



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADJCJ3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

for

Manufacturing, testing & supply of Type-tested, 33 KV, 1250 Amp. Outdoor type

VCB with CT, PT & CRP

Quantity: 201 Sets

Due date of NIT 19.06.2026 at 18.00 hrs.

Date/ time for download of bids documents	Date/time for receipt of bids
From 05.06.2026 at 13:00 hrs. to 18.06.2026 upto 18.00 hrs.	From 05.06.2026 at 13:00 hrs. to 18.06.2026 upto 18.00 hrs.
Online EMD submission 18.06.2026 upto 18.00 hrs.	

Price of tender document:

Rs. 11800/- (10,000 + 18% GST)

FIRM price



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General Terms and Conditions for Submission of Tender for Supply of Materials

1. e-tenders are invited from reputed and experienced manufacturers/ authorized supplier only having adequate manufacturing & testing capacity, best facilities and capability only for supply of **Manufacturing, testing & supply of Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP** as per specifications attached at Annexure 'B'. Offers of manufacturers/ authorized supplier who have no past experience and adequate manufacturing capacity of the tendered item may not be considered valid and may be rejected. **Purchase preference will be given to manufacturing unit of Jharkhand State as per Jharkhand Purchase Policy, 2014 and its amendment.**

Note: -

- (i) **MSEs unit of Jharkhand must fulfill the criteria of clause no. 3 of Jharkhand Procurement Policy 2014 & its subsequent amendment to avail exemption of tender fee. EMD, Security amount. Past performance etc. or other benefit mentioned as mentioned in the JPP 2014.**
- (ii) **Purchase preference will be given to MSEs unit of Jharkhand owned by the scheduled caste or the scheduled tribe entrepreneurs as per provision in clause no. 5 of Jharkhand Procurement Policy 2014. So bidder who belong to this category must upload the relevant document issued from competent authority to claim their eligibility under this category.**
- (iii) **Manufacturer/Authorized supplier of tender item can participate. However, Supplier will have to submit Notarized authorization certificate issued from manufacturer (OEM) on stamp paper of Rs. 100/- or more for tender item and should be valid on due date of NIT.**

2. **Quantity :** 201 Sets

The quantity indicated is tentative and purchaser reserves the right to change the quantities to the any extent for award of order/Purchase Order, as may be necessary, based on Purchaser's judgment/requirement. No correspondence shall be entertained into, neither discussed regarding change in quantity, nor any reason will be assigned thereof.

3. The online Tender should be submitted in the prescribed enclosed proforma only in two parts i.e. (Technical & Commercial Part) and (Price Part) in two separate folders.
4. Both parts of the tenders will be submitted upto 18.00 hrs on 18.06.2026 **in the website Jharkhand tenders.gov.in** and the Part – I will be opened on 19.06.2026 at 18.00 hrs. The undersigned may extend the due date of opening of Part – I with intimation to all tenderers. Price part should only be uploaded in price part-II folder only (excel sheet) and not in tender performa for part-II (Price bid) failing which offer shall be rejected.

The Price Part (Part-II) of those tenderers whose offers are found technically and commercially acceptable will be opened later on.

5. No offers/ tenders will be accepted after due date and time.
The desirous tenderers can download tender documents including terms and conditions, BoQ and technical specification from website of jharkhandtenders.gov.in. Online Payment of tender documents **Rs. 11800/- (10,000 + 18% GST)** only (non-refundable) must be made **upto 18:00 hrs. on 18.06.2026**. If tender fee not submitted by bidder on above mentioned due date and time then tender will not be considered.

MSEs unit of Jharkhand only are exempted from submission of tender fee as per condition mentioned at clause no. 3 of Jharkhand Procurement Policy 2014 & its amendment

6. **Deposit of Earnest Money:** -

- a) Tender must be accompanied with an earnest money for **Rs. 35.84 Lacs**. Only of their offer unless exempted from such deposit, failing which the offer will be out rightly rejected.
- b) The earnest money should be submitted online valid for **180 days** from date of opening of tender with claim period of another three months, (subject to further extension if required).
- c) Online payment against EMD value must be made **upto 18:00 hrs. on 18.06.2026**.

- d) Earnest money deposited by firms against any other tender of the NIGAM/ or of this office will not be considered as earnest money for the present tender under any circumstances.
- e) No earnest money will be accepted after opening of the tender.
- f) No interest on the earnest money deposited by the tenderer will be payable by the purchaser.
- g) **MSEs unit of Jharkhand only are exempted from submission of EMD as per condition mentioned at clause no. 3 of Jharkhand Procurement Policy 2014 & its amendment.**

7. **Exemption:**

The tenderers of following categories are exempted from deposit of earnest money subject to the conditions laid down below: -

- a) The State Govt./ Govt. of India undertaking.
- b) Firms registered with NSIC under single point registration scheme for manufacture of the item, provided that certificate is valid on the date of tender and during the period of delivery. The monetary limit should be more than **Rs. 17.92 Cr.** as mentioned in the NSIC certificates, failing which the exemption will not be applicable & offer will be rejected.
- c) The earnest money will be liable to be forfeited on revocation of tender before the validity of the quotations expires or on refusal to enter into a contract after the award (LoI/PO) is made to the tenderer.
- d) **MSEs unit of Jharkhand**, registered with Department of Industries, Govt of Jharkhand / Industrial Area Development Authority, Govt of Jharkhand, for manufacture/supply of tendered item, valid on the due date of tender and during the period of contract. **MSEs unit of Jharkhand** must submit notarized valid copy of **MSEs** registration certificate for tendered item, issued from department of Industries/ Industrial Area Development Authority, Govt of Jharkhand, failing which, they will not be considered **MSEs** unit.

