a maximum resetting time of less than 35 milli seconds.
- x) Have residual compensation with suitable variable setting range.
- xi) The setting/reach should not be affected by mutual coupling effect of D/C line or nearby paralleled circuits. The proof of compensation should be given if provided.
- xii) Operate instantaneously when circuit breaker is closed to Zero-volt 3 phase fault.
- xiii) Be suitable for single and three phase tripping
- xiv) Have a continuous current rating of two times rated current. The voltage circuit shall be capable of operation at 1.2 times rated voltage. The relay shall also be capable of carrying a high short time current of 70 times rated current without damage during a period of 1 sec.
- xv) Be selective between internal and external faults

- xvi) Incorporate three high speed trip relays for single phase faults and a fourth high speed trip relay for multi-phase faults. Each of these trip relays shall have adequate contacts to meet the complete scheme requirement. These trip relays shall be self reset type.
- xvii) Include power swing blocking protection which shall
  - a) be of triple pole type
  - b) have suitable setting range to encircle the distance protection described above
  - c) have a continuously adjustable time delay on pick up of setting range 0-2 seconds.
  - d) block tripping during power swing conditions
  - e) be possible to select the power swing blocking in zone 1,2 or 3 or any combination of zones
- xviii) Include fuse failure protection which shall
  - a) Monitor all the three fuses of CVT and PT and associated cable against open circuit
  - b) inhibit trip circuits on operation and initiate annunciation
  - c) have an operating time less than 7 milli seconds
  - d) remain inoperative for system earth faults
  - e) have sufficient no. of contacts one for alarm and others for blocking the tripping.
- xix) Necessary auxiliary relays and carrier switches required for carrier blocking/carrier inter trip protection feature
- xx) Suitable no. of potential free contacts (if required multiplied through reed relays only) be provided on each distance scheme for carrier tripping , auto re-closing, fault locator, disturbances recorder, and data acquisition system.
- xxi) have built in supervision and testing facility
- xxii) include continuous DC supply supervision
- xxiii) Operation of the scheme shall be immune to the presence of DC transients during fault condition in the voltage/current inputs to the relays.
- xxiv) Have indicators to show the phase or phases involved in a fault and the zone in which the scheme has operated.
- xxv) Essential performance curves of the offered distance scheme shall be submitted by the bidder.

**b) Open circuit protection:**

Necessary additional protection relays for detecting single phase/2 phase open circuiting of 220 kV feeders and to trip the 220 kV feeder circuit breaker shall be

provided. Alternatively this feature can also be supplied as a built in feature of Main-I & Main-II protection schemes.

- c) **Auto re-closing relays shall be either included in Main I and Main II as a built-in feature or provided separately, but shall be available for Main I and Main II relays even if one of them is not in operation. (Selector switch to be provided- Main-I – OFF – Main-II for A/R).**
- i) Have single phase and three phase re-closing facilities
  - ii) Have a continuously variable single phase dead time of 0.5 to 5 seconds
  - iii) Have continuously variable three phase dead time range of 0.5 to 5 seconds.
  - iv) Have a continuously variable reclaim time range of 5-25 seconds
  - v) Incorporate a four-position selector switch from which single phase/three phase/single and three phase/auto re-closure and non-auto re-closure mode can be selected
  - vi) Have facilities for selecting check synchronising or dead line charging features. It shall be possible at any time to change the required feature by reconnection of links.
  - vii) Be of single shot type
- viii) Include check synchronising relay which shall
- a) have a time setting variable between 0.5 to 5 seconds.
  - b) have a response time within 200 milli seconds with the timer disconnected
  - c) have a phase angle setting not exceeding 35 deg.
  - d) have voltage difference setting not exceeding 10%
- ix) Include dead line charging relay which shall
- a) have two sets of relays and each set shall be able to monitor the three phase voltage.
  - b) have one set connected to the line CVTs with a fixed setting of 20% of rated voltage
  - c) have one set connected to the bus CVTs with a fixed setting of 60% of rated voltage

- d) incorporate necessary auxiliary relays and timers to give comprehensive scheme
- x) Incorporate a separate pole discrepancy relay with timing range of 0.1 to 5 sec
- xi) Auto reclosure of the line shall take place only when fault is cleared in first zone by the main protection.
- xii) Incorporate auto re-closure lockout relays to prohibit auto re-closure under the following conditions
  - a) tripping due to operation of bus bar protection
  - b) tripping immediately after the manual closer of line breaker
  - c) tripping for faults in second and 3rd zone as backup
  - d) When tripping takes place after a power swing condition
  - e) In the event of trip on pole discrepancy
  - f) When carrier is out of service.
- xiii) It should have positive phase selections under all operating conditions. The scheme should be such as to have Main-I and Main-II fully segregated such that shut down and testing on one Main protection should not affect the other Main protection. The auto reclosure should then be connected to the other Main protection.
- xiii) Come in to operation with either or both Main-I & Main-II distance protection when these protections operate for Zone-I faults and trip the breaker.

**d) Local breaker backup protection scheme:**

This scheme shall

- a) Comprise of a breaker failure initiating relay associated with each protective system viz., Main-I and Main-II, breaker failure relay which supervises the fault current flowing through the breaker being protected against failure and breaker failure time delay relay and breaker failure lockout relay.
- b) The operation of both breaker failure initiating relay and breaker failure relay will initiate timer relay which in turn operates lockout relay. The lockout relay will have N/O contacts for annunciation and for energisation of bus bar protection trip relays (available on bus bar protection panels procured separately) for tripping all the other breakers connected to the bus
- c) Breaker failure relay scheme above shall:
  - i) be triple pole type

- ii) be suitable for 220 V DC supply
- iii) have an operating time of less than 15 milli secs.
- iv) have a resetting time of less than 15 milli secs.
- v) have two over current and one earth fault elements
- vi) be of numeric type and can be given as a built in feature.
- vii) have a setting range of 20-320% of rated current for phase over current and 20-80% for ground over current.
- viii) have continuous thermal withstand rating of two times rated current irrespective of the setting.
- ix) have a separate/in built timer with a continuously adjustable setting range of 0.1 to 1 sec.
- x) have necessary auxiliary relays to make a comprehensive scheme the scheme shall be so engineered that in the event of persisting breaker lockout condition and simultaneous incidence of fault shall result in instantaneous tripping of the concurred bus bar to which the faulty breaker is connected.

**e) Distance to Fault Locator:**

This shall have

- i) electronic or microprocessor based type
- ii) on line type
- iii) suitable for breaker operating time of 2 cycles i.e. measurement time for fault locator shall not exceed 2 cycles (40 ms)
- iv) built in display unit
- v) the display shall be directly in percent of line length or kilometers without requiring any further calculations
- vi) have an accuracy of 3% or better for all types of faults and fault levels
- vii) the above accuracy should not be inspired under the following conditions
  - a) presence of remote end feed
  - b) predominant DC component in fault current
  - c) high fault arc resistance
  - d) severe CVT transients
- viii) have facility for remote data transmission
- ix) shall meet IEC-255 or any other equivalent internationally recognised standards
- x) fault locators shall provide the following information by means of printer/equivalent device
  - i) type of fault
  - ii) phases on which fault is involved
  - iii) distance to fault in terms of line length
  - iv) magnitudes of pre-fault currents and voltages and magnitude of fault currents and voltages for further analysis

xi) have built in supervision and testing facility.

**NOTE:-** Distance to fault locator can be offered as a built in feature for Main-I or Main-II distance relay **with 24 DI & 32 DO (Minimum)**

**B) Main II protection:-**

**The Main I and Main II Numerical Distance Protection Relays of two different makes should be provided. (with 24 DI & 32 DO (Minimum))**

**The technical requirements are similar for Main-I and Main-II distance relays and they should be of different make.**

**The operating characteristic of numerical distance protection scheme shall be of quadrilateral characteristic with independently settable R&X values for phase to phase faults and phase to earth faults.**

- i) The basic scheme (without considering carrier protection scheme) shall have a Zone-I operating time up to trip impulse to breaker (complete protection time including the trip relay operating time) not more than 40 milli seconds.
- ii) Fourth zone back up timer with independent timing range of **0.5 to 5** seconds. The fourth zone setting shall have the facility to set for directional or non-directional operation.
- iii) Operate on carrier inter trip feature
- iv) Except for above Main-II protection shall have all other features (power swing blocking, VT fuse failure relay, single and 3 phase tripping, high speed tripping relays, carrier auxiliary relays etc.) as indicated for Main-I protection.

Panels shall be completely factory wired, ready for connecting to the equipment . Control wiring shall be done with 2.5 Sq.mm 1100V grade PVC insulated stranded copper cables. Panels shall be given two coats of light gray paint finish after thorough pre-treatment and application of corrosion resistant primer.

Earthing shall be done for all the equipment and the panel. The minimum size of earthing bus shall be 25 x 3 mm copper.

Construction of panels shall be such that it is possible to add more incoming/outgoing circuits by suitable and easy extensions. The incoming and outgoing circuits shall be provided with detailed equipment schedule as given in Annexure.

**Main I&II relay shall have under voltage relay feature for utilizing interlocking of line isolator earth switch**

### **Line Differential protection Relay with 2 Nos channels**

**Main-I:** Numerical Line Differential relay (with OPGW\*) complying to IEC61850 standard. (With distance protection feature)

**Main-II:** Numerical Line Differential relay (with OPGW\*) complying to IEC61850 standard. (With distance protection feature) – of a different make.

**\* Necessary equipment / Accessories / convertors required for Fibre optic communication between two line differential relays at both ends also to be provided. OPGW cable is in the scope of APTRANSCO.**

**Numerical Line Differential Protection Relay (The relay should be IEC 61850 compliant )**

- a) Line Differential protection relay shall have phase segregated line differential protection
- b) It shall measure Differential as well as restrain current continuously and shall display the same as measurement
- c) It shall communicate analogue as well as digital signals to remote end
- d) It shall have line charging current compensation feature for better sensitivity
- e) Have backup built in distance protection functionality as specified for distance protection relay. Distance protection function can be utilized as independent or as back up of differential protection in case of failure of remote communication.
- f) It shall communicate time coordinated current signals for remote communication to execute line differential protection algorithm accurately. Time synchronization through GPS shall also be possible
- g) Have high immunity to electrical & electromagnetic interference.
- h) Have DR with 8 nos analog channels & 32 Nos binary channels
- i) Generate GOOSE message as per latest IEC 61850 standard for interlocking and also to ensure interoperability with third party relays
- j) Be provided with necessary user friendly configuration tools to configure the relays and shall be compatible with SCL/SCD files generated by a third party system

.GOOSE signals shall be freely configurable for any kind of signals using graphic tool/user friendly software .there shall be a facility to have latest IEC 61850 protocol inbuilt without use of any external coverter.

- k) Have the facility of setting parameter access restriction
- l) Have self supervision with fault diagnostics.
- m) Be provided with necessary WINDOWS 7/WINDOWS 10 based support software for setting parameterization, up & downloading data etc.,
- n) Have channel communication with continuous supervision facility and the facility for switching to backup protection mode in the event of communication channel failure
- o) Have cold start switching facility at every end
- p) Have phase segregated measurement and tripping facility
- q) Have a high set differential trip setting with tripping time of maximum 15ms
- r) Have a normal line differential trip time of maximum 35ms at 5 times of set value
- s) Provide high stability during external fault.

***Schedule of Detailed Equipment:-***

**220 KV FEEDER CONTROL AND RELAY PANELS (Distance/Differential protection) :**

**ITEM-2&3 220 kV FEEDER CONTROL PANEL SUITABLE FOR DOUBLE BUS ARRANGMENT TO BE EQUIPPED AND WIRED WITH THE FOLLOWING:**

**Panel Dimensions:**

Control Panel: WDXH = 1000mm x 800mm x 2250mm (including base frame and the anti vibration pad)

Relay Panel: WDXH = 1000mm x 800mm x 2250mm (including base frame and the anti vibration pad)

1 No. Circuit identification label

1 No. BCU (with 110 DI, 40 DO minimum)

1 No. Digital Ammeter. Range: 0-800A. Scale of accuracy 0.5.

1 No. Ammeter selector switch. 6 Positions (OFF-R-Y-OFF-B-N). Rating: 16A

1 No. Transducer (Dual output) operated Digital Mega Watt Meter. Range: 266.67-0-266.27MW. Class of accuracy: 0.5, 3 element, 3 phase 4 wire

1 No. Transducer (Dual Output) Digital Mega VAR Meter. Range: 266.67-0-266.27MVAR. Class of accuracy 0.5, 3 element, 3 phase 4 wire

- 1 No. Electronic Tri Vector Meter. ABT Featured Meter. Class of Accuracy: 0.2S. Both Export and Import of MWH and MVARH as per clause 5.1.10 C (4). CT Ratio: 800/1A & PT Ratio: 220KV/ $\sqrt{3}$ /110V/ $\sqrt{3}$
- 1 No. TTB suitable for 3 phase, 4 wire for the above the TVM.
- 1 Nos. Digital MFM (96x144 mm or 144x144 mm, LED type, 3 or 4 line, 25mm digit size) which can show MW, MVAR, PF (incase of 3 line, frequency also to be included in 4 line display) suitable for 3 phase, 4 wire system scaled suitably, class of accuracy 0.5 or 0.2.
- 15 Nos. LED type Indicating lamps for the following functions:
- 1 No. for Circuit Breaker Close permission indication of breaker – Blue Colour
  - 2 Nos. for Circuit Breaker Open and close indication – Green & Red
  - 2 Nos. for Trip Circuit Healthy Indication for TC-1 & TC-2 – White
  - 6 Nos. Indicating lamps for bus I and bus II isolators and Line isolator Open/Close indications – Green & Red
  - 3 Nos. for line VT on indication – Red, Yellow & Blue Colour
  - 1 No. for Capacitor charged indication of Circuit Breaker – White
- 1 No. Push button for capacitor charge testing
- 1 No. Painted and overlaid mimic diagram representing bus bars, connections and symbols and layout.
- 2 No. **Circuit Breaker Control Switch, 3 position 22 way with pistol grip handle**, lockable pattern for the remote control of Feeder Circuit Breaker. Rating of the Control Switch shall be not less than **32A**. NAC & N contacts also shall be provided for utilization in Auto trip Indication and Annunciation (52CS)
- 4 Nos. Auxiliary Relay for Close/Open operation of Feeder Circuit Breakers (52CX & 52TX)
- 3 Nos. 3 position, 8 way spring return to neutral type isolator control switch with lock facility  
for 2 Nos. Bus Isolators and 1 No. for Line Isolator (CS-89A, CS-89B & CS-89L)
- 6 Nos. Auxiliary Relay for Close/Open operation of 2 Nos. Bus Isolators & 1 No. Line Isolator along with push buttons in parallel with BCU DO contacts (89A-CX, 89A-TX, 89B-CX, 89B-TX, 89L-CX & 89L-TX)
- 6 Nos. Trip circuit supervision relays for continuous supervision (pre-close and post close supervision) for individual supervision of 3 phases of circuit breaker having 2 sets of trip coils (Total: 6 Nos. Trip Coils, 2 Nos. for each pole) (with spare contacts)

- 1 No. Digital Volt Meter. Range: 0-250 kV. Class of accuracy 0.5
- 1 No. Volt Meter Selector Switch. 6 Positions (RY-YB-BR-RN-YN-BN). Rating: 16A.
- 1 No. 230V 10A Rating AC MCB (with N/C contact for alarm) for AC supply control – AC-MCB
- 2 Nos. 220V 16A Rating DC MCBs (with N/C contact for alarm) for DC supply control – DC1-MCB & DC2-MCB
- 2 Nos. **DC Supply Change Over Relays in DC-1 & DC-2 Circuits–DCSCOR-1 & DCSCOR-2**
- 6 Nos. DC operated Auxiliary Relays each element provided with 2 pairs of contacts and hand reset operation indicator for the following functions.
- a) Circuit Breaker SF6 Gas Pressure Low Alarm – 52A
  - b) Circuit Breaker SF6 Gas Pressure Lock Out – 52B
  - c) Circuit Breaker Air Pressure Low Alarm – 52C
  - d) Circuit Breaker Tripped on CTD – 52D
  - e) Circuit Breaker Tripped on Pole Discrepancy –52E
  - f) Spare – 5F
- 1 Set Micro Processor based 24 way Annunciation scheme comprising of the following:
- a) Annunciation windows for 24 ways.
  - b) Push button switches for alarm Accept, Reset, Lamp test and Alarm test facilities.
  - c) Alarm bell for trip alarm – Provide Fuse Link in the Alarm Bell Circuit
  - d) Hooter for non-trip alarm - Provide Fuse Link in the Hooter Circuit
- 1 Set. DC fail Annunciation scheme comprising of following:
- a) Indicating lamps for DC fail indication
  - b) Push button for DC fail Alarm accept and test facility
  - c) Alarm Relay ( 2 Pole relay one AC pole and other DC pole) for DC fail Alarm scheme.
  - d) Low tone AC Bell for DC fail alarm.
  - e) AC Relay for DC fail alarm.
- 1 Set AC fail annunciation scheme as per clause 5.1.13
- 1 Set Name plates for all the equipment mounted on panel front side inside.