The tender in such cases should be accompanied with notarized copy of the valid registration certificate, failing which tender shall be rejected.

NOTE:-

- i) Aforementioned certificate must accompany with documentary evidence for its validity on the due date of the tender, failing which tenders will be rejected. As the documents mentioned herein above must be valid during the period of supply/ delivery also. Copy of the same shall be produced at the time of submission of bill for payment.
- ii) **All kind of exemption and procurement preferences will be given to MSEs unit of Jharkhand subject to fulfillment of provisions & conditions laid down in Jharkhand Procurement Policy 2014 & its subsequent amendment**
- iii) **All amendment in Jharkhand Procurement Policy 2014 will be applicable in this NIT.**
- iv) **Tender fee and EMD will be received through online mode only. Bidders can use internet banking facility for faster processing of tender fee and EMD.**

Alternatively, bidders can use NEFT/RTGs challan generated for the tender from jharkhandtenders.gov.in portal and upload payment evidence/ details along with bid documents.

Refund will only be issued to the originated bank account used for the payment of tender fee and EMD. So, bidders are advised NOT to close Bank Account used for online payment/ (NEFT/ RTGS) of tender fee and EMD.

No Hard copy/ physical copy is required to be submitted for tender opening/ evaluation. However, department may ask original documents for verification before award of contract.

8. **Security Deposit and Contract Agreement:**

The successful tenderers shall have to deposit security money @ 2% of the ordered value (0.2 % for MSE unit of Jharkhand Only) valid till guarantee period at the time of executing the contract agreement. However, the **MSEs** units of Jharkhand having permanent valid registration with Department of Industries /Industrial Area Development Authority (IADA) Govt. of Jharkhand for the manufacture of the item will be required to **deposit security money** of the ordered value as per Jharkhand Purchase Policy"2014. In no case, exemption from security money will be granted. Security money to be deposited may be adjusted from the earnest money deposited in shape of Bank Draft only, if any.

The amount of security money deposited to Sr. Manager JBVNL, Ranchi in cash or in shape of Bank Draft/ Bank Guarantee (of any **Nationalized Bank/ Schedule Bank**) will be treated as a performance guarantee. The security money thus deposited will be released after completion of satisfactory supply of full ordered quantity of materials, expiry of guarantee period. Payment will be made only after depositing the security money and execution of contract agreement.

9.

Annual turnover:

(i) **Bidder who Participate as Manufacturer of tender item:** - Minimum Average Annual turnover (MAAT) of the firm for preceding three financial years must be at least **Rs. 5.37 Cr.** in related activities. Certified / Attested copy of annual A/C (Balance sheet, profit & loss A/c etc) from practicing chartered Accountant with **UDIN number** both for financial year **2022-23, 2023-24 & 2024-25** must be submitted along with the offer to establish financial credibility of the bidders. In absence of the above credentials, offer may be rejected.

However, relaxation shall be given to MSE Unit of Jharkhand only against above clause as per provision of Jharkhand Procurement Policy – 2014.

(ii) **Bidder who Participate as Authorized supplier of tender item:-** Minimum Average Annual turnover (MAAT) of the Manufacturer (who gives authorization to supplier) for preceding three financial years must be at least **Rs. 5.37 Cr.** in related activities. Certified / Attested copy of annual A/C (Balance sheet, profit & loss A/c etc) from practicing chartered Accountant with **UDIN number** both for financial year **2022-23, 2023-24 & 2024-25** must be submitted along with the offer to establish financial credibility of the bidders. In absence of the above credentials, offer may be rejected.

In Addition to above Minimum Average Annual turnover (MAAT) of the authorized supplier, for preceding three financial years must be at least **Rs. 1.80 Cr.** in related activities. Certified /Attested copy of annual A/C (Balance sheet, profit & loss A/c etc) from practicing Accountant with **UDIN number** both for financial year **2022-23, 2023-24 & 2024-25** must be submitted along with the offer to establish financial credibility of the supplier. However, MSES units of Jharkhand are exempted from Minimum Average Annual turnover (MAAT) limit of **Rs. 1.80 Cr.** subject to condition of Jharkhand Procurement Policy – 2014.

10.

Delivery:

The materials are to be delivered as mentioned in the delivery schedule i.e. annexure – ‘H’ separately. Early delivery may be preferred. The proforma of schedule of delivery is enclosed with the tender. Tenderers shall fill up the proforma giving a clear schedule of month-wise delivery. The commencement of delivery period shall be reckoned from the date of issue of PO.

Transit damages/ shortages/ losses shall be reported by the consignees within 30 days from the receipt of the consignments. Such damages/shortages/losses shall be repaired/ replaced by the suppliers, free of cost within 03(three) month from the date of intimation by the consignee without awaiting for his settlement from carrier or Insurance Purchaser etc. If the supplier fails to do so the consignee(s) shall be free to get the repair work done from other sources and they shall be free to recover the cost of such material/ expenses of repairs either from the supplier’s balance bills or from the security deposit as deemed fit. Also offer of such bidder may be rejected in this tender or future tender of JBVNL.

11.

Penalty / Liquidated damage:

Delayed delivery of goods will be guaranteed under liquidated damage clause. Our usual terms of **Liquidated damage** clause is ½% (Half percent) of the value of the materials delayed per fortnightly or part thereof subject to maximum 10% (Ten percent).

Manufacturing, testing & supply of Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP will be deemed to have been delivered only when all its component parts are also delivered in stores of JBVNL. If certain components are not delivered in time the equipment/item will be considered as delayed till such time as the missing parts are delivered.

If supplier fails to deliver the material within the period of maximum penalty of 10% , then JBVNL may take decision to end contract or short close the P.O. In this case submitted BG may be forfeited and firm may be debarred in JBVNL for period of 03(three year). JBVNL will go for risk purchased and extra liability occur shall be paid by the supplier.

12.

Price:

Rate in figures and in words must be quoted in the enclosed proforma of price part on ‘**FIRM PRICE**’, subject to any statutory change in due course of time, indicating therein Ex-factory price, freight element up to destination, input tax credit under section -171 of CGST/SGST act or scheme to be retained by the supplier.

As per section 171 of CGST act 2017, any reduction in rate on any supply of Goods or services or the benefits of input tax credit shall be passed on to the receipt by ways of commensurate reduction in prices. Hence supplier/manufacturer to ensure to pass the benefit of reduced prices JBVNL. Further price quoted by supplier/manufacturer is subject to scrutiny under above section”.

Freight element will include **loading, unloading, packing and forwarding complete**. If any other taxes are levied or reduced by the Govt. the same will be added or subtracted respectively to the landed cost for evaluation of the tender.

If Ex-works, Freight & GST are not quoted separately in respective column or proof of exemption of the same is not given separately, the quoted landed price of the bidder may be treated invalid and accordingly offer may not be considered for further tender evaluation. If Freight is not quoted separately in respective column, then quoted Ex-works may be treated inclusive of freight.

Arithmetical errors will be rectified on the following basis: If there is discrepancy between unit price and the total price i.e obtained by multiplying the unit price and quantity, the unit price shall prevail and total price shall be corrected. If the bidder does not accept the correction of errors, his bid will be rejected & EMD will be forfeited. If there is a discrepancy between words and figures, the amount in words shall prevail.

13. **Insurance:**

The rates are F.O.R destination basis and it is the responsibility of the firm to deliver the goods/materials in sound condition FOR destination and for that purpose firm may at their option insure the materials against all risk at own cost during transit for full delivered value of the material up to the destination. All works in connection with making and setting of claim if any shall be carried out by firm for which no extra payment shall be made by purchaser.

Any other charges & documentation related with claim of insurance shall be arranged by bidder itself.

14. **Import Licence:**

Import license cannot be arranged by the Nigam for such of these materials, which are under banned category of import. When import is desired to be effected by the tenderers under their own quota license, the value of quota specifically available against the tender should be stated. In case of availability of suitable indigenous make materials the same may be preferred.

15. **Tests:**

All routine tests will have to be conducted on the materials in case order is placed according to relevant standard and test certificate in triplicate will have to be furnished prior to supply of materials. Each lots of the materials shall be subjected to the test prescribed in the relevant standard (latest edition) before supply is affected. Untested material will not be accepted.

16. **Inspection**

- (i) The materials may be inspected by the Nigam's representative / 3rd party or both during the process of manufacturing and prior to dispatch. The suppliers are requested to intimate the progress of manufacturing and testing at least 15 days in advance to Chief Engineer (S&P), JBVNL, Ranchi to enable them to depute an officer or an authorized representative for inspection. Failure to adhere to the specification will entail rejection of materials. All tests and inspection shall be made at the place of manufacture unless otherwise specially 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 material is being furnished in accordance with the specification. The materials cleared for dispatch after approval of inspection report should be dispatched/ delivered immediately to different consignees.
- (ii) The purchaser has the right to have the tests carried out at his own cost by an independent agency whenever there is a dispute regarding the quality of supply.
- (iii) During the pre-dispatch inspection the firm shall have to produce original copy of calibration certificate of testing equipments (not more than one year old)/ type test report/ BIS license/ NSIC, DGS&D or SSI registration certificate to the inspecting officer for verification. If there is any discrepancies found during verification the materials may not be accepted.
- (iv) The pre-dispatch inspection & testing is mandatory unless an order for waiver of the same is given by the competent authority.
- (v) Stage inspection may be carried out in more than one or two phases or up to the satisfaction of purchaser
- (vi) The manufacturer shall offer the inspector representing the purchaser all reasonable facilities without charges to satisfy him that the material is being furnished in accordance with the specification. The materials cleared for dispatch after approval of inspection report should be delivered **within 20 (twenty) days** to different consignees failing which inspection may be cancelled and accordingly re-inspection should be done at firm's own cost

- (vii) During the pre-dispatch inspection the firm shall have to produce original copy of calibration certificate of testing equipments (not more than one year old)/ type test report/ BIS license/ NSIC or SSI registration certificate to the inspecting officer for verification. If there is any discrepancies found during verification the materials may not be accepted. These documents should be authenticated by inspecting officer at the time of inspection and forwarded to accounts with bills of each lot.
- (viii) The pre-dispatch inspection & testing is mandatory unless an order for waiver of the same is given by the competent authority. These documents should be attested by inspecting officer at the time of inspection & forwarded to accounts with bills of each lot.