- 1 No. Door operated cubicle illumination lamp. Toggle Switch in addition to the Door Operated Limit Switch
- LS Terminal Blocks disconnecting type in CT, PT, Main DC and Main AC circuit and stud type terminals and 20% spare terminals.
- 1 Set Fuses in AC and DC and PT circuits.
- 1 Set Cable Glands
- 1 Set Space Heater with thermostat control and ON/OFF Control Switch.
- 1 No. 3 pin plug socket with switch control for AC supply
- 2 Nos. Contact multiplying Relays (High speed Change Over Relays) with 7 NO & 7 NC Potential free contacts for multiplying the Bus Isolator Auxiliary Contacts (89AX & 89BX) Auxiliary contacts to use in Indication, Bus PT selection, Bus Bar Protection and SCADA circuits.
- 2 Nos. Contact multiplication relays (High speed Change Over Relays) with 7 NO & 7 NC Potential free contacts for multiplying Feeder Circuit Breaker & Line Isolator Auxiliary Contacts (52X & 89LX)
- 1 No. blank plate for rack mounted Ethernet Switch
- 1 No. blank plate for Line Interface Unit
- 4 Nos. MW and MVAR (HV & LV) 4-20 mA transducers are to be provided for SCADA purpose.
- 1 No. Synchronizing selector switch (10 ways)
- 1 No. Synchronizing socket (12 pins)
- 1 No. 25x6 mm Copper Earth Bus
- 2 Sets Name plates for the mounted equipment both on front panel and inside
- 1 Set Terminal blocks with required stud type terminals and 20% spare terminals with required bolts and nuts.

**220 kV FEEDER RELAY PANEL WITH FAULT LOCATORS EQUIPPED AND WIRED WITH THE FOLLOWING.**

- 1 Set Numerical type non-switched distance protection with carrier protection feature for phase and ground faults as described in technical specification clause 5.5.1(a) complete with carrier starter relays, out of stop blocking relay, fuse failure relays for CVT and PT supply and test terminal blocks (Main-I protection) **with 24 DI & 32 DO (Minimum)**
- 1 Set The Main II Numerical Distance Relays should be of different make with same technical requirements. The bidder/Supplier should be responsible for coordinating for commissioning, testing, trouble shooting, replacement etc., to the Main I/ Main II Numerical Distance Relays for the different make of relay ( manufacturer )with carrier inter-trip features as described in the technical specification clause 5.5.1 (b)

complete with carrier aux. relays for inter-tripping, out of step blocking feature, fuse failure relay for CVT and PT fuse failure and 4<sup>th</sup> zone backup protection relay and test terminal blocks (Main-II protection) **with 24 DI & 32 DO (Minimum)**

- 1 Set            Auxiliary relays for carrier protection of the Main-I distance scheme above complete with carrier in/out selector switch, 2 position, 8 way stay-put pattern.
- 1 Set            Aux. Relays for carrier protection of the Main-II distance scheme above complete with carrier in/out selector switch, 2 position, 8 way stay-put pattern.
- 3 Nos.           Selected Bus PT/Line CVT Selection Relays (Change over Relays with Operating Coil (Bus PT) & Resetting Coil (CVT)) for Main-I & II, BCU/TVM along with Push buttons in parallel with BCU DO contacts. – 75C,D, 75E,F & 75G, H.
- 2 sets           Selected Bus PT Selection relays (Change over Relays with Operating Coil (Bus-1 PT) & Resetting Coil (Bus-2 PT)) – 75A & 75B
- 2 Nos.           High speed tripping relay with **16 N/O + 4 N/C** Contacts to cater for 2 sets of trip coils of the breaker to act in conjunction with bus bar protection scheme to trip the 220 kV feeder breaker – 86A & 86B
- 1 No.            High Speed Tripping Relay in LBB Circuit (86-LBB) with **16 NO + 4 NC** contacts with electrical and hand reset operation indicator for HV
- 3 Nos.           Trip Relay Coil Supervision Relays for the above 3 Nos. Tripping Relays (95/86-A, 95/86-B & 95/86-LBB)
- 6 Nos.           High speed tripping relays for Single Phase Tripping both for TC-2 & TC-2 in R, Y & B Phases of the Circuit Breaker - 21-1RX, 21-1YX, 21-1BX, 21-2RX, 21-2YX & 21-2BX
- 1 No.            Voltage selector relay scheme to operate on N/O and N/C contacts of Bus I and Bus II isolators for proper extension of bus PT supply.
- 1 Set            Distance to fault locators as described in Technical specification for measuring and displaying the distance to fault for phase to phase and phase to ground faults along with pre fault and post fault data.
- 1 Set            Numeric LBB protection scheme comprising of
  - 1 No. LBB relay
  - 1 No. timer with 0.1 to 1 sec. Range
  - 2 Nos. Auxiliary relays.
- 1 No.            Door operated cubicle illumination
- 1 Set            Terminal blocks with stud type terminal and 20% spare terminals
- 1 Set            AC and DC fuses
- 1 Set            Cable glands

- 1 No. 3 pin 15 AC plug socket with switch control
- 1 No. Thermostat operated cubicle heater with switch control
- 1 No. Earth bus
- 1 Set Name plate for mounted equipment both on front panel and inside.
- 4 Nos. Contact multiplication relays with base. (High speed) with 2 NO & 2 NC potential free contacts.

**Item 4: 220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS with low impedance as per schedule of requirement**

- a. **Multi zone** numeric type bus bar protection scheme is required for 220kV bus bar protection for double bus substations (without by pass breaker features) with one bus coupler or for single bus arrangement. The bus protection shall cater for **16 / 24** Nos. 220kV circuits including 1 No. bus coupler. The layout arrangement of double bus substations is such that any outgoing circuit can be connected to either bus I or bus II by means of bus I or bus II isolator for each outgoing circuit.
- b. All the equipment like individual tripping relays for all circuits (including bus coupler) and CT Zone switching relays and auxiliary CTs for outgoing circuits shall be supplied for **Multi zone** bus bar protection panels. Each trip relay shall have necessary N/O and N/C contacts as required.
- c. The CT ratios contemplated for 220kV substations are indicated in clause-5 of the technical specification. The bus bar protection schemes shall also be suitable for operation with main CTs having unequal magnetizing characteristics and unequal secondary resistance and unequal ratios  
  
The bidders shall specifically confirm whether auxiliary CTs are required or not for the bus protection schemes quoted by them. The scheme shall include necessary software for CT Ratio correction.
- d. The bus bar protection shall not impose stringent requirements on main CTs regarding burden, knee point voltage and accuracy.
- e. Two cores of accuracy class PS are available for Bus Bar Protection in CTs including Bus Coupler CTs. CTs are provided on either side of Bus Coupler Circuit Breakers.
- f. The bus bar protection shall have facilities for modification and extension when new circuits are added at a later date (over and above the **16 nos.** outgoing circuits for double bus substation)
- g. Bus bar protection shall be based on circulating current principle and shall not be affected by CT saturation in case of internal faults. The schemes shall be provided with suitable means so as to remain insensitive for CT saturation during external faults.

Necessary CT selection auxiliary relays to ensure that the bus bar protection CT cores are connected to the appropriate zone CT bus wires shall be supplied. The CT selection shall be carried out electrically which shall be so arranged that the secondary circuits are made before break after the primary circuits. These relays as required for 16 Nos. outgoing circuits in double bus substations shall be supplied.

- h. Bus bar protection shall have the following features.
  - 1. Numeric, fast acting with operating time of less than 1 cycle.
  - 2. Triple pole type.
  - 3. Individual independent zone protection relay for each bus of the two zones.
  - 4. Each zone of bus bar protection with a check feature operating on different principle or independent, additional check features common to all zones.
  - 5. Detect both phase and earth faults.
  - 6. Sensitive for internal faults and stable for external faults with currents upto the short circuit rating of the switch gear, CT saturation, permissible CT errors, normal load flow, and growing fault level.
  - 7. Shall operate selectively for each zone of bus faults and trip the minimum number of circuits, but shall ensure isolation of fault completely and reliably.
  - 8. The bus bar protection shall give clear zone indication and give visual and audible alarm. Necessary alarm and annunciation scheme shall be quote.
  - 9. The protection scheme shall include continuous supervision for each zone over the various CT secondary pilot wires, so that in the event of open circuit, short circuit and crossed bus wires in the pilots, the relevant zone of protection shall be shorted and appropriate alarm initiated. The supervision shall not give false alarms due to normal load flows in the bus bars. The CT secondary circuit shall have sensitivity to detect open circuit of CT secondary of the least loaded circuit.
  - 10. The bus bar protection scheme shall include continuous supervision of DC auxiliary supply and shall give necessary visual indication and alarm for DC fail.
  - 11. The scheme shall include built-in automatic test facility. This shall be confirmed in the tender.
  - 12. Individual tripping relays for each breaker shall be provided.
  - 13. Bus bar protection OUT and IN switches for each zone with indicating lamps for bus bar protection in/bus bar protection out indications shall be supplied.
  - 14. 6 way annunciation scheme shall be supplied for each bus protection panel.
  - 15. DC fail alarm and indication scheme shall be supplied for each bus bar protection panel.
  - 16. The detailed description of bus bar protection schemes offered shall be given and necessary descriptive literature shall be enclosed.
  - 17. The bidder shall high-light all salient points of their offer and the deviations, if any from technical specification and furnish detailed comments on deviations from specification.
  - 18. The bus bar protection schemes required for panel shall be in accordance with specification.
    - i) The scheme should be fully numerical
    - j) CT ratio correction should be done through software without use of any external ICTs.
    - k) Zone CT selection shall be through isolator replica without usage of external CT switching relays.

1) It should have built in feature of breaker failure protection and should also be possible to selectively enable/disable breaker failure function for each feeder.

**The control unit should be a single unit only for all the 16 / 24 bays, summation or attachment of control units will not be acceptable.**

**Note: - 1) LBB part of busbar scheme is to be provided. Retrip also to be configured. Feature of end fault protection also to be provided.**

2) All isolators & CB open and close status of all bays shall be wired to BB relay.

3) All BB schemes are to be suitable for 2 bus system and same to be site configurable for utilization to single bus system if required as per site requirement.

4) 1Ph Initiation ( 3 Nos), 3Ph Initiation(1 No) provision is required. Additional Logic is need that shall be accepted. CT summation is not accepted. sufficient BI/BOs shall be provided as a inbuilt or separate Logic unit. Inter IED Communication is required for logic unit & bus Bar Phase segregated units.

**\*\* 1 No 220kV Busbar C&R Panel required for 220kV Tallapalli SS out of 9 Nos is Multi zone numeric type bus bar protection scheme is required for 220kV bus bar protection for double bus substations (without by pass breaker features) with two bus couplers or for single bus arrangement. The bus protection shall cater for 16 bays. 220kV circuits including 2 Nos bus couplers along with 2 Nos Bus Sectionalizes . The layout arrangement of double bus substations is such that any outgoing circuit can be connected to either bus I or bus II by means of bus I or bus II isolator for each outgoing circuit.**

Busbar protection relay shall generate one signal (NO contact) whenever both isolators of any feeder are in closed condition

GE make B-90 centralized Busbar scheme is not acceptable

### ***SCHEDULE OF DETAILED EQUIPMENT***

#### **220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS**

**Panel Dimensions:** WXD<sub>X</sub>H = 1000mm x 800mm x 2250mm (including base frame and the anti vibration pad)

Multi zone Bus Bar Protection Scheme as described in technical specification for 16 Nos. 220kV Circuits including Bus Coupler Circuit Breaker, complete with built in automatic test facility with provision to add on more circuits at a later date as and when required.

CT – Zone switching relays as required for the outgoing 15 and 23 Nos. 220 kV circuits complete with separate indoor type panels for mounting these relays.

Individual tripping relays for 16 Nos. 220kV circuits.

12 way alarm scheme complete with DC bell.

DC fail alarm scheme complete with AC bell.

Following panel accessories shall be supplied

- a) Space Heater with thermostat control and also ON/OFF switch. Provide 2A HRC Fuse & Link for Protection.
- b) Door operated cubicle illumination lamp. Provide Toggle Switch in addition to Door Operated Limit Switch. Provide 2A HRC Fuse & Link for Protection.
- c) 1 set of test terminal block with stud type terminals and 20% spare terminals.
- d) 1 set disconnecting type terminals with shorting links for CT terminals.
- e) 1 set cable glands.
- f) 1 set AC and DC fuses.
- g) 1 No. 3 pin 15 Amp AC plug socket with switch control 3 pin plug. Provide 6A HRC Fuse & Link for Protection

2 Nos. DC Supply Change Over Relays in DC-1 & DC-2 Circuits

5 sets Auxiliary CTs shall be provided. For matching unequal CT ratios in each panel.

16 trip relays along with supervision relay (of 16 or 18 contacts) are to be provided along with BB scheme by mounting in a panel with wiring.

1 No. 25x6 mm Copper Earth Bus

Name plates for the equipment mounted on panels from side and inside the panel.

**Note: 1) The control unit should be a single unit only for all the 16 bays, summation or attachment of control units will not be acceptable.**

**2) The supplier shall include all such accessories which are required for proper functioning of the above control and Relay panel. Such accessories even if they are not mentioned in the above list shall be deemed to have been included. No extra cost will be paid on that account.**

#### **Item 5: 220kV BUS COUPLER BREAKER PROTECTION:**

The following protection schemes are required for Bus Coupler Breaker panels

- i) Shall be Numerical.
- ii) Triple pole Non-directional IDMT over-current relays and Single Pole Non-Directional IDMT Earth Fault Relay shall be supplied for Bus Coupler Breaker protection.
- iii) Shall be compatible for IEC61850 Protocol
  - Setting required:
  - O/C relay range 0.5 to 2 amps
  - E/L relay range 0.2 to 0.8 amps.
- iv) **Local breaker backup protection scheme:**

This scheme shall

- Comprise of a breaker failure initiating relay associated with each protective system viz., Main-I and Main-II, breaker failure relay which supervises the fault current flowing through the breaker being protected against failure and breaker failure time delay relay and breaker failure lockout relay.
- The operation of both breaker failure will initiate timer relay which in turn operates lockout relay. The lockout relay will have N/O contacts for annunciation and for energisation of Bus Bar Protection Trip Relays (available on Bus Bar Protection Panels procured separately) for tripping all the other breakers connected to the bus
- Breaker failure relay scheme above shall:
  - a) be triple pole type
  - b) be suitable for 220 V DC supply
  - c) have an operating time of less than 15 milli secs.
  - d) have a resetting time of less than 15 milli secs.
  - e) have two over current and one earth fault elements
  - f) be of numeric type and can be given as a built in feature.
  - g) have a setting range of 20-320% of rated current for phase over current and 20-80% for ground over current.
  - h) have continuous thermal withstand rating of two times rated current irrespective of the setting.
  - i) have a separate/in built timer with a continuously adjustable setting range of 0.1 to 1 sec.
  - j) have necessary auxiliary relays to make a comprehensive scheme the scheme shall be so engineered that in the event of persisting breaker lockout condition and simultaneous incidence of fault shall result in instantaneous tripping of the concurred bus bar to which the faulty breaker is connected.

### **SCHEDULE OF DETAILED EQUIPMENT**

**220KV BUS-COUPLER CONTROL & RELAY PANEL SUITABLE FOR DOUBLE BUS ARRANGMENT TO BE EQUIPPED AND WIRED FOR UTILISATION OF DUAL DC SOURCE WITH THE FOLLOWING:**

**Dimensions: WDXH = 1000mm x 800mm x 2250mm (including base frame and the anti vibration pad)**

- |       |   |
|-------|---|
| 1 No. | Circuit identification label  |
| 1 No. | BCU (with 110 DI, 40 DO minimum)  |
| 1 No. | Digital Ammeter. Range: 0-1600A. Accuracy Class: 0.5. Auxiliary Supply: 220V DC |
| 1 No. | 6 position Ammeter selector switch. OFF-R-Y-OFF-B-N. Rating: 16A                |

- 1 No. Digital Mega Watt Meter ( + or - ) - Transducer Driven. Accuracy Class: 0.5.  
CT Ratio: 1600/1A & PT Ratio: 220KV/ $\sqrt{3}$ /110V/ $\sqrt{3}$ . Transducer shall be suitable for 3 Phase 4 Wire system with 4-20mA output contacts. Aux. Supply: 220V DC
- 1 No. Digital Mega VAR Meter ( + or - ) - Transducer Driven. Accuracy Class: 0.5  
CT Ratio: 1600/1A & PT Ratio: 220KV/ $\sqrt{3}$ /110V/ $\sqrt{3}$ . Transducer shall be suitable for 3 Phase 4 Wire system with 4-20mA output contacts. Aux. Supply: 220V DC
- 2 Nos. MW and MVAR 4-20 mA transducers are to be provided for SCADA purpose.
- 12 Nos. LED type Indicating lamps for the following functions:  
1 No. for Circuit Breaker Spring Charge Indication – Blue Colour  
2 Nos. for Circuit Breaker open and close indication – Green & Red Colour  
2 Nos. Circuit Breaker Trip Circuit Healthy Indication for TC-1 & TC-2 – White Colour  
4 Nos. Indicating lamps for Bus-I and Bus-II Isolators Open/Close Indications – Green & Red Colour  
1 No. for capacitor charged indication of Circuit Breaker - White  
2 Nos. for Bus-1 PT & Bus-2 PT Supply Indication Lamps – Red Colour
- 1 No. Push button for capacitor charge testing
- 1 No. Painted and overlaid mimic diagram representing Bus Bars, connections and symbols and layout.
- 1 Nos. 3 position 22 way control switch for Circuit Breaker Control, Not less than 32A.
- 2 Nos. 3 position 12 way control switch for Circuit Breaker Control, Bus-I and Bus-II Isolators Control. Rating of the Switch: Not less than 32A.
- 6 Nos. Close / open Auxiliary relays for 2 Nos. HV & 4 Nos. for Bus-1 & Bus-2 Isolators along with push buttons in parallel with BCU DO contacts (52CX, 52TX, 89A-CX, 89A-TX, 89B-CX & 89B-TX)
- 6 Nos. Trip circuit supervision relays for continuous supervision (Pre-close and Post Close supervision) for individual supervision of 3 phases of circuit breaker having 2 sets of trip coils (total 6 trip coils, 2 Nos. for each pole) – 195R, 195Y, 195B, 295R, 295Y & 295B
- 2 Nos. Digital Volt Meters. Accuracy Class: 0.5 for Bus-I & Bus-II. Range: 0-250KV. PT Ratio: 220KV/ $\sqrt{3}$ /110V/ $\sqrt{3}$  – V & V2

- 2 Nos. Volt meter selector switches. 6 Position. (RY-YB-BR-RN-YN-BN) for Bus-I & Bus-II Volt Meters. Rating: 16A – VSS-1 & VSS-2
- 2 Nos. Digital Frequency Meters. Accuracy Class: 0.5 for Bus-I & Bus-II. Range: 47.5 to 55 Hz. Input: 110V/ $\sqrt{3}$  or 110V – F1 & F2
- 2 Nos. DP MCB for DC supply control with N.C contact for annunciation. Rating: 16A – DC1-MCB & DC2-MCB
- 1 No. DP MCB for AC supply control with N.C contact for annunciation. Rating: 10A – AC-MCB
- 1 Set 16 Way Micro Processor Based Annunciation scheme comprising the following:
- Annunciation windows for 16 way
  - Push buttons for Alarm Accept, Reset, Lamp Test and Alarm Test.
  - DC Bell for trip alarm. Provide Fuse Link in the DC Bell Circuit.
  - Hooter for non-trip alarm. Provide Fuse Link in the Hooter Circuit.
- 1 Set DC fail annunciation scheme comprising the following:
- Indicating lamp for DC fail indication
  - Push buttons for DC fail alarm accept and DC fail test functions.
  - DC fail Accept Relay
  - AC alarm bell
- 1 Set AC fail annunciation scheme as per class 6.13 (h)
- 10 Nos. 220V DC Auxiliary relays for any future wiring.
- 1 No. High speed tripping relay with 16 N/O + 4 N/C contacts to cater for 2 sets of trip coils of the breaker to act in conjunction with Bus Bar Protection scheme to trip the 220 kV feeder Circuit Breaker - 86
- 1 No. Trip Coil Supervision Relay with 2 C/O Contacts. Same as Trip Circuit Supervision Relay – 95/86
- 1 Set Numerical LBB protection scheme comprising of
- 1 No. LBB relay compatible with IEC 61850 Protocol
  - 1 No. timer with 0.1 to 1 sec. Range
  - High Speed Tripping Relay with 11 N/O + 3 N/C contacts with Trip Coil Supervision Relay with 2 C/O Contacts. Trip Coil Supervision Relay shall be same as Trip Circuit Supervision Relay.
- 1 Set Back up protection scheme of numerical type as per technical specification consisting of (Part of BCPU acceptable) – 50/51RYBN
- 3 Nos. Non Directional over current relays
  - 1 No. Non Directional IDMT earth fault relay compatible with IEC 61850 Protocol
- 6 Nos. DC operated Auxiliary Relays each element provided with 2 pairs of contacts

and hand reset operation indicator for the following functions.

- a) Circuit Breaker SF6 Gas Pressure Low Alarm – 52A
- b) Circuit Breaker SF6 Gas Pressure Lock Out – 52B
- c) Circuit Breaker Air Pressure Low Alarm – 52C
- d) Circuit Breaker Tripped on CTD – 52D
- e) Circuit Breaker Tripped on Pole Discrepancy –52E
- f) Spare – 5F

- 3 Nos. Contact multiplication relays (High speed Change Over Relays) with 7 NO & 7 NC Potential free contacts for multiplying Bus Coupler Circuit Breaker, Bus-1 Isolator & Bus-2 Isolator Auxiliary Contacts (52BC-X & 89A-BC-X & 89B-BC-X)
- 1 No. Synchronizing Socket - SSS
- 1 No. Synchronizing Switch, Stay put type. Rating: 32A - SS
- 2 Nos. DC Supply Supervision Relays in Source-1 DC & Source-2 DC – Shall be same as Trip Circuit Supervision Relays –DCSCOR-1 & DCSCOR-2
- 1 Set Terminal blocks with stud type terminal and 20% spare terminals
- 1 No. 3 pin 15 AC plug socket with switch control and 3 pin plug with 6A Fuse & Link Protection
- 1 No. Door Operated internal cubicle illumination lamp with 2A Fuse & Link.  
Provide  
Toggle Switch in addition to the Door Operated Limit Switch.
- 1 Set Cable glands
- 1 Set AC and DC fuses
- 1 No. Thermostat operated cubicle heater with switch control with 2A Fuse & Link Protection
- 1 No. 25x6 mm Copper Earth Bus
- 2 Sets Name plates for the mounted equipment both on front panel and inside
- 1 No. blank plate for rack mounted Ethernet Switch
- 1 No. blank plate for Line Interface Unit

Note: - all 220 kV bay panels are to be designed and wired for 2 No. DC sources with change over of supply to BCU/BCPU.

#### **Item 6: GPS based Time Synchronization Equipment:**

- 1. The time Synchronozation equipment shall receive the coordinated Universal Time (UTC) transmitted through Geo Positioning Satellite System (GPS) and

synchronize equipments to the Indian Standard Time in substation. The time synchronization shall be realized using the Simple Network Time Protocol (SNTP) at inter bay bus.

2. Time Synchronization equipment shall include antenna with mounting clamp, display unit, all special cables and processing equipment etc.,
3. It shall be compatible for synchronisation of Event Loggers, Disturbance recorders and SCADA / SAS at a substation through Ethernet realized through optic fibre bus.
4. Equipment shall operate up to the ambient temperature of 55 degree centigrade and 100% humidity.
5. Equipment shall give real time corresponding to IST (taking into consideration all factors like voltage and temperature variations, propagation and processing delays etc)
6. Equipment shall meet the requirement of IEC 60255 for storage and operation.
7. The system shall be able to track the satellites to ensure no interruption of Synchronization signal at least GPS receiver of 12 channel should have 8 channel continuous tracking facility.
8. The output signal from each port shall be programmable at site for either one hour, half hour, minute or second pulse, as per requirement
9. The equipment offered shall have various combinations of output ports to be selected by the customer, during detailed engineering, from the following.
  - i) Pulse
    - a) 1No. PPS, 220V DC Dry rated
    - b) 2 Nos. PPM/PPH, 220VDC Dry rated.
  - ii) IRIG-B (Shall have 1 micro second accuracy)
    - a) 2 Nos. Un Modulated (TTL)
    - b) 2 Nos. Modulated carrier
  - iii) 3 Nos. of Ethernet RJ45 port with link/activity and 10/100 Mbps.
    - iii) Accuracy is to be better than 1 microsecond
10. 1 No. Industrial grade EFS (with 20 to 24 ports),
11. The equipment shall have a periodic time correction facility of one second periodicity.
12. Time synchronization equipment shall be suitable to operate from DC available at substation.
13. **REMOTE THE DISPLAY UNIT**

A part from LCD, the GPS unit should have 100mm height bright LED remote time display unit (in hour, minute, second (24 hour mode). This time display unit should have facility for time synchronized with GPS unit through all the following outputs from GPS unit.

  - i) IRIG-B DC level shift.

- ii) IRIG-B modulated carrier
- iii) Serial Port (RS232C)

Also this time display unit should have its own Real Time Clock to maintain time during signal loss.

14 .Dual DC Source and AC distribution circuit as per feeder & PTR C&R Panels

15 GPS receiver with 1 No. Industrial grade EFS (with 20 to 24 ports), antenna, Display clock and necessary equipment are to be supplied in separate panel. Bidder has to configure IEDs with GPS in IEC 61850 protocol.

#### **Item 7: Testing & commissioning of C&R Panels :-**

1. The bidders/manufacturers are requested to depute senior/experienced service engineers for Configuration, Testing & Commissioning of the C&R Panels to avoid delay in completion of the Project.
2. The bidder needs to test & commission their C&R panels, without any additional cost for any Change of location also.

#### **6.0 TESTS**

The bidder shall carryout routine tests on all associated equipment as per relevant Indian Standards/IEC Standards. The bidder shall submit along with the bid type test reports for protective relays, instruments, switches and other devices of the type and class being offered to assess the suitability of the equipment. Type tests must have been conducted not earlier than Seven years as on the date of bid opening. The bids received without type test reports will be treated as non-responsive.

Control and relay panels shall be subjected to the following tests:

- a. Mechanical operation tests
- b. Verification of degree of protection as per IS:2147
- c. High voltage test (2 kV for 1 minute) or as per relevant IS.
- d. Insulation resistance test
- e. Electrical control, interlock and sequential operation test
- f. Verification of wiring and general arrangement as per approved schematic/G.A. diagrams.

#### **7.0 Inspection:**

- 7.1 i All routine tests shall be conducted at the time of inspection and inspection shall be made at the place of manufacturers unless otherwise specifically agreed upon by the manufacturer and purchaser at the time of purchase. The manufacturer shall offer the inspector representing the purchaser all reasonable facilities without charges to satisfy him that the panels/materials are manufactured/supplied as per the specification/final approved drawings.

- ii. The supplier shall give 15 days (for local supplier) and 60 days (in case of foreign supplier) advance intimation to enable the purchaser to depute his representative for witnessing acceptance and routine tests.
- iii. The panels shall be manufactured and offered for inspection as per the final approved General Arrangement Drawing and schematic drawing which will be binding both on supplier and purchaser.
- iv. The panels shall not be despatched from its point of manufacture unless the same are satisfactorily inspected and tested.
- v. The acceptance of any material shall in no way release the supplier of his responsibility for meeting all the requirements of the specification and shall not prevent subsequent rejection of such material later found to be defective.
- vi. **The To and fro travelling expenses and accommodation facility for inspection officers shall be borne by the supplier of material / Bidder.**
- vii. **All bidders are requested to take vendor approval from APTRANSCO, this is responsibility of manufacturer only, otherwise material inspection will not be done by APTRANSCO QC wing.**  
**Any delay due to above will come under bidder scope only.**

#### **8.0. Quality Assurance Plan:**

- 8.1** The bidder shall invariably furnish the following information along with his offer failing which the offer shall be liable for rejection. Information shall be separately given for individual type of equipment offered.
- i. The Structure of organization
  - ii. The duties and responsibilities assigned to staff ensuring quality of work
  - iii. The system of purchasing, taking delivery and verification of materials
  - iv. The system for ensuring quality of workmanship
  - v. The quality assurance arrangements shall conform to the relevant requirement of ISO-9001 and ISO 9002 as applicable.
  - vi. Statement giving list of important raw materials, names of sub-supplies for the raw materials, list of standards according to which the raw material are tested, list of tests normally carried out on raw material in the presence of suppliers representative, copies of test certificates.
  - vii. Information and copies of test certificates as on (i) above in respect of bought out items.
  - viii. List of manufacturing facilities available
  - ix. Level of automation achieved and list of areas where manual processing exists.
  - x. List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
  - xi. List of testing equipment available with the bidder for final testing of equipment specified and test plant limitation, if any vis-a-vis the type. Special acceptance and

routine tests specified in the relevant standards. These limitations shall be very clearly brought out in "Schedule of Deviations" from the specified test requirements.

**8.2** The Contractor shall within 30 days of placement of order, submit the following information to the purchaser.

- i. List of the raw material as well as bought out accessories and the names of sub-suppliers selected from those furnished along with the offer.
- ii. Type test certificates of the raw material and bought out accessories if required by the purchaser.
- iii. Quality Assurance Plan (QAP) with hold points for purchasers inspection. QAP and purchasers hold points shall be discussed between the purchaser and contractor before the QAP is finalised.

The contractor shall submit the routine test certificates of bought out accessories and central excise asses for raw material at the time of routine testing if required by the purchaser and ensure that the quality assurance requirements of specification are followed by the sub-contractor.

**8.3** The Quality Assurance Programme shall give a description of the Quality System and Quality Plans with the following details.

i. Quality System:

- The Structure of the Organization
- The duties and responsibilities assigned to staff ensuring quality of work.
- The system of purchasing, taking delivery of verification of materials.
- The system of ensuring of quality workmanship.
- The system of control of documentation.
- The system of retention of records.
- The arrangement of contractor internal auditing.
- A list of Administrator and work procedures required to achieve contractors quality requirements. These procedures shall be made readily available to the purchaser for inspection on request.

ii. Quality Plans:

- An outline of the proposed work and program sequence.
- The structure of contractors organizations for the contract.
- The duties and responsibilities ensuring quality of work
- Hold and notification points.
- Submission of engineering documents required by this specification.
- The Inspection of the materials and components on request.
- Reference to contractors work procedures appropriate to each activity.
- Inspection during fabrication/construction.

- Final inspection and test.

#### **8.4. Training of Personnel:**

The contractor shall provide necessary facilities for training personnel at their works/principals works relating to testing, operation and commissioning of the relays and Control and Relay panels for six personnel free of cost. However, travel charges of the personnel will be borne by the purchaser.

#### **9.0. Guaranteed Technical Particulars (GTP):**

The GTP for the equipment / material being supplied shall be provided with the bid as specified in this technical specification annexure. The bids received without GTP shall be treated as non-responsive.

#### **10.0. Documentation:**

- 10.1 The bidder shall furnish the dimensioned drawings along with the bid indicating the details like components, make, quantity, ranges of meters, relays etc., in case the bidder quotes different makes of relays shall furnish copies of wiring scheme and literature of all relays.

#### **11.0 Packing and Forwarding:**

- 11.1 Name plate (giving details of equipment) in all equipments (i.e. relays, breaker switches, indicating lamps, push buttons etc.) mounted on the panel shall be provided. Name plates of suitable size on metal/PVC acrylic/thick plastic sheets shall only be provided. Stickers in no case will be accepted. Large and bold name plates shall be provided for circuit/feeder designation. Name plates for AC fuses, DC fuses, resistors and other equipment mounted inside the panel shall be provided clearly indicating the purpose for which they are meant for.

Name plates of suitable size shall be provided on the top of the panel clearly indicating manufacturers name, purchase order number and date, year of manufacturer, serial number of the panel and type of panels. The panels shall be packed in suitable sized strong and weather resistant wooden cases / crates.

- 11.2 Suitable cushioning, protective padding or spacer shall be provided to prevent damage to or deformation of the components during transit and handling.
- 11.3 All packing cases shall be marked legibly and correctly with the suppliers name and consignee's address so as to ensure their safe arrival at their destination and to avoid possibility of goods being lost or wrongly dispatched on account of faulty or illegible marking.

#### **12.0 Coordination:**

- 12.1. Outdoor switch gear like isolators, breakers, CTs, PTs are being ordered separately and the technical details are furnished in the annexure, so that schemes of protection can be coordinated.

- 12.2** The bidder shall also prepare and supply the coordination wiring diagrams between the control and relay panels and control switch gear as part of this contract. The control and wiring diagrams of the switch gear will be supplied to the successful bidder.
- 12.3** The bidder shall coordinate in all respects with the manufacturers of associated equipment and shall freely exchange all relevant information to ensure satisfactory and economic overall design. No extra charge shall be payable for these services. The bidder is responsible for the performance and service support for all the bought-out items he has used in the panel.
- 12.4** Erection of equipment called for in this specification will be undertaken by the purchaser. The bidder shall furnish full detailed instructions, complete with drawings and leaflets to enable satisfactory erection and commissioning of the plant by the departmental staff. Such instructions should reach the purchaser sufficiently in advance of the receipt of the equipment in order that all the preliminary arrangement for the erection of the equipment can be made by the department in advance so that there will be no delay in regard to erection as soon as the equipment are received.

It is obligatory on the part of the bidder to make available services of their testing and commissioning engineers (with necessary testing equipment) to assist the APTRANSCO staff in commissioning their equipment as and when their services are requisitioned.

**13.0 Tropical Treatment:**

- 13.1** Under the climatic conditions prevalent at site, the equipment furnished under the specification will be subjected to operation under ambient temperatures of 50 deg. C and very high relative humidity. All equipment shall therefore, be suitably designed and treated for normal life and satisfactory operation under the hot and humid climatic conditions prevalent at site and shall be dust and vermin proof. All parts and surfaces which are subject to corrosion, shall be made of such material and shall be provided with such protective finishes as would protect the equipment installed from any injurious effects of excessive humidity. All electrical auxiliary equipment shall be specifically treated for tropical conditions, and the materials and methods for this treatment shall be approved in advance by the Purchaser.