17. **Forfeiture of Earnest Money & Bid Security Money Deposit:**

It should be clearly understood that in the event of the tenderers failing to accept and execute the detailed orders (LoI/PO), if it is placed within the validity period of the offer, then the full amount of earnest money and security deposit will be forfeited and the Nigam's decision in this respect will be final and binding on the tenderer. Earnest money of those tenderers will be forfeited who are found indulging in changing/adding or deleting the conditions of the "downloaded tender document".

Earnest money of those tenderers will be forfeited who are found to form cartel.

The forfeiture of earnest money and security money shall not in any way affect, limit or extinguish any remedy or relief to which above authority may at any time be lawfully entitled.

The bid security may also be forfeited:

- a) If the Bidder:
- i) Withdraws its bid during the period of bid validity specified by the bidder in the bid form, or
 - b) In the case of a successful bidder, if the bidder fails:
 - i) to execute the contract agreement, or
 - ii) to furnish the required performance security.

Notwithstanding the above clause, the purchaser may solicit the Bidder's consent to an extension of the period of Bid validity. The request and the responses thereto shall be made in writing by Fax/e-mail.

18. **Guaranteed Particulars:**

The performance particulars as required in the specifications should be sent along with the tender, other details not specified may also be given.

19. **Manufacturing Capacity:**

The tenderer must have sufficient manufacturing capacity to meet the delivery schedule. The bidder should also be financially sound to manufacture the tendered item within scheduled time.

In support of above capacity the tenderer must produce documentary evidence Viz Annual Accounts / Bankers Solvency certificate (Not more than 01 year old) etc.

20. **Past Performance:**

i) **Bidders (who participate as manufacturer of tender item)** must submit detailed list of executed purchase orders along with their copies for the same item or similar item (**Not in lower size/ capacity**) and capacity clearly indicating PO # and date with name of material and its quantity & value and also submit name and address of the ordering authority issued in at least any two of the last 3 (three) years from the due date of tender, failing which the offer may be rejected. The bidder should also submit performance certificate if any, indicating period of supply, quantity and value for the tendered item issued during the above period with the offer. Purchase order of only Govt. Utility/DISCOMs shall be considered.

However, material supplied of same or similar item in JBVNL (Jharkhand Bijali Vitran Nigam Ltd.) by bidder through EPC /turnkey contractor may also be considered. Bidder must have supplied following quantity of respective item in any two of last three years from due date of NIT:

Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP or similar item – 60 Set (Not in lower size/ capacity)

However, relaxation shall be given to MSE Unit of Jharkhand only against above clause as per provision of Jharkhand Procurement Policy – 2014.

Note:- If any terms or price are hidden by bidder in uploaded copy of Purchase order , then it will be considered tampered documents and offer of the bidder may be rejected.

ii) Bidder who Participate as Authorized supplier of tender item:- Authorized supplier must submit detailed list of executed purchase orders by manufactures who gives authorization along with their copies for the same or similar item **(Not in lower size/ capacity)** and capacity clearly indicating PO # and date with name of material and its quantity & value and also submit name and address of the ordering authority issued in at least any two of the last 3 (three) years from the due date of tender, failing which the offer may be rejected. The bidder should also submit performance certificate if any, indicating period of supply, quantity and value for the tendered item issued during the above period with the offer. Purchase order of only Govt. Utility/DISCOMs shall be considered. However, material supplied of same or similar item **(Not in lower size/ capacity)** in JBVNL (Jharkhand Bijali Vitran Nigam Ltd.) by bidder through EPC /turnkey contractor may also be considered. Manufacturer must have supplied following quantity of respective item in any two of last three years from due date of NIT:-

Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP or similar item – 60 Set (Not in lower size/ capacity)

In addition to above, supplier must submit detailed list of executed purchase orders along with their copies for the same or similar item **(Not in lower size/ capacity)** and capacity clearly indicating PO # and date with name of material and its quantity & value and also submit name and address of the ordering authority issued in at least any two of the last 3 (three) years from the due date of tender, failing which the offer may be rejected. Purchase order of only Govt. Utility/DISCOMs shall be considered. However, material supplied of same or similar item **(Not in lower size/ capacity)** in JBVNL (Jharkhand Bijali Vitran Nigam Ltd.) by bidder through EPC /turnkey contractor may also be considered. Supplier must have supplied following quantity of respective item in any two of last three years from due date of NIT:

Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP or similar item – 20 Set (Not in lower size/ capacity)

(The Supplier having registration of MSE Unit of Jharkhand shall be exempted from past experience for supply of **20 Set** subject to condition of Jharkhand Procurement Policy – 2014)

iii) Offers of those firms (including MSME Unit of Jharkhand) who have not completed full ordered quantity against previous Purchase Orders of JBVNL for any item issued as on date of opening of price bid against this NIT, may not be considered as valid and their offer may be rejected. On placement of purchase order, Bidder has to complete the order, failing which the bidder may not be eligible to participate in future tenders. Past performance of the materials supplied by a bidder in JBVNL may be taken in to account while finalizing this tender and if performance is not found satisfactory their offer may be rejected.

21. **Deviation from Specification:**

If there are some deviations, then it must be mentioned in the schedule of deviations from specification sheet annexed separately. In case of not mentioning deviations in the deviation sheet and just mentioning it at any other place of the offer except in the tender proforma for part-I (Techno commercial part) will be treated as no deviations.

22. **Income Tax:**

Self-declaration certificate with a declaration separately that nothing is due to Income Tax Department & payment of Income Tax is up to date should be enclosed with the offer.