**14.0 Foundations and Fixtures:**

Foundations will be prepared by the Purchaser in accordance with the basic designed data to be supplied by the contractor. All fixtures necessary for proper erection of the embedded parts shall be supplied by the supplier.

**15.0 Support:**

The bidder shall give the necessary support (deputing personnel and supplying the required spares) for their product for at least 15 years from date of supply of material at reasonable cost.

## **ANNEXURE**

### GUARANTEED TECHNICAL PARTICULARS

#### **I: 220KV TRANSFORMER HV/LV CONTROL & RELAY PANELS.**

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**TECHNICAL PARTICULARS****MW/MVAR Meters    Volt Meter    Ammeter**

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**A. INSTRUMENTS AND METERS :**

Type of instrument

Size

Whether Magnetically  
Shielded or not

Limits of error in the Effective range

Scale length

Short time over load Capacity

VA Burden

    i) Current Coil

    ii) Potential Coil

Power Consumption

    i) Current Coil

    ii) Potential Coil

i) ISS Grade of Accuracy

j) Description leaflet

    Reference Nos. submitted

**ELECTRONIC ENERGY METERS :**

a. Rating of Current Coil &  
    Potential coil.

b. Continuous with stand  
    capacity of the above coils

Limits of error at unity pf and

    i) 125/25% rated current

    ii) 10% rated current

    iii) 5% rated current

Limits of error at 0.5 pf  
(lag) and

    i) 125/25% rated current

ii) 10% rated current

Power losses per element

- i) Current coil
- ii) Potential coil

Minimum running current  
(per of marked current)

Variation of voltage to cause  
a change of not more than 1%  
at any load form full to 1/10

Variation of air temperatures  
maximum temperature co-efficient  
of error in percent per Deg. C at

- i) Unity pf
- ii) 0.5 pf (lag)

Variation of heating by Main current in percent at

- i) Unity pf
- ii) 0.5 pf (lag)

Variation of frequency percent  
error due to 5% variation in frequency

- i) At unity pf
- ii) At 0.5 pf (lag)

Overload capacity

- i) Continuous
- ii) ½ Second

Excess voltage permissible  
for 30 minutes

Type of register mechanism  
With register constant

DETAILS OF THE PANELS :

Guage of the panel

Height, width and depth  
of the panel

Weight of the panel

Type of terminals used  
in the panel

Internal wiring of the panel

ANNUNCIATORS :

Type and particulars  
of windows

Particulars of wiring

Rated voltage

Power consumption

Instantaneous making capacity  
contacts

Breaking capacity

TRANSFORMER DIFFERENTIAL RELAY :

Type

Current Coil Rating

Tap Range :

- i) Coil - 1
- ii) Coil - 2

Maximum VA Burden

- i) Operating Coil:
- ii) Restraining Coil:

e) Is the slope setting  
variable? if so, range  
of slope setting

f) Harmonic Restraining features  
provided or not

Stability at through fault

**Current of 15 times tap setting**

Range of HT / LT current ratio  
over which the Relay can be  
used.

i) Operating time Cycles

j) Trip contact rating (Amps)

k) Whether seal in contacts  
provided or not

PROTECTIVE RELAYS OVER CURRENT & EARTH FAULT RELAYS :

Type

Current coil rating

Tap range

VA Burden :

- i) Highest tap
- ii) Lowest tap

Power Consumption

- i) Highest tap
- ii) Lowest tap

Time of operation at maximum  
Time setting at .

- i) 5 times tap setting current
- ii) 10 times tap setting current

Type of characteristics

Whether draw out type or not

Trip contact rating

Whether seal in contacts  
are provided

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D. ANNUNCIATORS :

- a. Type and particulars  
Of windows
- b. Particulars of wiring
- c. Rated voltage
- d. Power consumption
- e. Instantaneous making capacity  
contacts
- f. Breaking capacity
- g. Whether the offered Relays are conforming to IEC 61850 Protocol or not:
- h. Whether the offered Relays are having communication Port or not:

## II: 220 kV FEEDER CONTROL AND RELAY PANELS

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### TECHNICAL PARTICULARS

MW /MVARMeters Volt Meters Ammeters

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- A. INSTRUMENTS AND METERS.
- a) Type of instrument
  - b) Size
  - c) Whether Magnetically shielded or not
  - d) Limits of error in the Effective range
  - e) Scale length
  - f) Short time over load capacity
  - g) VA Burden
    - i) Current Coil
    - ii) Potential Coil
  - h) Power Consumption
    - i) Current Coil
    - ii) Potential Coil
  - i) ISS Grade of Accuracy
  - j) Description leaflet  
Reference Nos. submitted
- B. ELECTRONIC ENERGY METERS :
- a. Rating of Current Coil & Potential Coil
  - b. Continuous with stand capacity of the above coils
  - c. Limits of error at unity pf and
    - i) 125/25% rated current
    - ii) 10% rated current
    - iii) 5% rated current
  - d. Limits of error at 0.5 pf (lag) and
    - i)125/25% rated current

- ii) 10% rated current
  - e. Power losses per element
    - i) Current coil
    - ii) Potential coil
  - f. Minimum running current  
(per of marked current)
  - g. Variation of voltage to cause  
a change of not more than 1%  
at any load form full to 1/10
  - h. Variation of air temperatures  
maximum temperature co-efficient  
of error in percent per Deg. C at
    - i) Unity pf
    - ii) 0.5 pf (lag)
  - i. Variation of heating by  
Main current in percent at
    - i) Unity pf
    - ii) 0.5 pf (lag)
  - j. Variation of frequency percent  
error due to 5% variation in  
frequency
    - i) At unity pf
    - ii) At 0.5 pf (lag)
  - k. Overload capacity
    - i) Continuous
    - ii) ½ Second
  - l. Excess voltage permissible  
fr 30 minutes
  - m. Type of register mechanism  
With register constant
- C. DETAILS OF THE PANELS
- a. Gauge of the panel
  - b. Height, width and depth  
of the panel
  - c. Weight of the panel
  - d. Type of terminals used  
in the panel

e. Internal wiring of the panel

E. ANNUNCIATORS :

- a) Type and particulars  
Of windows
- b) Particulars of wiring
- c) Rated voltage
- d) Power consumption
- e) Instantaneous making capacity  
contacts
- f) Breaking capacity

F. DISTANCE RELAY :

MAIN - I  
PROTECTION

MAIN - II  
PROTECTION

- a) Type of distance measuring  
elements
  - i) Reactance
  - ii) Resistance
  - iii) Impedance
  - iv) MHO( quadrilateral ) type
- b) Starting unit :
  - i) Is a separate differential  
relay provided or not ?
  - ii) Is the distance element  
directional ?
- c) First zone element taps are  
variable in steps of
- d) Second zone element taps are  
variable in steps of
- e) i) 3<sup>rd</sup> zone element taps  
are variable in steps of  
ii) MHO unit, if any off - set  
setting possible and its range
- f) Operating times
  - i) 1<sup>st</sup> zone timing
  - ii) 2<sup>nd</sup> zone timing adjustable  
between
  - iii) 3<sup>rd</sup> zone timing adjustable

- g) Out of step blocking relay provided
- h) Have targets been provided for all 3 zones ?
- i) Contact rating :
  - i) 1<sup>st</sup> zone
  - ii) 2<sup>nd</sup> zone
  - iii) 3<sup>rd</sup> zone
- j) Can all carrier auxiliary relays be provided
- k) Recloser out off switch provided or not ?
- l) VA burden of each scheme
  - i) Current circuit
  - ii) Potential circuit
- m) Have seal in contacts been provided in the trip circuit ?
- n) Whether the relays are of drawout type

G. AUTO RECLOSE EQUIPMENT :

- a) Reclosing scheme
- b) Operating voltage
- c) Type of closing relay
- d) Relay pattern
- e) Time of setting of reclosing relays.

H. GENERAL :

- a) Panel sheet thickness
- b) Over all dimensions :
  - i) Width
  - ii) Depth
  - iii) Height
- c) Total weight of each type of panel
- d) Internal finish
- e) External finish

## IV-220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS

---

### TECHNICAL PARTICULARS

---

-----

----

- A) DETAILS OF THE PANELS :
  - a) Gauge of the panel
  - b) Height, width and depth of the panel
  - c) Weight of the panel
  - d) Type of terminals used in the panel
  - e) Internal wiring of the panel
  
- B) ANNUNCIATORS :
  - a) Type and particulars of windows
  - b) Particulars of wiring
  - c) Rated voltage
  - d) Power consumption
  - e) Instantaneous making capacity contacts
  - f) Breaking capacity
  
- C) BUS BAR PROTECTION SCHEME
  - i) Current rating
  - ii) Operating time
  - iii) Maximum permissible loop resistance
    - a) typical setting and range of selection.
    - b) Whether seal in contacts are provided
    - c) CT requirement
    - d) Auxiliary details
    - e) CT zone selection relays

## V: 220kV Bus-Coupler C&R Panels

---

### TECHNICAL PARTICULARS

MW /MVAR Meters Volt Meters Ammeters

---

- B. INSTRUMENTS AND METERS.
  - j) Type of instrument
  - k) Size
  - l) Whether Magnetically shielded or not

m) Limits of error in the  
Effective range

n) Range

o) Short time over load  
Capacity

p) VA Burden

i) Current Coil

ii) Potential Coil

q) Power Consumption

i) Current Coil

ii) Potential Coil

i) ISS Grade of Accuracy

j) Description leaflet  
Reference Nos. submitted

**B. DETAILS OF THE PANELS**

d. Gauge of the panel

e. Height, width and depth  
of the panel

f. Weight of the panel

d. Type of terminals used  
in the panel

e. Internal wiring of the panel

**C. ANNUNCIATORS :**

g) Type and particulars  
Of windows

h) Particulars of wiring

i) Rated voltage

j) Power consumption

k) Instantaneous making capacity  
contacts

l) Breaking capacity

**D. PROTECTIVE RELAYS OVER CURRENT**

## AND EARTH FAULT RELAYS

Type

Current coil rating

Plug Setting Range

Time Multiplier Setting Range:

VA burden

- i) Highest tap
- ii) Lowest tap

Power consumption

- i) Highest tap
- ii) Lowest tap

Time of operation at  
max. time dial setting at :

- i) 5 times tap setting
- ii) 10 times tap setting

Type of characteristic

Whether draw out type or not

Trip contact rating

Whether seal in contacts are provided

E. GENERAL :

f) Panel sheet thickness

g) Over all dimensions :

- i) Width
- ii) Depth
- iii) Height

h) Total weight of each type of panel

- i) Internal finish
- j) External finish

F. Whether the offered Relays are conforming to IEC 61850 Protocol or not:

G. Whether the offered Relays are having communication Port or not:

**ANNEXURE-ANNUNCIATOR WINDOW DETAILS**

| <b>220/132kV Transformer Panel</b>         | <b>220kV Feeder C&amp;R Panels</b>                                     |
|--|--|
| 01) Differential Protection Operated (T)   | 01) Main – I Distance/Differential Protection Operated (T)             |
| 02) HC O/C Protection Operated (T)         | 02) Main – II Distance/Differential Protection Operated (T)            |
| 03) HV E/F Protection Operated (T)         | 03) Auto reclose operated (T)  |
| 04) LBB Protection Operated (T)            | 04) LBB Protection operated (T)  |
| 05) HV Over Flux Protection Operated (T)   | 05) Power Swing Blocking operated (NT)                                 |
| 06) Transformer Buchholz Alarm (NT)        | 06) PT fuse fail (NT)  |
| 07) HV Winding Temp. Alarm (NT)            | 07) Carrier supply fail (NT)   |
| 08) LV Winding Temp. Alarm (NT)            | 08) Main–I Distance/Differential Protection Power supply fail (NT)     |
| 09) Oil Temp. Alarm (NT)                   | 09) Main – II Distance /Differential Protection Power supply fail (NT) |
| 10) Low Oil level Alarm (NT)               | 10) Circuit Breaker TC-1 Faulty (NT)                                   |
| 11) PTR Air Cell Puncture Alarm            | 11) Circuit Breaker TC-2 Faulty (NT)                                   |
| 12) Transformer Trouble Trip (T)           | 12) DC Fail (NT)   |
| 13) HV Pole Discrepancy operated (NT)      | 13) Circuit Breaker SF6 Gas pressure low                               |
| 14) HV – TC-1/TC-2 Faulty (NT)             | 14) Circuit Breaker General lockout (NT)                               |
| 15) HV – CB trouble (NT)                   | 15) Air pressure low (NT)  |
| 16) LV O/C Protection Operated (T)         | 17) Carrier inter Trip operated (T)                                    |
| 17) LV E/F Protection Operated (T)         | 18) Spare  |
| 18) LV Over Flux Protection operated (T)   | 19) Spare  |
| 19) LV – TC-1/TC-2 Faulty (NT)             | 20) Spare  |
| 20) LV – CB trouble (NT)                   | 21) Spare  |
| 21) HV/LV – CB tripped on CTD (NT)         | 22) Spare  |
| 22) HV/LV DC Fail (NT)                     | 23) AC Supply Fail   |
| 23) HV/LV MCB Tripped (NT)                 | 24) DC Supply Fail   |
| 24) Tripping Relay Operated (T)            |  |
| 25) Trip Relay Coil Faulty (NT)            |  |
| 26) Protection Unhealthy                   |  |
| 27) df/dt Protection Operated              |  |
| 28) Under Voltage Protection Operated (NT) |  |
| 29) Spare                                  |  |
| 30) Spare                                  |  |
| 31) AC Supply Fail                         |  |
| 32) DC Supply Fail                         |  |
|  |  |
| <b>220kV Bus-Coupler C&amp;R Panels</b>    | <b>220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS</b>             |
| 01) O/C Protection Operated (T)            | 01) Bus Bar Protection Zone-I Operated (T)                             |
| 02) E/F Protection Operated (T)            | 02) Bus Bar Protection Zone-II Operated (T)                            |
| 03) LBB Protection operated (T)            | 03) Bus Bar Protection Zone-I CT Circuit Faulty (NT)                   |
| 04) CB Tripped on Pole Discrepancy (T)     | 04) Bus Bar Protection Zone-II CT Circuit Faulty (NT)                  |
| 05) Circuit Breaker TC-1/TC-2 Faulty (NT)  | 05) Isolator Fail (NT)   |
| 06) Master Trip Relay Operated (T)         | 06) LBB Protection Operated (T)  |
| 07) MCB tripped (NT)                       | 07) Bus-Bar Protection Relay Unhealthy/ Supply Fail (NT)               |
| 08) Circuit Breaker SF6 Gas pressure low   | 08) Master Trip Relays Operated (T)                                    |
| 09) Circuit Breaker General lockout (NT)   | 09) Spare  |
| 10) Air pressure low (NT)                  | 10) Spare  |
| 11) Circuit Breaker tripped on CTD         | 11) AC Supply Fail Alarm (NT)  |

|                               |                               |
|-------------------------------|-------------------------------|
| 14) Protection Unhealthy      | 12) DC Supply Fail Alarm (NT) |
| 15) AC Supply Fail Alarm (NT) |                               |
| 16) DC Supply Fail Alarm (NT) |                               |
| 17) Spare                     |                               |
| 18) Spare                     |                               |

## ACRONYMS

|          |                          |           |                                |
|----------|--------------------------|-----------|--------------------------------|
| MVA      | Mega Volt Ampere         | OLTC      | On Load Tap Changer            |
| kVA      | Kilo Volt Ampere         | WTI       | Winding Temperature Indicator  |
| kV       | Kilo Volt                | OTI       | Oil Temperature Indicator      |
| Cu. mt   | Cubic meter              | Torr      | Torr.                          |
| Deg. C   | Degrees Centigrade       | LOI       | Letter of Intent               |
|          |                          |           | Cost including Insurance &     |
|          |                          |           | Freight                        |
| mm.      | Milli meter              | CIF       | Carriage Insurance Paid        |
| cm.      | Centi meter              | CIP       | Transient Recovery Voltage     |
| km.      | Kilo meter               | TRV       | Capacitor Tripping Device      |
| g.       | Grams                    | CTD       | Normally Open                  |
| kg.      | Kilo gram newton         | NO        | Normally Close                 |
| V        | Volts                    | NC        |                                |
|          |                          | sq.mm     | Cu.                            |
| Hz       | Hertz                    | Cable     | Square millimeter Copper cable |
| DC       | Direct Current           | MS Flat   | Mild Steel Flat                |
| AC       | Alternate Current        | C         | Close                          |
| HV       | High Voltage             | O         | Open                           |
| IV       | Intermediary Voltage     | HRC       | High Rupturing Capacity        |
| Db       | Decibel                  | PVC       | Poly Vinyle Chloride           |
| KA       | Kilo Amperes             | p.f       | Power factor                   |
| sec.     | Seconds                  | CT        | Current transformer            |
| Amps.    | Amperes                  | NCT       | Natural Current Transformer    |
| kVp.     | Kilo volts peak          | TEFC      | Totally enclosed fan cooled    |
|          | Kilo volts root mean     |           |                                |
| kV. Rms. | square                   | P.U.      | Per Unit                       |
| KW       | Kilo watt                | ISO       | Indian Standard Organisation   |
| Max.     | Maximum                  | CB        | Circuit Breaker                |
| Min.     | Minimum                  | Auto      | Automatic                      |
| UTS      | Ultimate Tensile Strenth | kg./Sq.mm | Kilogram per square centimeter |
| QAP      | Quality Assurance Plan   | T         | Metric Tonn                    |
| HP       | Horse Power              | Kn        | Kilo Newtons                   |
| ppm.     | Parts Per Million        |           |                                |

**SECTION – VI**  
**QUALIFICATION REQUIREMENTS**

1. The bidder should be a manufacturer who must have designed, manufactured, tested, supplied and executed to power utilities at least 40% of the tendered quantity of the goods/equipment of same or higher voltage class against each lot indicated in the “Schedule of Requirement” in one continuous period of 12 months in the last five years as on the date of opening of bid and its financial turnover during any one year of the last five years should have been equal or more than 100% value of the estimated contract value. The Bidder should be manufacturer of Main Protective Numerical Relay.