23. **Taxes and Landed Unit Rate Evaluation Process:**

- (i) The bidders must quote GST amount if applicable on closing date of tender in price part II at the time of submission of the offer. In case the bidder quote absurd rate of GST then applicable rate of GST on closing date of tender will be taken into account for evaluation of the tender. The evaluation of **L-1 bidder shall be made on the landed unit rate (ie FoR destination basis), which is inclusive of the ex-works price, freight, applicable GST etc.**

Note:- There is provision in Jharkhand Procurement Policy 2014 and its amendments for MSME unit of Jharkhand which is as below:

“While preparing comparative price statement for evaluation of tender paper, the VAT/SGST payable in Jharkhand state shall not be included in the quoted price or selling price. However, any tax payable outside Jharkhand shall be added to the quoted price and selling price for such price comparison”.

(ii) GST shall be paid at the rate quoted by the bidder in the price part-II submitted with the offer against the NIT subject to **statutory variation** (in case of both, increase or decrease) imposed by the Government but any increase in taxes and / or duties because of the increase in the bidders annual-turn-over etc, for which the firm is functionary, would be borne by the firm.

No upward variation shall be payable beyond the contractual delivery schedule. In case supply against the contract is completed late and rate of GST undergoes upward revision, the payment will be continued on the basis of rates prevailing during the contractual schedule.

24. **Progress Report:**

The suppliers will have to submit monthly/ fortnightly progress report regularly until completion of delivery, to the Chief Engineer (S&P), JBVNL Ranchi by the first week of every month following the month in which order is placed to monitor the progress made by the supplier towards proper execution of the order.

25. **Terms of Payment:**

- a) 100% payment will be made by Sr. Manager, JBVNL, Headquarter, Ranchi on submission of 5% Bank Guarantee(0.5% for MSE unit of Jharkhand only) from any Nationalized/Scheduled Bank of ordered value on non-judicial stamp Rs. 100/- (Rupees hundred) only valid for Guarantee period and on receipt of SRV duly signed by the concerned consignee after receipt of the materials in good condition along with approved routine test certificate and duly filled check list for payment from Stores & Purchase wing.
- b) If the Bank Guarantee of any Nationalized/Scheduled Bank is not furnished, payment will be made after deducting 5% of the total order value from the first or consecutive bills after receipt of the materials in good condition along with approved routine test certificate and duly filled check list for payment from Stores & Purchase wing. However, the MSEs unit of Jharkhand having permanent registration will have to deposit Bank Guarantee as per Jharkhand Procurement policy'2014. The 5% BG / equivalent deducted amount as above will be kept back as performance guarantee and will be released after successful completion of guarantee period.

For the above modes of payment ¼ % (Quarter percent) rebate will be deducted from the ex-factory price of the materials. However, GST part will be paid only as per prevailing GST rule. The 5% amount / B.G. will be paid after expiry of Guarantee period.

26. **Validity Period:**

Tenderer should specify the validity period of their offer which should not be less than **180** (One Hundred Eighty) days from the date of opening of tender. The offers with lesser validity period may be out- rightly rejected. However, before finalization of NIT and if required, validity of offer may be extended if agreed mutually.

27. **Raw Materials:**

No raw materials will be arranged by the NIGAM. Tenderers will have to arrange their requirements of raw materials themselves.

The Purchase reserves the right to inspect the raw material procured by the supplier for the purpose of manufacture of materials to check the genuineness of the raw materials. The purchase or his representative can demand the original invoices in respect of all the raw materials.

28. **Quantity:**

The requirement mentioned in the tender and general conditions is tentative and is subject to increase or decrease at the time of finalization of the tender. **The tenderer must quote 100% of the tendered quantity.** Tenders with lesser quantity will not be entertained.

29. In case the order is placed, the firm will have to dispatch the materials in the name of the consignee only and "self booking" will not be accepted.

30. **Litigation History**

- i). The bidder (Manufacturer/Authorized Supplier including OEM who gives authorization) should provide detailed information on any litigation or arbitration arising out of contracts completed or under execution by it over the last five years. A consistent history of awards involving litigation against the Bidder may result in rejection of Bid.
- ii). Not with standing anything stated hereinabove, the Employer reserves the right to assess the capacity and capability of the bidder, should the circumstances warrant such assessment in an overall interest of the Employer. The Employer reserves the right to waive minor deviations if they do not materially affect the capability of the Bidder to perform the contract.

- iii) Notarized affidavit in the stamp of Rs. 100 (one hundred) only will be submitted by the bidder along with the tender that.
- The bidder (Manufacturer/Authorized Supplier including OEM who gives authorization) has not been blacklisted by any State Govt./Central Govt./ Govt. undertaking/Power utilities/DISCOM in India as on the date of tender.
 - Its agreement/work order has not been terminated on account of performance in past three years by any State Govt./Central Govt./ Govt. undertaking in India as on the date of tender.
 - The bidder has not been debarred by JBVNL and its subsidiary companies and other PSU/Govt. undertaking/power utilities/DISCOM as on the date of tender.
 - The bidder has not been listed in RBI Defaulter List.
- iv) Bidder (Manufacturer/Authorized Supplier including OEM who gives authorization) who is found blacklisted/debarred or its agreement/work order terminated by any State Govt./Central Govt./ Govt. undertaking/Power utilities/DISCOM in India or in JBVNL, JUVNL and its subsidiary companies will not be eligible for participating in the bid or placement of purchase order.
In case of false declaration, the earnest money deposited by the bidder will be forfeited and bid may be rejected/ LOA (work order) may be cancelled.
- v) Declaration will be submitted by the firm that all the information related to technical, commercial, financial and other matter mentioned in the bid and relevant paper/ documents submitted in this regard are true and correct. In case of false documents/ declaration by the firm, earnest money deposited / bank guarantee submitted by the bidder will be forfeited and bid may be rejected / LOA (work order)/PO may be cancelled.
- vi) Declaration regarding no blood relation or no close family or no proxies is participation in the bid including all Joint venture partners with employee of JBVNL, JUVNL and its subsidiary companies as per Office order of secretary, JSEB no. 686 dated 26.05.2011.

31. **Contract Form:**

The successful tenderers will have to execute contract agreement in the NIGAM's proforma after the placement of the purchase order. The contract agreement is to be executed on Rs. 200.00 non-judicial stamp paper.

32. **Extension/repeat Order:**

The Purchaser reserves the right to place an extension/repeat order for any additional quantity to the extent of **50%** quantity of the tender quantity on the same rates, terms and conditions. In such event of an extension/repeat order being placed on the tenderer, then tenderer will have to give their concurrence that their firm is willing to accept additional order on the same terms and conditions if the extension/repeat order is placed by Nigam within **12 (twelve)** month from the date of placement of order. Bidder should submit an undertaking that they will supply additional quantity, if required by Nigam on same rate, terms and conditions, if extension/repeat order is placed within 12 month from the date of placement of order.

33. **Tolerance of Electrical Performance:**

Tolerance shall be according to relevant I.S.S. unless & otherwise stated in technical specification.

34. **Packing:**

Materials shall be delivered with suitable packing. Although method of packing is left to the discretion of the manufacturer it should be robust enough for rough handling that occasioned during transportation by Rail/ Road. Further it is to clarify here that all the charges towards packing, forwarding, loading and unloading etc shall be borne by the supplier.

35. **Drawing & design of item:**

Drawing and design of item offered should accompany the tender. Tenderer must furnish complete design details, dimensional details & drawing indicating the internal arrangement in addition to a drawing indicating outside dimensions and method of fixation of fittings etc. The tenderer shall submit design details supported by type test report of the manufactured item. The NIGAM reserves the right to reject the tenders if design parameters are considered qualitatively inferior or prefer, the tenders whose design parameters are qualitatively considered better. However, due opportunity will be given to bidders before taking decision in this regard.

36. **Type Test Certificate:**

- i) Tenderers must submit attested/ certified copy of complete volume of type test certificates as per relevant ISS issued from CPRI / ERDA, Vadodara / National Test House Govt. of India, only for the tendered item, failing which the tender shall be rejected. The copy of test certificates must contain approved drawings, test report no & date, name of test, name of material, rating, transformer serial no etc. The Test report submitted shall not be more than Five (05) years old as on the date of bid opening. Provisional test report shall not be accepted.
- (ii) The submitted type-test reports must be in conformity to the technical specification of this NIT, failing which, offer will be rejected.
- (iii) Specification (GTP) of the offered transformer must conform to the specification of the NIT, failing which the offer will be **rejected**.
- (iv) If the offered item [Guaranteed Technical Particulars (GTP)] is not proto-type of type tested design but conforming the technical specification of NIT, then one unit will randomly be selected and sealed by the Inspecting Authority of JBVNL, at the time of pre-despatch inspection, from the manufactured and offered lot and the tenderer would have to get this unit type tested afresh at **CPRI/ ERDA, Vadodara / National Test House Govt. of India** at his own cost. In such case 90% (ninety percent) payment of ordered value shall be made and balance 10% (ten percent) payment shall be released after submission of successful type test reports. If offered item is proto type of type tested design, fresh type test is not required.
- (v) MSEs unit of Jharkhand registered for Tendered item may submit type-test report of tender item before opening of price part, failing which, offer will be rejected
- (vi) It may be noted carefully that the type test reports submitted by the bidders may be sent to the testing laboratory / institution from where the type test are carried out for verification & genuineness. In case any discrepancy is reported by Testing Laboratory / Institution the offer will be out rightly rejected and the action against the bidder for submission of forged / fake type test report will be taken in accordance.

37. **Bank Guarantee for repairs of equipments / materials at the supplier's works:**

In case the equipment fails, within the guarantee period and the same is required to be taken back to the supplier's factory, the same shall be covered up by suitable Bank Guarantee of any Nationalised Bank of equivalent cost of equipment for period required for replacement. Further Bank Guarantee shall be furnished by the supplier within one week's time on hearing from the consignees. He shall not lift the damaged/rejected equipment from our store unless the approval of acceptance of Bank Guarantee is received from our Manager/Sr,Manager (Account), JBVNL.

38. **Guarantee Period:**

The materials shall be guaranteed for satisfactory performance and against defective or low quality materials and bad workmanship for minimum **60 months** from the date of last supply of PO. If during the guarantee period the goods are found defective or defects observed in service, the same will be replaced/ repaired by the supplier free of all the charge within one month on receipt of intimation. In case defective stores/ materials are not replaced / rectified as per the above guarantee clause, the Nigam shall recover an equivalent amount plus 15% supervision charges from any of the bills/ Bank Guarantee.