At least 20% of the similar material offered against each lot as indicated in the ‘Schedule of Requirements’ should be in successful operation since 2 years in any Govt. Power Utility as on the date of opening of the Bid.

**Note: Performance Certificates issued by an officer not below the rank of Executive Engineer or equivalent cadre of State Govt. Power utility/Government Organizations/ PSU only shall be furnished by the bidder without fail, in support of the above information.**

2. The bidder should furnish the information on all past supplies and satisfactory performance in proforma under Form-5.
3. All bids submitted will also include the following information:
  - a) Copies of original documents defining the constitution or legal status, place of registration and principle place of business of the company or firm or partnership, etc.
  - b) The bidder should furnish a brief write-up, backed with adequate data, explaining his available capacity and experience (both technical and commercial) for the manufacture and supply of the required equipment within the specified time of completion after meeting all their current commitments.
  - c) The bidder should clearly confirm that all the facilities exist in his factory for inspection and testing and these will be made available to the purchaser or his representative for inspection.

- d) Reports on financial standing of the Bidder such as profit and loss statement, balance sheets and auditor's report for the past three years, bankers certificates etc.
- 4. The bidder shall furnish Type Test Reports. The type tests must have been conducted on the material offered as per the relevant IS in recognized laboratory as per the latest revision of the relevant standards applicable and Technical Specification. The date of type tests shall not be later than seven years as on the date of bid opening. If any change in design was made latest type tests shall be furnished along with approved drawing. The Bids received without type test reports will be treated as Non-Responsive.
- 5. Even though the bidder meets the above qualifying criteria, they are subject to be disqualified if they have...
  - a) made misleading or false representations in the forms statements and attachments submitted in proof of qualification requirements and / or
  - b) record of poor performance such as not properly completing the contract, inordinate delays in supply completion, litigation history or financial failure etc.
- 6. Bidders should quote for 100% of the tender quantity of all items in the lot indicated in the 'Schedule of Requirements' of Bid specification, on single responsibility basis. **Bidder has to quote for all items in the bid should meet aggregate qualification requirement. Bids will be evaluated combining all the items for finalizing the award of order. Offers less than the prescribed quantity and items will be treated as non-responsive and liable for rejection.**
- 7. Notwithstanding anything stated above the purchaser reserves the right to assess bidders capability and capacity to perform the contract should circumstances warrant such an assessment in the overall interest of the Purchaser.

**Note: "No clarifications shall be asked / entertained regarding Qualification Requirements (Supply, Performance and Financial Turnover). Tenders shall be evaluated with uploaded documents only in the e-procurement website."**

**SECTION VII : SAMPLE FORMS**

**FORM - 1 : QUALIFICATION & PERFORMANCE PARTICULARS**

Specification No. : **PMM 31-e- 25 /2023**

Material Description : **CONTROL & RELAY PANELS**

**I. Qualification Requirements as per Specification:**

|   |   |   |      |                          |   |                         |                             |
|---|---|---|------|--------------------------|---|-------------------------|-----------------------------|
|   |   |   |      | 220/132 KV<br>PTR Panels | 220KV Feeder<br>panels(Distance/Differential) | 220KV Bus<br>Bar panels | 220KV Bus<br>Coupler panels |
| a | Quantity as per schedule of requirement | Nos.  | 14   | 23/7                     | 9   | 5                       |                             |
| b | Supply                                  | 40% of requirement                            | Nos. | 6                        | 9/3   | 4                       | 2                           |
| c | Performance                             | 20% of requirement                            | Nos. | 3                        | 5/2   | 2                       | 1                           |
| d | Turn over                               | Lakhs   |      |                          |   |                         |                             |
| e | Type Test Reports                       | Past seven years from the date of Bid opening |      |                          |   |                         |                             |

**II. Bidders past supply details to be furnished by the Bidder**

| Sl No  | Particulars     | Name of the Purchaser and quantity |          |                |          |                |          | Total |
|--|-----------------|------------------------------------|----------|----------------|----------|----------------|----------|-------|
|  |                 | (1)                                |          | (2)            |          | (3)            |          |       |
|  |                 | Purchaser Name                     | Quantity | Purchaser Name | Quantity | Purchaser Name | Quantity |       |
| Quantity supplied during the last five years |                 |                                    |          |                |          |                |          |       |
| 1.   | 2017            |                                    |          |                |          |                |          |       |
|  | Supply Qty      |                                    |          |                |          |                |          |       |
|  | Turnover Amount |                                    |          |                |          |                |          |       |
| 2.   | 2018            |                                    |          |                |          |                |          |       |
|  | Supply Qty      |                                    |          |                |          |                |          |       |
|  | Turnover Amount |                                    |          |                |          |                |          |       |
| 3  | 2019            |                                    |          |                |          |                |          |       |
|  | Supply Qty      |                                    |          |                |          |                |          |       |
|  | Turnover Amount |                                    |          |                |          |                |          |       |
| 4  | 2020            |                                    |          |                |          |                |          |       |
|  | Supply Qty      |                                    |          |                |          |                |          |       |
|  | Turnover Amount |                                    |          |                |          |                |          |       |

|   |   |  |  |  |  |  |  |  |
|---|---|--|--|--|--|--|--|--|
| 5 | 2021  |  |  |  |  |  |  |  |
|   | Supply Qty  |  |  |  |  |  |  |  |
|   | Turnover Amount   |  |  |  |  |  |  |  |
| 6 | 2022  |  |  |  |  |  |  |  |
|   | Supply Qty  |  |  |  |  |  |  |  |
|   | Turnover Amount   |  |  |  |  |  |  |  |
| 7 | Maximum supply in continuous 12 months period in last 5 years.<br>From To |  |  |  |  |  |  |  |
| 8 | Performance for similar equpt. Qty  |  |  |  |  |  |  |  |
| 9 | Year of Type Test Reports enclosed  |  |  |  |  |  |  |  |

- Note :
- 1) Documentary evidence in support of the above shall be furnished along with Bid. Month wise supply details for the above shall also be furnished.
  - 2) If any of the information furnished above is found to be false the firm will be debarred.
  - 3) If the Bidder has supplied to more than three purchasers to meet the qualifying requirement a separate sheet may be enclosed to include the other purchasers and total indicated.
  - 4) This above schedule shall be enclosed to the qualification bid.

Signature of the Bidder

## **2. BID SECURITY FORM**

Whereas. .... (hereinafter called "the Bidder") has submitted its Bid dated (date of submission of bid) for the supply of. ....(name and /or description of the Materials / equipment) (hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that WE. ....(name of bank) having our registered office at. ....(address of bank)(hereinafter called "the Bank"), are bound unto. ....(name of Purchaser) (hereinafter called "the Purchaser") in the sum of for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this day of \_\_\_\_\_ 2023.

THE CONDITIONS of this obligation are:

1. If the Bidder
  - d) withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or
  - e) does not accept the correction of errors in accordance with the Bid Specification, or
  
2. If the Bidder, having been notified of the acceptance of its bid by the Purchaser during the period of bid validity;
  - (a) fails or refuses to furnish the performance security, in accordance with the Bid Specification.
  
  - (b) fails or refuses to execute the Contract Form if required; or

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

This guarantee will remain in force up to and including sixty (60) days after .....(Specification Date) the period of the bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

. ....  
(Signature of the Bank)

**NOTE :** This will be executed on a Rs.100/- non-judicial stamp paper issued by a scheduled Bank.

### **3. CONTRACT FORM**

**THIS AGREEMENT** made the. .... day of. .... 2023 Between. ....(Name of Purchaser) of the one part and. ....(Name of Supplier) of the other part:

**WHEREAS** the Purchaser invited bids for certain Materials / equipment and ancillary services viz.,

.....(Brief description of Materials / equipment and Services) and has accepted a bid by the Supplier for the supply of those Materials / equipment and services in the sum of. ....(Contract Price in Words and Figures)(hereinafter called "the Contract Price").

#### **NOW THIS AGREEMENT WITNESSETH AS FOLLOWS:**

1. In this Agreement words and expressions will have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents will be deemed to form and be read and construed as part of this Agreement, viz.:
  - (a) the Bid Form and the Price Schedule submitted by the Bidder;
  - (b) the Schedule of Requirements;
  - (c) the Technical Specifications;
  - (d) the General Conditions of Contract;
  - (e) the Purchaser's Notification of Award.
3. In consideration of the payments to be made by the Purchaser to the Supplier as hereinafter mentioned, the Supplier hereby covenants with the Purchaser to provide the Materials / equipment and services and to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Purchaser hereby covenants to pay the Supplier in consideration of the provision of the Materials / equipment and services and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

Brief particulars of the Materials / equipment and services which will be supplied/ provided by the Supplier are as under:

| Sl. No | Brief Description of Materials / Equipment & services | Quantity to be supplied | Unit Price Rs. | Total Price Rs. | Delivery Terms |
|--------|---|-------------------------|----------------|-----------------|----------------|
|        |   |                         |                |                 |                |
|        |   |                         |                |                 |                |
|        |   |                         |                |                 |                |

**TOTAL VALUE: (Rupees \_\_\_\_\_ only)**

**DELIVERY SCHEDULE:**

**IN WITNESS** whereof the parties hereto have caused this Agreement to be executed on the day and year first above written.

Signed, Sealed and Delivered by the  
 said. ....(for the Purchaser)  
 in the presence of. ....

Signed, Sealed and Delivered by the  
 said. ....(for the Supplier)  
 in the presence of. ....

**NOTE:** To be executed on a Rs.100/- Non-judicial stamp paper.

**4. PERFORMANCE SECURITY FORM**

To: \_\_\_\_\_ (Name of Purchaser)

**WHEREAS**..... (Name of Supplier)

(hereinafter called "the Supplier") has undertaken, in pursuance of Contract No..... dated....., 2017 to supply ..... (Description of Materials/ equipment and Services) (hereinafter called "the Contract").

**AND WHEREAS** it has been stipulated by you in the said Contract that the Supplier will furnish you with a Bank Guarantee by a recognized Bank for the sum specified therein as security for compliance with the Supplier's performance obligations in accordance with the Contract.

**AND WHEREAS** we have agreed to give the Supplier a Guarantee:

**THEREFORE WE** hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of. .... (Amount of the Guarantee in Words and Figures) and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract and without cavil or argument, any sum or sums within the limit of..... (Amount of Guarantee) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the. .... day of ..... 2023.

Signature and Seal of Guarantors

.....  
Date. ....2023.

.....  
.....  
Address:.....  
.....  
.....

**NOTE :** This will be executed on a Rs.100/- non-judicial stamp paper by a scheduled Bank.

**5. PROFORMA FOR PERFORMANCE STATEMENT**

Bid No. \_\_\_\_\_

Date of Opening \_\_\_\_\_

Time \_\_\_\_\_ Hours

Name of the Firm \_\_\_\_\_

| Order placed by (full address of purchaser) | Order No. and Date | Description and quantity of ordered equipment/ material | Date of Completion of Delivery |        |
|---|--------------------|---|--------------------------------|--------|
|   |                    |   | As per Contract                | Actual |
|   |                    |   |                                |        |
|   |                    |   |                                |        |
|   |                    |   |                                |        |

| Remarks indicating reasons for late delivery, if any | Has the equipment been satisfactorily functioning? (Attach a Certificate from the Purchaser) |
|--|--|
|  |  |
|  |  |
|  |  |

Signature of the Bidder \_\_\_\_\_

**FORM - 6 : DETAILS TO BE FURNISHED BY THE MANUFACTURER**

|     |  |   |  |
|-----|--|---|--|
| 1.  | Specification No.  | : |  |
| 2.  | Name of the Material   | : |  |
| 3.  | Bidder's vendor Registration No. for this item   | : |  |
| 4.  | Quantity to be procured  | : |  |
| 5.  | Last date and time for submission of Bid   | : |  |
| 6.  | Date and time for opening of Bid   | : |  |
| 7.  | State whether Bid Security is uploaded   | : |  |
| 8.  | Whether willing to furnish performance Security B.G. @ 10 %<br>%, if order is placed                                     | : |  |
| 9.  | Whether a local SSI Unit/ Local Unit   | : |  |
| 10. | Whether APTRANSCO delivery schedule accepted?  | : |  |
| 11. | Prices whether Firm / variable   | : |  |
| 12. | Whether any other tax / duty payable.<br>If so give details and the same is included / not included.                     | : |  |
| 13. | State whether APTRANSCO terms of payment are accepted.   | : |  |
| 14. | Quantity offered for supply  | : |  |
| 15. | State whether 90 days validity offered   | : |  |
| 16. | Whether sample is enclosed (if specified)  | : |  |
| 17. | Whether the material/ equipment offered conforms to the<br>relevant APTRANSCO Specification                              | : |  |
| 18. | Whether you have executed orders of the APTRANSCO<br>previously for these items (if executed, please furnish<br>details) | : |  |
| 19. | Similar details in respect of supplies made to other utilities   | : |  |
| 20. | Whether GST clearance certificate enclosed   | : |  |
| 21. | Whether Income-tax clearance certificate enclosed.   | : |  |
| 22. | Furnish the max production capacity per month of your plant<br>for each type of the quoted materials.                    |   |  |
| 23. | Whether APTRANSCO penalty clause accepted  |   |  |
| 24. | Whether APTRANSCO Guarantee clause accepted  |   |  |

**Signature of the Bidder**

## 7. SCHEDULE OF DEVIATION

### TECHNICAL

| Sl. No | Requirements / Equipment | Specification Clause No. | Deviations | Remarks |
|--------|--------------------------|--------------------------|------------|---------|
| .      |                          |                          |            |         |
|        |                          |                          |            |         |
|        |                          |                          |            |         |

It is hereby conformed that except for deviations mentioned above, the offer conforms to all the other features specified in Technical Specification Section \_\_\_\_ of this Bid Document

Place :

Signature of the Bidder :

Date :

Name :

Business address :

### **SCHEDULE OF DEVIATION** COMMERCIAL

| Sl. No | Requirements / Equipment | Specification Clause No. | Deviations | Remarks |
|--------|--------------------------|--------------------------|------------|---------|
| .      |                          |                          |            |         |
|        |                          |                          |            |         |
|        |                          |                          |            |         |

It is hereby conformed that except for deviations mentioned above, the offer conforms to all the other features specified in Commercial Specification Section \_\_\_\_ of this Bid Document

Place :

Signature of the Bidder :

Date :

Name :

Business address:

## **8. DECLARATION FORM**

### **UNDERTAKING TO BE GIVEN BY THE COMPANY / PARTNERSHIP FIRM / CONTRACTOR ALONG WITH THE TENDER REGARDING RELATIVES**

I, \_\_\_\_\_  
representing the Company / Partnership Firm / Contractor responding to the bid invitation by  
the APTRANSCO / APEPDCL / APSPDCL / APNPDCL / APCPDCL vide Specification  
No. \_\_\_\_\_ hereby sincerely and solemnly affirm and state as  
follows:

**(STRIKE OUT THAT WHICH IS NOT APPLICABLE)**

(a) that myself or any of the representatives of my company / firm do not have any  
relatives as defined in the appended Annexure III in the APTRANSCO / DISCOM.

**OR**

(b) that the following officers / employees of the APTRANSCO / DISCOM are related to  
me and to the representatives of my company / firm and their status in the  
APTRANSCO / DISCOMS is as under:

| <b>Sl.<br/>N<br/>o.</b> | <b>Name of the Officer<br/>Employee</b> | <b>Designation<br/>and Place of<br/>working</b> | <b>APTRANSC<br/>O / DISCOM</b> | <b>Relationship</b> |
|-------------------------|---|---|--------------------------------|---------------------|
| 1.                      |   |   |                                |                     |
| 2.                      |   |   |                                |                     |
| 3.                      |   |   |                                |                     |
| 4.                      |   |   |                                |                     |
| 5.                      |   |   |                                |                     |
| 6.                      |   |   |                                |                     |

It is certified that the information furnished above is true to the best of my knowledge  
and belief. It is hereby undertaken that in the event of any of the above information found to  
be false or incorrect at the later dated the APTRANSCO / DISCOM is entitled to terminate  
the contract / agreement entered into besides recovering damages as may be found necessary,  
with due notice.

**Signature of the Authorised Representative**

**DECLARATION TO BE GIVEN BY THE COMPANY / PARTNERSHIP FIRM / CONTRACTOR AT THE TIME OF ENTERING INTO AGREEMENT WITH APTRANSCO / DISCOMS:**

**(STRIKE OUT THAT WHICH IS NOT APPLICABLE)**

- (a) I declare that myself or any one of the representative of my company / firm do not have any relatives as defined in the appended annexure II in the APTRANSCO / DISCOM.

**OR**

- (b) that the following officers / employees of the APTRANSCO / DISCOM are related to me and to the representatives of my company / firm as mentioned hereunder:

| <b>Sl. No.</b> | <b>Name of the Officer Employee</b> | <b>Designation and Place of working</b> | <b>APTRANSCO / DISCOM</b> | <b>Relationship</b> |
|----------------|-------------------------------------|---|---------------------------|---------------------|
| 1.             |                                     |   |                           |                     |
| 2.             |                                     |   |                           |                     |
| 3.             |                                     |   |                           |                     |
| 4.             |                                     |   |                           |                     |
| 5.             |                                     |   |                           |                     |
| 6.             |                                     |   |                           |                     |

It is certified that the information furnished above is true to the best of my knowledge and belief. It is hereby undertaken that in the event of any of the above information found to be false at the later dated the APTRANSCO / DISCOM is entitled to terminate the contract / agreement entered into besides recovering damages as may be found necessary, with due notice.

**Signature of the Authorised Representative**

**LIST OF RELATIVES:**

- |                                       |                                      |                   |
|---------------------------------------|--------------------------------------|-------------------|
| 1. Father                             | 14. Daughter's Husband               |                   |
| 2. Mother (including step mother)     | 15. Daughter's Son                   |                   |
| 3. Son (including step son)           | 16. Daughter's Son's Wife            |                   |
| 4. Son's Wife                         | 17. Daughter's Daughter              |                   |
| 5. Daughter (including step daughter) | 18. Daughter's Daughter's Husband    |                   |
| 6. Father's Father                    | 19. Brother (including step brother) |                   |
| 7. Father's Mother                    | 20. Brother's Wife                   |                   |
| 8. Mother's Mother                    | 21. Sister (including step sister)   |                   |
| 9. Mother's Father                    | 22. Sister's Husband                 |                   |
| 10. Son's son                         | 23. Son's Wife's Father              | } and<br>siblings |
| 11. Son's Son's Wife<br>their         | 24. Son's Wife's Mother              |                   |
| 12. Son's Daughter                    | 25. Daughter's Husband's Father      |                   |
| 13. Son's Daughter's Husband          | 26. Daughter's Husband's Mother      |                   |

**FORM - 9**

**BANK ACCOUNT DETAILS FOR RTGS**

1. Name of the Bank :
2. Name of the Branch :
3. Branch code :
4. City :
5. Account No. :
6. MICR No. :
7. IFSC No. :
8. Income Tax PAN Number :
9. VAT Registration Number :
10. Date of VAT Registration :
11. Place of VAT Registration :

Signature of the Bidder

**FORM – 10 : BANKERS CERTIFICATE**  
**TO WHOM SO EVER IT MAY CONCERN**

This is to certify that M/s.  
\_\_\_\_\_, having their plant at  
\_\_\_\_\_ is our customers and have  
satisfactory record of transactions. They are having the credit limits of Rs. \_\_\_\_\_ Lakhs  
in our Bank.

Place :

Date :

Signature of the Manager

Name:

Bank address and Seal.

**FORM – 11 : MANUFACTURERS' BIDDING AUTHORISATION FORM**

No. \_\_\_\_\_ dated

To

.....  
.....  
.....

Dear Sir,

SPECIFICATION No.

We \_\_\_\_\_ (Name & complete Address) who are established and reputable manufacturers of \_\_\_\_\_ (Name & descriptions of Materials / equipment offered) having factory at \_\_\_\_\_ (address of factory) do hereby authorize \_\_\_\_\_ (Full name and Designation) whose specimen signature is attested here under to submit the bid, and sign the contract with you for the above Materials / equipment manufactured by us against the above Specification No.

Specimen Signature

Yours faithfully,

(Name)  
(Name of manufacturers)

**Note : This letter of authority should be on the letterhead of the manufacturer. It should be included by the Bidder in its bid.**

The Bidder's complete postal address and their factory complete postal address with phone and fax numbers shall be invariably mentioned in the above proforma.

**FORM - 12**

**UNDERTAKING TO BE GIVEN BY THE COMPANY ALONG WITH THE BID REGARDING BLACKLISTING/BANKING**

I, \_\_\_\_\_  
representing the Company responding to the bid invitation by the APTRANSCO vide Specification No. \_\_\_\_\_ hereby sincerely and solemnly affirm and state as follows:

(a) We, \_\_\_\_\_ (Name of Company)  
or our promoter's firm(s) have not been banned/ black-listed/debarred by any Govt. Department/ undertaking or Power Utility for non-performance or malpractice or due to any reasons.....

It is certified that the information furnished above is true to the best of my knowledge and belief. It is hereby undertaken that in the event of any of the above information found to be false or incorrect at the later dated, the APTRANSCO / DISCOM is entitled to terminate the contract / agreement entered into besides recovering damages as may be found necessary, with due notice.

**Signature of the Authorised Representative**

**FORM-13**

*Format for Affidavit of Self certification regarding Local Content in line with PPP-MII order and MoP Order, if applicable, to be provided on a non-judicial stamp paper of Rs.100/-.*

*Date:*

*I \_\_\_\_\_ S/o, D/o, W/o, \_\_\_ Resident of \_\_\_\_\_ hereby solemnly affirm and declare as under:*

*I am the << Designation of the Authorized signatory >> of and I am duly authorized to furnish this undertaking declaration on behalf of -----*

*That I will agree to abide by the terms and conditions of the Public Procurement (Preference to Make in India) Order, 2017 of Government of India issued vide NotificationNo:P-45021/2/2017 -BE-II dated 15/06/2017, its revision dated 04/06/2020(hereinafter PPP-MII order).*

*'Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content)' order dated 28/07/2020 issued by Ministry of Power (hereinafter MoP order) and Revised on 17/09/2020 in respect of Power Sector.*

*Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content), Further Revised Order No. A-1/2021-FSC-Part(5) dt.16/11/2021 issued by Ministry of Power (MoP Order) .*

*As per Orders vide G.O.Ms.NO.9, Industries and Commerce (PROG-I) DepartmentDt.25.02.2021 and any subsequent modifications/Amendments, if any and*

*That the information furnished hereinafter is correct to the best of my knowledge and belief and I undertake to produce relevant records before the procuring entity/ POWERGRID or any other Government authority for the purpose of assessing the local content of goods/services/works supplied by me for*

*.....*

*(Enter the name of the package).*

*That the local content for all inputs which constitute the said goods/services/works has been verified by me and I am responsible for the correctness of the claims made therein.*

*That the 'Local Content 'as defined in the PPP-MII order and MoP order in the goods/services/works supplied by me for \_\_\_\_\_ (Enter the name of the package/procurement) is percent (%).*

*That the goods/services/works supplied by me for .....  
(Enter the name of the package/ procurement) meet the 'Local Content' requirements defined in the PPP-MII order and MoP order for 'Class -I local supplier'/'Class-II Local supplier(choose as applicable).*

*That the value addition for the purpose of meeting the 'Local Content' has been made by me at (Enter the details of the location(s) at which value addition is made).*

*That in the event of the local content of the goods/services/works mentioned herein is found to be incorrect and not meeting the prescribed Local Content criteria, based on the assessment of procuring agency (ies)/APTransco/Government Authorities for the purpose of assessing the local content, action shall be taken against me in line with the PPP-MII order, MoP order and provisions of the Integrity pact/ Bidding Documents.*

*I agree to maintain the following information in the Company's record for a period of 8 years and shall make this available for verification to any statutory authority.*

- i. Name and details of the Local Supplier  
(Registered Office, Manufacturing unit location, nature of legal entity)*
- ii. Date on which this certificate is issued*
- iii. Goods/services/works for which the certificate is produced*
- iv. Procuring entity to whom the certificate is furnished*
- v. Percentage of local content claimed and whether it meets the Local Content prescribed for 'Class – I local supplier'/'Class-II Local supplier (choose as applicable)*
- vi. Name and contact details of the unit of the Local Supplier (s)*
- vii. Sale Price of the product*
- viii. Ex-Factory Price of the product*
- ix. Freight, insurance and handling*
- x. Total Bill of Material*
- xi. List and total cost value of input used to manufacture the Goods/to provide services/in construction of works*
- xii. List and total cost of input which are domestically sourced. Value addition certificates from suppliers, if the input is not in-house to be attached*
- xiii. List and cost of inputs which are imported, directly or indirectly for and on behalf of...*

*(Name of firm/entity)*

*Authorized signatory (To be duly authorized by the Board of Directors)*

*<Insert Name, Designation and Contact No.>*

**FORM-14**

Certificate from statutory auditor or cost auditor of the company (in the case of companies) or from a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) giving the percentage of Local Content, in line with PPP-MII order **and MoP order** , if applicable[*to be submitted on the letter head of the issuer.*]

Dear Sir,

We have read and understood the provisions of “Public Procurement (Preference to Make in India) Order, 2017” dated 15/06/2017, its revision dated **04/06/2020**[hereinafter, “PPP- MII Order”] issued by **Department for promotion of Industry and Internal Trade (DPIIT)**, Ministry of Commerce and Industry, Government of India,

**‘Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content)’ order dated 28/07/2020 issued by Ministry of Power [hereinafter, “MoP order”]**

As per Orders vide G.O.Ms.NO.9, Industries and Commerce (PROG-I) DepartmentDt.25.02.2021

and any subsequent modifications/Amendments, if any.

In line with the provisions of the PPP-MII Order **and MoP Order**, M/s.....[*Enter the name of the Bidder*] [here in after, “**Class-I Local Supplier**”/”**Class-II Local Supplier**”(choose as applicable)] have submitted an Affidavit of self-certification to M/s. APTRANSCO regarding Local Content in Goods/Services/Works to be supplied by the “**Class-I Local Supplier**”/”**Class-II Local Supplier**”(choose as applicable)for ..... [Enter the name of the package], wherein they have agreed to abide by the terms and conditions of the PPP-MII Order **and MoP Order**.

Further, in line with the PPP-MII Order, the statutory auditor or cost auditor of the company (in the case of companies) or a practicing cost accountant or practicing chartered accountant (in respect of suppliers other than companies) shall provide a certificate giving the percentage of Local Content in the Goods/Service/Works to be supplied by the “**Class-I Local Supplier**”/”**Class-II Local Supplier**”(choose as applicable)for [Enter the name of the package].

Accordingly, we, the Statutory Auditor(s) /Cost auditor of the “**Class-I Local Supplier**”/”**Class-II Local Supplier**”/ a practicing cost accountant or practicing chartered accountant [choose as applicable], certify that the Local Content as defined under the PPP-MII **and MoP Order**, in the Goods/Service/Works to be supplied by the “**Class-I Local Supplier**”/”**Class-II Local Supplier**”(choose as applicable) for..... [Enter the name of the package] is .....percentage [specify the percentage of Local content].

For and on behalf of, Date:

<<Statutory Auditor’s/Cost auditor’s/ Cost accountant’s/Chartered

accountant’s attestation>> Firm Reg No. Membership No.

Note: This is a guiding format. In case the bidder submits the certificate in a format different from the above, the same may be considered provided it meets the intent and purpose, as may be ascertained by APTRANSCO.

### CHECK LIST

The bidders shall invariably upload the information and records listed in the check list below on **e-procurement platform**, and also confirm by marking Yes or No. The same shall have to be furnished either personally or through courier or by post in the stipulated time, if asked by the Purchaser.

|    |  |          |
|----|--|----------|
| 1  | State whether the work / materials offered conforms to the relevant APTRANSCO's / ISS Specifications and drawings. (If not Specify the Deviations in Annexure)   | Yes / No |
| 2  | State whether Qualification and Performance particulars are uploaded along with necessary performance certificates in PDF formats.   | Yes / No |
| 3  | State whether copies of 'Tax Deducted at Source' certificates are uploaded with proper attestation in PDF formats.   | Yes / No |
| 4  | State whether copy of 'Service Tax Registration Certificates' are uploaded with proper attestation in PDF formats.   | Yes / No |
| 5  | State whether copy of 'A-Grade license certificate' issued by CEIG is uploaded with proper attestation in PDF formats.   | Yes / No |
| 6  | State whether copy of 'Income Tax registration / PAN registration certificate' are uploaded with proper attestation in PDF formats.  | Yes / No |
| 7  | State whether complete Quantity is quoted. (Bidder must quote for 100% of quantities of all items)   | Yes / No |
| 8  | Whether copy of Original Bid Security BG / online money transfer or payment uploaded <a href="#">for each Lot separately?</a>  | Yes / No |
| 9  | Whether Transaction Fee is paid electronically or not. The copy of the receipt may be uploaded.  | Yes / No |
| 10 | Whether Guaranteed Technical Particulars (GTP) are uploaded  | Yes / No |
| 11 | Whether Proof of Turnover signed by Auditors are uploaded  | Yes / No |
| 12 | Whether Form-1 i.e. Q.R. and Performance statements uploaded   | Yes / No |
| 13 | Whether all the documents as proof to the Pre-Qualification Requirement i.e. 40% quantity of supply in 12 months from the utilities as called for, are uploaded  | Yes / No |
| 14 | Whether all the documents pertaining to the 2 years satisfactory performance, i.e., satisfactory performance certificates from the govt. power utilities with documentary proof with attestation, are uploaded | Yes / No |
| 15 | State whether Bank's Certificate for availability of Credit facilities are uploaded  | Yes / No |
| 16 | Whether Schedule of Deviations - Technical & Commercial are uploaded   | Yes / No |
| 17 | State whether Clause 1.0 of Section II Financial is accepted.  | Yes / No |
| 18 | State whether Bid Validity is offered as per specification.  | Yes / No |
| 19 | State whether APTRANSCO's Payment Terms are accepted.  | Yes / No |
| 20 | State whether APTRANSCO's Penalty Clause is accepted.  | Yes / No |

|    |   |          |
|----|---|----------|
| 21 | State whether APTRANSCO's Delivery Schedule / Completion period is accepted.  | Yes / No |
| 22 | Are you prepared to furnish Performance Security B.G. if order is placed?   | Yes / No |
| 23 | State whether APTRANSCO's Guarantee Clause is accepted.   | Yes / No |
| 24 | State whether Bid form uploaded   | Yes / No |
| 25 | State whether all the Schedules are uploaded.   | Yes / No |
| 26 | State whether the Guaranteed Technical Particulars for Section-2 to Section -6 of technical Specification are uploaded  | Yes / No |
| 27 | State whether copies of type test certificates for equipment/materials are uploaded.  | Yes / No |
| 28 | State whether all the clauses are accepted.   | Yes / No |
| 29 | State whether prices Schedule –A are uploaded. (Commercial schedules)   | Yes / No |
| 30 | Whether 'Declaration Form' uploaded   | Yes / No |
| 31 | Whether copies of Type Test Certificates uploaded   | Yes / No |
| 32 | Whether uploaded the Forms as per Section-VII of the Specification?   | Yes / No |
| 33 | Whether uploaded the undertaking informing that firm has not been banned/black listed/debarred by any Govt. Department / undertaking or any power utility for non-performance or malpractice? | Yes / No |
| 34 | Whether all the required forms (including Forms -13 to 15) are uploaded.  | Yes / No |
| 35 | <b>Whether 8 digits HSN Codes (GST) of all the quoted items in separate sheet</b> are uploaded.   | Yes / No |

*The Bidder shall indicate that all the forms and enclosures indicated in the checklist furnished are compiled with.*