39. **Re-inspection Charge:**

Re-inspection charges as applicable shall be leviable in case it is found at the time of inspection at the works of the bidder that:

- a) The material /item/equipments was not ready for inspection and the inspection notice given by supplier was fictitious.
- b) Quantity offered for inspection is short by the quantity in the inspection call.
- c) Inspection is not arranged / not got carried out due to any reason on account of supplier.
- d) Material/ item/equipments is found not confirming to provisions of Purchase order/ GTP/ relevant BIS and thus rejected by inspecting officer.

Or

- e) Manufacturing defects are observed during physical/ visual inspection/ checking.

Or

- f) Quantity of item not found as per provisions of Purchase order.

40. **Termination of Contract:**
In case the contractor/ supplier fails to deliver the materials or any consignment there of within the period of Penalty/Liquidate damage clause or in case the materials are found not in accordance with the prescribed specification/GTP, the Nigam shall exercise its discretionary power either:
- A) To recover from the supplier the damages as provided in the penalty of general conditions of tender for supply.
- Or**
- B) To Purchase elsewhere after giving due notice to the supplier on account and at the risk of supplier such material not so delivered or other of similar description without canceling the contract in respect of consignment not yet due for delivery.
- Or**
- C) To cancel the contract reserving Nigam's right to recover damages.
Notwithstanding the powers, under (a), (b), (c) referred above are in addition to the rights and remedy available to this Nigam under the General Law of India relating to contracts.
- Note:**
- a) In the event of risk purchase of stores of similar description, the option of the Nigam shall be final. In the event of action taken under (a) or (b) above, the supplier shall be liable for any loss which the Nigam sustain on the account but the supplier shall not be entitled to any saving on such purchases made against default.
- b) The decision of the Nigam shall be final as regards the acceptability of the stores supplied by the supplier on the Nigam shall not be required to give any reason in writing or otherwise at any time for the rejection of the materials.
41. No documents submitted by bidders after opening of the tender (Part-I) on their own shall be accepted, unless and until asked for.
42. The tenderer must enclose all documents inclusive of their covering letter PAGINATED and INDEXED and mention their number in the covering letter in WORDS. Also all the documents MUST bear the signature of the person who signed in the covering letter followed with the stamp of the tenderer. Overwriting / cut mark / use of whitener must not be done in all documents; otherwise the offer of the bidder may stand cancelled.
43. The Nigam reserves the right to reject the lowest or any of the tender either in whole or in part without assigning any reason.
44. **Factory Inspection & factory license:**
NIGAM's officer/ authorized representative may inspect the factory regarding availability of adequate manufacturing and testing for producing quality materials in case tenderers being considered for placement of order by the NIGAM. Bidder must submit valid factory license.
However, in case of New firms/ Participants (MSE unit of Jharkhand) quoted for the first time who had not executed any order of DISCOMS in last three years, their factory inspection shall be carried out by the purchaser representative after opening of tender or prior to opening of price or placement of order on them, with a view to ascertain whether they are a qualified manufacturer and are having adequate facilities, technical know-how and practical experience for manufacturing of the quoted items. The satisfactory report of factory inspection of such new firms shall be an essential requirement for them for qualification in bid or execution of order. The representative of purchaser may see testing lab and testing facilities, may question workers/Staff, see the machineries, safety standards floor layout of factory etc.
45. **General:**
Please again note that an incomplete offer not having specific comments on all the points of our specification and not supported by various information desired in our specifications shall be rejected out-right and no further correspondence shall be made with the supplier in respect of their offer which causes delay in finalizing the tender.
46. **Governing Language:**
The Contract shall be written in English or Hindi and shall be interpreted in accordance with the laws of the union of India.
47. **Jurisdiction of Court:**
The court Ranchi only shall alone have an exclusive jurisdiction to decide any difference/ dispute/ cases for and against JBVNL / Contractors/ Suppliers arising out of or in respect of the NIT, or contract agreement, or Purchase order.

48. Successful interested bidder may match the L-1 rate after opening of online price part. However, the Nigam reserve the right for its consideration.
49. The NIGAM reserves the right to distribute the materials among successful bidders depending upon the offered delivery schedule with respect to the then requirement of the Nigam. No reasons shall be assigned by the Purchaser for this and the same will be binding on the bidders
50. The Nigam reserves the right to cancel full or part of the awarded contract without assigning any reason of those firms which will be found defaulter for delay in supply of materials or his supply or his supply of sub-standard quality of the materials or whose design parameters are considered technically inferior.
51. The Nigam reserves the right to change/enlist/delete the specification/GTP of NIT till or before opening of part-I, for which, bidder may be given due opportunity for submission of their fresh bids/revised bids.
52. **Award Decision:-** Purchaser intends to award the business on a lowest bid basis, so suppliers are encouraged to quote competitively. The decision to place purchase order solely depends on purchaser on the cost competitiveness across multiple lots, quality, delivery and bidder's capacity, in addition to other factors that purchaser may deem relevant.
The purchaser reserves all the rights to award the contract to one or more bidders so as to meet the delivery requirement or nullify the award decision without any reason.
In case any supplier is found unsatisfactory during the delivery process, the award will be cancelled. The NIGAM reserves the right to award other suppliers who are found fit. Extra cost incurred by the NIGAM for such purchase will be recovered from the defaulting supplier.
53. **Supplier confidentiality:-** All information contained in this BoQ is confidential and may not be disclosed, published or advertised in any manner without written authorization from JBVNL. This includes all bidding information.
Suppliers who do not honour these confidentiality provisions will be excluded from participating in future bidding events.
54. All correspondences with regard to the above shall be made to the following address:- General Manager (Stores & Purchase), JBVNL, Engineering Building, Dhurwa, Ranchi-834004.
55. The Bidder is expected to examine the Bidding Documents, including all Instructions, Forms, terms and specifications. Failure to furnish all information required by the Bidding Documents or submission of a Bid not substantially responsive to the Bidding Documents in every respect will may result in the rejection of the Bid.
56. **One Bid per Bidder:-** Each bidder shall submit only one bid by itself. A bidder who submits or participates in more than one bid will cause all those bids to be rejected. In case Manufacturer and supplier of same manufacturer participate in NIT then only bid of manufacturer will be evaluated, supplier bid will be rejected.
57. After opening of first parts (i.e. Part-I), the deviations from the Nigam's terms & conditions, if any, proposed by the tenderer in regard to Bid, as per prescribed schedules given along with the tender documents, shall be notified and clarifications as may be required by Nigam, shall be submitted by the tenderers the time of scrutiny of tender and within the time prescribed. **Purchaser** will examine the bids to determine whether they are complete, whether any computational errors have been made, whether required sureties have been furnished, whether the documents have been properly signed, and whether the bids are generally in order. In case of any error in filling the documents, the purchaser will be at their liberty to reject the bid and/or draw the inference in the favour of purchaser.
58. Prior to the detailed evaluation, purchaser will determine the substantial responsiveness of each bid to the bidding documents including production capability and acceptable quality of the Goods offered. A substantially responsive bid is one, which conforms to all the terms and conditions of the bidding documents without material deviation.
59. The purchaser's right to accept any bid and to reject any or all bids:- The purchaser reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders any obligation to inform the affected bidder or bidders of the grounds for the purchaser's action.