**SIGNATURE OF THE BIDDER**

**Earlier Tender clarifications:**

| S.No. | SPECIFICATI<br>ON CLAUSE                       | SPECIFICATIO<br>N<br>REQUIREMENT  | Queries  | APTRANSCO reply   |
|-------|--|---|--|---|
| 1     | 5.2.1 Item 1: 220 TRANSFORMER C&R PANELS/a.xii | Numerical Transformer Differential protection(87T): with 24 DI & 32 DO (Minimum)  | <p>1.We request APTRANSCO to clarify requirement is 2 winding protection or 3 Winding Protection?</p> <p>2.We suggest APTRANSCO that remove the clause of 87T &amp; 64R shall be interchangeable and identical. as we feel this will add cost to the panels.</p> <p>3. Total BI+BO including spares we propose 33 nos.</p> <p>4.APTRANSCO requirement of phase segregated REF protection , we suggest the following:</p> <p>a. This can achieved by scheme if the same is acceptable by using one REF coil with phase indication with voltage level for protection operated.</p> <p>b. Single relay with phase wise protection</p> <p>c. Three independent relays.</p> <p>5. For REF total BI + BO including spares we propose 35 Nos.</p> <p>Please Clarify on the above.</p> | <p>2 winding differential relay (phase segregated) and 3 element high impedance REF relay (phase segregated) are to be provided. Single relay with 3 element for REF is to be provided. As per recent drawing approvals only, DI/DOs are worked out and incorporated in Specification. APTRANSCO Specification holds good. 20 to 24 BI/DI Minimum &amp; 16 to 24 BO/DO Minimum and both Total BI &amp; BO shall have minimum 40 Nos. However this will be finalized during detailed engineering while drawing approval.</p> |
| 2     | 5.2.1 Item 1: 220 TRANSFORMER C&R PANELS/b.xii | Numerical phase segregated REF Protection (64T): It shall have minimum of 24DI & 32DO contacts. It shall have default features of 81, 59, 27, 50z, 67, over flux etc..Identical type of relays for 87T & 64R are to be provided. This relays must be interchangeable. | <p>APTRANSCO requirement of phase segregated REF protection , we suggest the following:</p> <p>a. This can achieved by scheme if the same is acceptable by using one REF coil with phase indication with voltage level for protection operated.</p> <p>b. Single relay with phase wise protection</p> <p>c. Three independent relays.</p> <p>5. For REF total BI+BO including spares we propose 35 nos.</p>  | <p>As per recent drawing approvals only, DI/DOs are worked out and incorporated in Specification. APTRANSCO Specification holds good.</p> <p>Note: - all the DI &amp; DOs are inclusive of 20% spare contacts in all IEDs.</p> <p>However this will be finalized during detailed engineering while drawing approval.</p>  |

|   |   |   |  |   |
|---|---|---|--|---|
|   |   |   | 6. 81,59,27,50Z,67 can be available as inbuilt function in any of the offered protection relays. Please Clarify on the above.                                  |   |
| 3 |   | BCU / BCPU  | We understand the BCPU - Bay control and protection unit i.e. Control and Protection in same IED is sufficient for 220/132kV Voltage level.                    | Bay control and protection unit i.e. Control and Protection in same IED is acceptable as per specification. In case of BCPU - PS core of CT is to be configured.  |
| 4 | 5.2.1 Item 1: 220 TRANSFORMER C&R PANELS /i.vii   | Numerical Under Frequency Relay Scheme with df/dt feature: vii) A separate numerical relay is to be provided for under frequency relay scheme with df/dt feature & 81: Under frequency relay scheme with rate of change of frequency as per technical specification. (part of BCPU / main protection relay is acceptable) | We understand that df/dt relay is required in case of Line Feeders. Further, the same is acceptable as built in function of BCPU/BCU/Main Relays               | Numerical Under Frequency Relay Scheme with df/dt feature as part of BCPU / main protection relay is acceptable, but separate trip relay for Under frequency is to be provided as per technical specification.        |
| 5 | 5.2.1 Item 1: 220 TRANSFORMER C&R PANELS/160/100 MVA, 220/132 kV TRANSFORMER CONTROL, RELAY, ALARM AND ANNUNCIATION PANELS. | BCU: BCU (with 110 DI, 40 DO & 8 or 10 AI (4-20 mA card, either in HV or LV BCU/BCPU acceptable)) and LV BCU (with 64 DI, 32 DO)  | We understand that BI & BO shall be as per scheme requirement and can be finalized during engg stage. If such BI / BO requirement, please furnish the details. | As per recent drawing approvals only, DI/DOs are worked out and incorporated in Specification. However this will be finalised during detailed engineering while drawing approval. APTRANSCO Specification holds good. |
| 6 |   | LBB Trip Relay  | As LBB is acceptable as built in function of bus bar relay. So, LBB & Bus Bar trip relay shall be common.  | 86 LBB trip relays are to be provided in all CRP panels and 96 trip relay is to be provided in bus bar panel for all bays.  |
| 7 | Item 2: 220 kV Feeder Protection C&R Panels:  | Main-I or Main-II distance relay with 24 DI & 32 DO (Minimum)   | We understand that for 220kV system 16BI & 24 BO is sufficient to fulfill the scheme   | As per recent drawing approvals only, DI/DOs are worked out and incorporated in Specification. APTRANSCO Specification holds good.  |

|    |   |  |   |   |
|----|---|--|---|---|
| 8  | Item 2: 220 kV Feeder Protection C&R Panels:  | Local breaker backup protection scheme:  | As LBB is acceptable as built in function of bus bar relay and the same function is also required in feeder protection panel as built in feature of Main relays / BCPU.   | APTRANSCO Specification holds good. LBB Feature shall be provided in both Main relays / BCPU and Busbar relay, as per site requirement, LBB feature is enabled either in Main relays / BCPU or Busbar scheme. |
| 9  | Item 2: 220 kV Feeder Protection C&R Panels:  | Line Feeder BCU: BCU (with 110 DI)   | We understand that BI & BO shall be as per scheme requirement and can be finalized during engg stage. If such BI / BO requirement, please furnish the details.  | As per recent drawing approvals only, DI/DOs are worked out and incorporated in Specification. APTRANSCO Specification holds good.  |
| 10 | Item-3: 220KV Numerical line differential Relays in built feature of line distance feature suitable for 400 or 220 kV Feeders (Main-I & II) (with redundant c37.94 (mono mode) ports) |  | Kindly clarify that Line Differential Relay without redundant port is also acceptable. The cable supply and connectivity from relays to relays are not in our scope.  | APTRANSCO Specification holds good. OPGW cable is under APTRANSCO scope only. This relay shall be suitable up to 50 kM line lengths. (single mode – 1300 nm or 1500 nm as per site requirement)               |
| 11 | Item 4: 220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS / 24 BAYS as per schedule of requirement  | Bus Bar Relay for 220kV  | please clarify:<br>1. we understand 28 nos busbar relays are suitable for 16 bays and 2 nos suitable for 24 bays.<br>2. we wish to clarify the Bus bar relay suitable for 16 bays can be extendable up to 18 bays and for busbar suitable for 24 bays we do not envisage further extension.<br>3. Please clarify whether we can offer two different models for Busbar Suitable for 16 bays and 24 bays. | Accepted, but trip relays and other accessories are to be provided for 16 or 24 Bays as per schedule requirement.   |
| 12 | Item 4: 220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS / 24 BAYS as per schedule of requirement  | The control unit should be a single unit only for all the 16 / 24 bays, summation or attachment of control units will not be acceptable. | The requirement of 16 bays with extendable to 2 bays is highly non standard and the specification does not specify centralized or decentralized. For making the offer cost efficient we suggest additional control unit to meet the specification requirements. In view of this we suggest APTRANSCO to modify the Busbar requirements to 14 bays extendable to 16 bays.                                | APTRANSCO Specification holds good.   |

|    |  |  |   |   |
|----|--|--|---|---|
| 13 | Item 4: 220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS / 24 BAYS as per schedule of requirement | All isolators & CB open and close status of all bays shall be wired to BB relay. | We understand that single position is sufficient for the bus bar scheme   | APTRANSCO Specification holds good (double status of isolators & CBs of all bays shall be wired to BB relay).   |
| 14 | Item 4: 220KV BUS BAR PROTECTION PANEL SUITABLE FOR 16 BAYS / 24 BAYS as per schedule of requirement |  | As we shall provide BB Trip Relays, So termination wiring of Bus Bar Relay output contacts directly to trip relays installed in the same panels only. The further extension of wiring from trip relay to breaker trip coils is not required and not in our scope. | APTRANSCO Specification holds good.   |
| 15 | Item 5: 220kV BUS COUPLER BREAKER PROTECTION:  | Local breaker backup protection scheme:  | As the LBB is acceptable is Bus Bar Relay. So, same is not required in Bus Coupler Protection Relay. Also the LBB Trip relay & Bus Bar Trip should be common only.  | APTRANSCO Specification holds good. LBB Feature shall be provided in both Main relays / BCPUs and Busbar relay, as per site requirement, LBB feature is enabled either in Main relays / BCPUs or Busbar scheme. |
| 16 | Transformer Protection Differential Relay  |  | We understand the transformer is 2 winding / Auto Transformer, hence the differential supplied is 2 winding relay only. Please confirm.   | Phase segregated 2 winding differential relay and Phase segregated 3 element high impedance REF relay are to be provided.   |
| 17 | Annunciation Scheme  |  | We propose the Micro based Alarm and Annunciator as per the APTRANSCO requirement. Please explain the relay scheme as per the latest specs.   | APTRANSCO Specification holds good.   |
| 18 | Line differential - Retrofit   |  | Integration into existing system is of whose scope  | Bidders scope only.   |
| 19 | Bus Coupler - LBB  |  | Please confirm whether the same can be considered as part of BCPUs.   | LBB Feature shall be provided in both BCPUs and Busbar relay, as per site requirement, LBB feature is enabled either in BCPUs or Busbar scheme.   |
| 20 | LED display meters   | High brightness LED display type meters are to be provided.                      | Please confirm if any specific requirement.   | APTRANSCO Specification holds good.   |

**Earlier Tender clarifications:**

| Page | Section | Clause | Sifang Queries | APTRANSCO reply |
|------|---------|--------|----------------|-----------------|
|------|---------|--------|----------------|-----------------|

|            |                         |   |   |  |
|------------|-------------------------|---|---|--|
| Page No.44 | Technical Specification | 5.1.0 Control and relay Panels:<br>Detailed description | Normally for control panels involving Mimic Diagram, instruments, meters, annunciation facia, control switches etc glass doors are not recommended and not provided. We would request you to kindly delete glass door | Accepted, glass door is not required for control panel, but acrylic door is required for relay panels and is of front opening only.  |
| Page No.51 | Technical Specification | 5.1.10 Instruments and Meters                           | We presume that 0.5 accuracy class MFM will be required and not 0.2 accuracy  | Yes, APTRANSCO Specification holds good.   |
| Page No.60 | Technical Specification | 5.2.1   | As the transformer is of 220/132KV two winding with unloaded tertiary, pl confirm if we can provide two winding transformer differential relay  | Phase segregated 2 winding differential relay and Phase segregated 3 element high impedance REF relay are to be provided.  |
| Page No.63 | Technical Specification | 5.2.1(i)  | Please confirm that stand alone Under frequency protection relay will be required and not as built-in feature of Transformer differential relay or any other relay.   | Numerical Under Frequency Relay Scheme with df/dt feature as part of BCPU / main protection relay is acceptable, but separate trip relay for Under frequency is to be provided as per technical specification. |
| Page No.66 | Technical Specification |   | We presume that Local Breaker Backup Protection is acceptable as built-in feature of Main & Backup protection relays.   | APTRANSCO Specification holds good. LBB Feature shall be provided in both Main relays / BCPU and Busbar relay, as per site requirement, LBB feature is enabled either in Main relays / BCPU or Busbar scheme.  |
| Page No.94 | Technical Specification | Unit Prices for addition/deletion of components         | Unit Prices for addition/deletion of components<br>There is no provision in on line bidding to include unit prices. Please advise us.   | Accepted, no need to quote and don't upload any prices in Excel or word or Pdf or any other format, it will lead to disqualification of their bid.   |

|  |                           |  |   |           |
|--|---------------------------|--|---|-----------|
|  | Qualification Requirement |  | We request you to consider the financial & performance credentials of our parent company BEIJING SIFANG AUTOMATION CO. LTD., Further considering our vendor registration with your board, the above list of orders executed with APTRANSCO and the eligibility criteria mentioned above, we request you to kindly consider SIFANG AUTOMATION INDIA PVT. LTD. as a qualified bidder for the present tender PMM22-e-81/2017 which is due on 25-05-2017. | Refer QR. |
|--|---------------------------|--|---|-----------|

### Earlier Tender clarifications:

| Sl.No. | Commercial:  | APTRANSCO reply   |
|--------|--|---|
| 1      | Since GST will come into force with effective from July 2017. Hence we recommend to include the GST clause in the Tender specification.                    | As per GST only.  |
| 2      | Payment Terms: For 30% retention payment, If there is any delay by APTRANSCO there should be cap for releasing of retention payment.                       | Accepted, for reasons which are not attributable to the bidder, if there is any delay in erection and commissioning, [APTRANSCO will release the last 20% payment within 6 months and 10% payment within 8 months] from the date of receipt of materials at site / Stores.  |
| 3      | Since there is no provision for unit prices split in e-procurement same shall be waived off from the tender specification                                  | Accepted, no need to quote and don't upload any prices in Excel or word or Pdf or any other format, it will lead to disqualification of their bid.  |
|        | <b>Technical:</b>  |   |
| 2      | GPS and synchronoscope are third party items. For Third party items Performance certificates and P.O. Copies cannot be produced. Kindly clarify as per QR. | Performance certificates and P.O. Copies for sychroscope and GPS are required. If any bidder they are not able to meet supply and performance qualification requirement for synchroscope, they have to provide one year additional warranty in addition to the 2 years warranty as per specification. GPS receiver with 1 No. Industrial grade EFS (with 20 to 24 ports), antenna, Display clock and necessary equipment are to be supplied in separate panel. Bidder has to configure IEDs with GPS in IEC 61850 protocol. |
| 3      | The BCPU is connected only Protection analog signals. No metering class CT and PT is connected to BCPU. Please clarify.                                    | Yes, APTRANSCO Specification holds good.  |
| 4      | The metering software will provided per station not per meter wise.  | Accepted.   |
| 5      | The under frequency can offered as part of built protection of BCPU or any protection IED please confirm.  | Numerical Under Frequency Relay Scheme with df/dt feature as part of BCPU / main protection relay is acceptable, but separate trip relay for Under frequency is   |

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|    |   | to be provided as per technical specification.  |
| 6  | MW and MVAR (HV & LV) 4-20 mA transducers are to be provided for SCADA purpose. We are going with BCU based solution with RTU and metering data is available in TVM and MFV, whether we need to offer or not please confirm.  | APTRANSCO Specification holds good.   |
| 7  | Please mention how many Test Block need to provide.   | Two Nos. Test handles / blocks per panel or 4 Nos. Test handles per substation are to be provided.  |
| 8  | All protective relays shall be provided with at least 20% of spare potential free isolated output contacts and wired to spare, The spare potential will be included as part of mentioned quantities with respect to each BCPV and IED in BOQ please confirm.  | Yes, APTRANSCO Specification holds good. However this will be finalized during detailed engineering while drawing approval.   |
| 9  | 20% spare DI, DO & AI contacts are made available in all IEDs and 20% spare contacts are made available in trip, auxiliary and other relays & equipments after meeting drawing remarks, The spare will be part of NO DI, DO and AI as mentioned required quantity in BOM for each BCPV or Protection IED please confirm.  | APTRANSCO Specification holds good.<br>Note: - all the DI & DOs are inclusive of 20% spare contacts in all IEDs. However this will be finalized during detailed engineering while drawing approval. |
| 10 | Each 220/132/33KV (YNao d11) Auto Transformer is proposed to be provided with identical Bushing Current Transformers for REF Protection (64T) in the following manner. i) 3 Nos. on H.V. bushing (one No. Per phase) - 2 sets (6 Nos.) ii) 3 Nos. on I.V. bushing (one No. per phase) - 2 sets (6 Nos.) iii) 3 Nos. on Neutral bushing (before star formation) - 2 sets (6 Nos.) The Bushing CTs are equal turns, equal knee point voltage, equal accuracy and equal ratio. The Bushing CT is not in our scope of supply please confirm | Yes, APTRANSCO Specification holds good.  |
| 11 | The control unit should be a single unit only for all the 16 / 24 bays, summation or attachment of control units will not be acceptable. The above clause is applicable to Decentralized Bus Bar only please confirm.   | Summation of CTs is not acceptable. Phase segregated busbar IEDs will be accepted as a complete busbar scheme. This will be finalised during detailed engineering while drawing approval.           |
| 12 | Inter IED Communication is required for logic unit means communication between the Bus bar IEDS i.e., signal Transmissions between R-Phase, Y-phase and B-phase IEDS only. please confirm   | Inter IED Communication between all logic and other phase wise units are to be established.   |

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| 13 | The sampling rate of analogue inputs are fixed and operating times will be as per IEC standards By changing the sampling rates operating times will be changed. | Noted. |
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**Earlier Tender clarifications:**

| SL. No. | Reference Clause  | Description  | SEL Query  | APTRANSCO Reply  |
|---------|---|--|--|--|
| 1       | Section-II(A), Instructions To Bidders<br><b>Clause 3.5 / Eligibility Criteria</b><br>(Page no. 10 of 1219) | <b>A) PHYSICAL EXPERIENCE:</b><br>The bidder should be a manufacturer who must have designed, manufactured, tested, supplied and executed to Power Utilities, at least 40% of the quoted quantity of the goods/equipment of same or higher voltage class with same or superior Class of Accuracy indicated in the "Schedule of Requirement" in one continuous period of 12 months in the last five years as on the date of opening of bid (The bidder is required to furnish the year wise supply of Material and the maximum quantity of Material supplied in one continuous period of 12 months of the last five years along with proof of supplies). The Bidder should be a manufacturer of Main protective Numerical Relay | i) We request APTRANSCO to accept to the supply of 132 kV Panels also against proof of experience.<br><br>ii) We also request APTRANSCO to accept the past supplies globally and not restricted to Indian Power Utilities only.                      | Refer QR.  |
|         |   | <b>B) PERFORMANCE</b><br>At least 20% of the similar material offered, as indicated in the 'Schedule of Requirements should be in successful operation since 2 years as on the date of opening of the Bid.   | i) We request APTRANSCO to accept the performance certificate against successful operation since one year instead of 2 years.<br>ii) We also APTRANSCO to accept the past supplies certificates Globally and not restricted to Indian Power Utility. |  |
| 2       | <b>Section-V, Schedule of Detailed Equipment for Panels</b>   |  | Control Panel with BCU(s), is also having Panels meters(Ammeters, Voltmeters, Frequency meter, MFM), BAY MIMIC on Panel, Isolator & Breaker Control switches, LED Lamps, 32-Facia Annunciator, Buzzer/Hooter etc. Kindly clarify, whether            | 1 No. Control and 1 No. Relay panel is to be provided. APTRANSCO Specification holds good. |

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|  |  |  | conventional equipment is also required along with BCU in the same Panel. If yes, whether it is mandatory to place in a single Panel. Kindly confirm |  |
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**Earlier Tender clarifications:**

| <b>S<br/>N<br/>o</b> | <b>Section / Clause<br/>No</b>               | <b>Required as per<br/>APTRANSCO<br/>tender document</b>  | <b>Clarifications /<br/>Proposed<br/>amendments</b>   | <b>APTRANSCO Reply</b> |
|----------------------|--|---|---|------------------------|
| A                    | SECTION-II(A)<br>INSTRUCTIONS<br>TO BIDDERS  | <b>Eligibility<br/>Clarification/Amendment</b>  | <b>Criteria</b>   |                        |
| 1                    | Clause No. 3.5<br>(A) Physical<br>Experience | The bidder should be a manufacturer who must have designed, manufactured, tested, supplied and executed to Power Utilities, at least 40% of the quoted quantity of the goods/equipment of same or higher voltage class with same or superior Class of Accuracy indicated in the “Schedule of Requirement” in one continuous period of 12 months in the last five years as on the date of opening of bid (The bidder is required to furnish the year wise supply of Material and the maximum quantity of Material supplied in one continuous period of 12 months of the last five years along with proof of supplies). The Bidder should be a manufacturer of Main protective Numerical Relay. | If the bidder is a subsidiary company of foreign company who is having ultimate shareholding in India Co, the supply credentials of parent Co also should be considered for qualification.<br><br>Since the quantity requirement is higher, we request to reduce the qualification requirement to 20% instead of 40%. | Refer QR.              |
| 2                    | Clause No. 3.5<br>(B) Performance            | At least 20% of the similar material offered, as indicated in the ‘Schedule of Requirements’ should be in successful operation since 2 years as on the date of opening of the Bid.  | If the bidder is a subsidiary company of foreign company who is having ultimate shareholding in India Co, the supply credentials of parent Co also should be considered for qualification.  |                        |

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|   |   | (The bidder is required to furnish evidence and certificates for the quantity of material which are in successful operation since 2 years as on the date of opening of the Bid.)  | In APTRANSCO SAS tenders, only one year performance certificate is required. Hence we request you to please change the performance requirement to one year.  |   |
|   |   | Note: The above eligibility criteria shall be fulfilled by the bidder against each lot separately for the lots the Bidder has quoted, in case of more than one lot.   | Since the quantity requirement is higher, we request to reduce the qualification requirement to 10% instead of 20%.  |   |
| 3 | Clause No. 3.5 (C) Financial Turnover   | Financial turnover during any one year of the last five years should have been equal or more than the estimated contract value. (The bidder is required to furnish the Financial Turnover of last five years).  | 1. We hereby request you to accept turnover criteria individual lot wise ECV.  | Refer QR.   |
|   |   | Reports on financial standing of the Bidder such as profit and loss statement, balance sheets and auditor's report for the past FIVE years, in support of financial turnover and Banker's certificates regarding Bank limits.   | 2. If the bidder is a subsidiary company of foreign company who is having ultimate shareholding in India Co please consider parent company turnover in case turnover requirement for total ECV.                          |   |
| 4 | Section I Notice Inviting Tenders (NIT) | The bidder shall quote all the items of all the lots of the tender, else bid will be made disqualified. However evaluation and awarding of contract will be done Lot wise. The bidder shall quote all the items of all the lots of the tender, else bid will be made disqualified. However evaluation and awarding of contract will be done Lot wise. | APTRANSCO has given Estimated Contract Value (ECV) lot wise and asking to submit Bid Security lot wise, Also APTRANSCO doing evaluation and award of contract lot wise. Hence we request to allow quoting also lot wise. | Bidders can quote for one lot or more than one lot or all the lots. |
| 5 |   | In your SAS tender, following QR for manufacturing experience in India is asked.  | For ensuring the manufacturing reliability, capability in India, we hope APTRANSCO shall   | Refer QR.   |

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|   |                                     | The bidder shall be a manufacturer, should have minimum of three year's experience in Design, Manufacture, <b>Supply</b> , Testing & commissioning of numerical protection relays, <b>BCUs for 220 kV &amp; above Substations</b> and should have experience in Design, supply, testing & commissioning of substation automation system with IEC 61850 protocol for 220 KV Substations and above <b>by integrating numerical relays, BCUs &amp; Energy Meters</b> in any SEB/ Public undertaking/ State Govt. Power utility in India. | be asking for such manufacturing experience in India.       |   |
| B | SECTION V – Technical specification | <b>Technical Clarifications.</b>  |   |   |
| 6 |                                     | In item 12, note a of section-IV, 2 nos. special tools such as ABB/Sifang/other make relay extractor per panel are to be provided. Please clarify the special tools details.  | Please Clarify Our relay doesn't require special extractor. | APTRANSCO Specification holds good. However, if special tools are required extractors are to be provided.   |
| 7 |                                     | Front opening panel with swing type door was consider in our bid documents. However, the panel should match with the existing panels in APTRANSCO substations as per item 5.1.0. Please clarify whether there is the special panel which there is an effect on the cost.  | Please Clarify  | APTRANSCO Specification holds good.   |
| 8 |                                     | Please clarify whether the LBB for HV side breaker of transformer can be built in main relay of back-up relay.  | Please Clarify  | APTRANSCO Specification holds good. LBB Feature shall be provided in both Main relays / BCPU and Busbar relay, as per site requirement, LBB feature is enabled either in Main relays / BCPU or Busbar scheme. |

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| 9  |  | As per the BOM of transformer CRP, only energy meter of LV side is required. Please clarify whether the energy meter of HV side is required or not.   | Please Clarify | In case of 220/132 kV PTR - HV and LV side (2 Nos.) TVMs & incase of 220/33 kV PTR - LV Main & Check (2 Nos.) TVMs are to be provided. |
| 10 |  | 1 Nos. BCU is included in 220kV feeder control panel, however one BCU also is mentioned in 220kV feeder relay panel as per the BOM. Please clarify whether both of BCU are required.  | Please Clarify | 1 No. BCU to meet system requirement in Control panel is to be provided.   |
| 11 |  | 16 no's separated tripping relays are required for busbar scheme. In the event of not enough space to mount these such relays in one panel, two panels are to be consider for busbar CRP per each substation. Please clarify whether this is acceptable as per the space of control room at the site. | Please Clarify | Yes, separate panel can be provided for accommodating 16 Nos. trip relays.   |
| 12 |  | Please clarify only synchroscope is required and synchronizing trolley and other accessories are not in this supply scope.  | Please Clarify | Synchroscope is required along with synchronizing trolley and other necessary accessories.   |

**Earlier Tender clarifications:**

| Sl. No. | Section/Clauses No.       | Description in Spec. | SEIL Queries / Clarification   | APTRANSCO reply                     |
|---------|---------------------------|----------------------|--|-------------------------------------|
| 1       | Sec-III/CL-13.1 AND CL-49 | Storage Insurance    | Refer Clause 53.9(C) - Transfer of ownership from supplier to APTRANSCO at destination point. So storage insurance for 45days can't be arranged by supplier once ownership is transferred. Hence request to remove the storage Insurance clause. | APTRANSCO Specification holds good. |

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| 2 | Sec-III/CL-53.7 | In the event of any correction of defects or replacement of defective material during the warranty period, the warranty for the corrected/replaced material will be extended to a further period of 18 months. | SEIL agreeable to provide warrantee for 24 month from the date of supply of panels. However warranty shall not be applicable in case of ;<br>a. unauthorized modifications, repairs,<br>b. unauthorized connection with third party equipment,<br>c. natural wear and tear,<br>d. use of software on hardware for which it was not licensed<br>e. the repaired/replaced material/Spare will cover under warrantee as per above warrantee period. Any extra warrantee will not be provided for the same as it will lead to ever green warranty. Hence we request you to please amend the clause accordingly. | APTRANSCO Specification holds good.  |
| 3 | Sec-III/CL-60   | Penalty for delay in supplies  | SEIL is agreeable to accept the penalty clause for the reasons attributable to SEIL only.   | APTRANSCO Specification holds good.  |
| 4 | Section-IV      | Schedule Requirements of   | Need Lot wise or Substation wise breakup of quantities (approx.). Also details of existing panels to be dismantled are required.  | The tentative Substation wise break up is annexed (Annexure-II).   |
| 5 | Section-IV      | Schedule of requirements - "Supply and erection within five months "   | TRANSCO to clarify the approximate duration for commissioning of panels which is not mentioned in the schedule. We request you to please cap the same at 6months from the date of supply of panels. In case the commissioning is not carried our due to reasons not attributable to SEIL,   | Accepted, for reasons which are not attributable to the bidder, if there is any delay in erection and commissioning, APTRANSCO will release the last 20% payment within 6 months and 10% payment within 8 months from the date of receipt of materials at site / Stores. |

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|    |   |  | we request you to please release the balance payment.   |   |
| 6  | Technical spec clause                                 | LBB Protection   | Please clarify if separate Numeric LBB relay to be provided (or) inbuilt of any Numeric IED is acceptable to TRANSCO.   | APTRANSCO Specification holds good. LBB Feature shall be provided in both Main relays / BCPUs and Busbar relay, as per site requirement, LBB feature is enabled either in Main relays / BCPUs or Busbar scheme. |
| 7  | Technical spec clause                                 | 220Kv Protection Busbar                                | Please clarify BB protection is required for 16bays (or) 24bays. Also please clarify if it is centralized (or) distributed type.                                | 28 Nos. of 16 Bays and 2 Nos. of 24 Bays, 220kV centralized (or) distributed type Bus Bar Protection Panel are to be provided.  |
| 8  | Technical spec clause /Schedule of detailed equipment | Digital MFM meter                                      | Since MFM meter can be supplied with Modbus communication for SCADA connectivity, separate transducers for SCADA interface may not be required. Please confirm. | APTRANSCO Specification holds good.   |
| 9  | Clause 5.0  | Control & Relay Panel                                  | Kindly confirm the Type of Panel whether Simplex or Swing type along with Dimensions.   | APTRANSCO Specification holds good.   |
| 10 | Metering Software                                     | Scope Clarification for metering software.             | Kindly confirm if meeting software has been provided on SS basis (i.e one per SS) or one per panel.   | one Metering software per Substation is acceptable.   |
| 11 | Transformer Protection Panels                         | Two Winding or Three Winding Trafo. Differential relay | Kindly confirm if the differential relay to be considered for transformer shall be 2 winding or 3 winding.  | 2 winding differential relay and 3 element high impedance REF relay are to be provided. (both relay are of phase segregated only)   |
| 12 | Feeder Protection Panels                              | Make of Main 2 relay                                   | We request you to please furnish the approved make of relays for Main 2 relays.   | Any make relay which will meet APTRANSCO QR and specification.  |
| 13 | Clause 18   | Quantity to quote                                      | Kindly clarify if multiple vendors will be awarded LOI/ Contract for a Lot 1, 2 & 4. (Except Lot 3).  | APTRANSCO Specification holds good.   |

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| 14 | Clause 35     | Purchaser's Right to vary Quantities at the time of Award | We request you to please vary the quantities by +/- 20% only instead of +/- 50% as the qty in the tender are very huge and will have significant impact on prices. | APTRANSCO Specification holds good.  |
| 15 | DI/DO Points  | DI/DO Points for IED and BCU including spares.            | Kindly clarify the maximum no. of DI/DO points to be considered for IED and BCU and clarify no. of spares points to be considered.                                 | APTRANSCO Specification holds good.  |
| 16 | Make of TTB's | DAV/Nelster make TTB is not acceptable                    | We request you to please other approved makes of TTB as DAV/Nelster make is not acceptable.  | Alstom (GE T&D) / ABB / equivalent as per APTRANSCO requirement and specification. |

**Earlier Tender clarifications:**

| S NO | PACKAGE              | SPEC CLAUSE   | GE QUERIES   | APTRANSCO REPLIES   |
|------|----------------------|---|--|---|
| 1    | Transformer          | with 24 DI & 32 DO (Minimum) 20 to 24 BI/DI Minimum & 16 to 24 BO/DO Minimum and both Total BI & BO shall have minimum 40 Nos   | Our understanding is we shall supply relay with total IO's 40 nos which includes BI and BO, pl clarify                     | 20 to 24 BI/DI Minimum & 16 to 24 BO/DO Minimum and both Total BI & BO shall have minimum 40 Nos                                      |
| 2    | Transformer / Feeder | Control Panel: WXDXH = 800 to 1000mm x 800mm x 2250mm   | We shall offer width also 1000mm, since this conventional cum SAS panel, pl confirm Panel dimension - 1000*1000*2200 mm    | Control Panel dimension - 1000*800*2200 mm and Relay Panel dimension - 1000*800*2200 mm is acceptable. However                        |
| 3    | Transformer / Feeder | Relay Panel: WXDXH = 800mm x 800mm x 2250mm   | We shall offer width & DEPTH 1000mm, since this conventional cum SAS panel, pl confirm Panel dimension - 1000*1000*2200 mm | this will be finalised during detailed engineering while drawing approval as per site requirement and suitability.                    |
| 4    | Transformer          | Electronic Trivector meter of 0.2S class accuracy for both export and import of MWH & MVARH and ABT features to be provided on LV side of PTR; with TTB suitable for above. CT ratio: 500/1A, PT ratio: 132kV Root 3/110V/Root 3. – TVM – LV. | TVM to be offered only for LV side, pl clarify   | In case of 220/132 kV PTR - HV TVM & LV TVM (2 Nos.) and in case of 220/33 kV PTR - LV Main & Check TVMs (2 Nos.) are to be provided. |

|   |         |   |  |  |
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| 5 | General | In the opinion of the purchaser in case it is undesirable to depend on one supplier, quantity may be distributed among two or more suppliers adopting the same price. | Pl clarify the % of offering to various bidders in view of L1/L2/L3  | As per APTRANSCO purchase manual. (refer Annexure-I)   |
|   | General | The purchaser reserves the right to vary the ordered quantity by $\pm 50\%$ during the execution of the contract.   | This shall be offered only during the contract period, pl clarify  | Yes, during execution of the contract.   |
|   | General | BCU FOR FEEDER  | BCU for feeder is required as per spec in Relay panel as well as Control panel. Pl clarify, only one BCU per line feeder is required by APTRANSCO                                | One BCU for one feeder, either in control or relay panel is to be provided.  |
|   | General | PERPLEX GLASS DOOR AND MIMIC  | Either of the two is only possible, since BCU has inbuilt mimic, we propose we don't provide mimic. Pl clarify   | Mimic without semaphore is to be provided.   |
|   | BUSBAR  | BUSBAR -CENTRALISED - 16 BAYS   | Pl clarify if the offered busbar shall be centralized or decentralized architecture  | Either centralized or decentralized busbar schemes can be provided.  |
|   | BUSBAR  | BUSBAR -CENTRALISED - 16 BAYS   | End zone protection requirement, pl clarify  | End zone protection has to be provided.  |
|   | BUSBAR  | BUSBAR -CENTRALISED - 16 BAYS   | Existing busbar to be replaced, pl clarify the type of existing busbar High Imp or Low Impedance   | Existing busbar has to be replaced.  |
|   | BUSBAR  | BUSBAR -CENTRALISED - 16 BAYS   | If contacts are to be multiplied from existing CRP, pl clarify if CMR relays to be provided for Breaker and Isolators. (1 Bkr and 2 Iso), we assume all are 2 bus system.        | as above.  |
|   | BUSBAR  | BUSBAR -CENTRALISED - 16 BAYS   | For busbar the requirement of zone is multi zone, pl clarify the total number of zones required by APTRANSCO or the bus configuration of stations where busbar is to be offered. | All schemes are of two bus system only.  |
|   | General | GPS   | GPS to be supplied loose or mounted in panel, pl clarify   | Clarified.   |
|   | General | GPS   | If GPS is supplied loose, do bidder need to mount the same in purchase supplied panel at site.   | Clarified.   |
|   | General | Total number of stores location   | Pl clarify the number of stores location in Andhra Pradesh   | The new panels will be directly supplied to SS as per site requirement, only in exceptional cases they will be allotted to stores. |