60. After award of purchase order, contract agreement shall be executed between JBVNL and firm's owner/head or employing duly authorized by firm
61. **Any suppression of facts or hiding of terms/price in uploaded bid documents may be treated invalid and offer may be rejected**
62. **Force Majeure**
- i. "Force Majeure" shall mean any event beyond the reasonable control of the nizam or of the tenderer, as the case may be, and which is unavoidable notwithstanding the reasonable care of the party affected, and shall include, without limitation, the following:
War, hostilities or warlike operations (whether war be declared or not), invasion, act of foreign enemy and civil war, rebellion, revolution, insurrection, mutiny, usurpation of government, conspiracy, riot and civil commotion, epidemics, earthquake, quarantine restrictions, freight embargoes, landslide, volcanic activity, flood or cyclone, or other inclement weather condition, nuclear and pressure waves or other natural or physical disaster
 - ii. Neither party shall be considered to be in default or in breach of his obligations under the Contract to the extent that performance such obligation is prevented by any circumstances of Force majeure, which arises after date of Notification of Award.
 - iii. If either party is prevented, hindered or delayed from or in performing any of its obligations under the Contract by an event of Force Majeure, then it shall notify the other in writing of the occurrence of such event and the circumstances thereof within fourteen (14) days after the occurrence of such event. The Engineer-in-Charge shall be the point of contact in such case.
 - iv. The party who has given such notice shall be excused from the performance or punctual performance of its obligations under the Contract for so long as the relevant event of Force Majeure continues and to the extent that such party's performance is prevented, hindered or delayed. The Time for Completion shall be extended.
 - v. The vendor who are agreeable to accept the above terms of general conditions will only be considered and other will outright be rejected
63. **Cartel:**
Formation of tenderer's cartel is strictly prohibited. "Cartel" includes an association of sellers, distributors, traders or service providers who by agreement amongst themselves, limit, control or attempt to control the production, distribution, sale or price of or trade in goods or provision of services. Here, "agreement" includes any arrangement or understanding or action, whether or not is formal or in writing. Quoting same rates i.e. pool rate is not acceptable. In case the same rate is found to be quoted by more than two bidders, offers of all such bidders shall be out rightly rejected. However, if rates of two bidders are found to be same, quantity of orders to be placed on them will be reduced to half of the quantity a bidder is entitled to be allocated by virtue of their common rank. But, in case of multi-item tender, if rates of even two bidders for more than one item are found to be same, it will be considered as deliberate cartel and offers of both the bidders shall be rejected. Accordingly, all the bidders are advised to quote their own individual and most competitive rates. Rates received in a tender will be minutely scrutinized to find out as to whether some or all bidders have entered into any such "agreement." If Company is satisfied with the conclusion that some or all the bidders have formed a cartel, offers of all such bidders shall be rejected.
64. If material supplied against previous purchase order was found defective in guarantee period and same was not replaced or repaired within 03 (Three) months from date of intimation, then offer of the firm shall not be considered valid and will be rejected.
- 65 (A). **Debarment who participate as authorised supplier:** –
- (i) If quality of supplied material is found sub-standard or not as per approved GTP & Drawing then supplier alongwith manufacturer whose material are supplied shall be debarred in JBVNL for period of 03 (three) years.
 - (ii) If supplier is found defaulter in any commercial terms other than technical terms against purchase order then only supplier will be debarred.

- (B) **Debarment who participate as manufacturer:** –
If manufacturer is found defaulter in any commercial terms or supplied material is found sub-standard or not as per approved GTP & Drawing against purchase order, then manufacturer will be debarred in JBVNL for period of 03 (three) years
66. If bidder upload annexures and documents related with other NIT then their offer against this NIT will not be evaluated and will be rejected out rightly.
67. After opening of price part if L-1 bidder is found blacklisted/ debarred in Govt. Utility/ DISCOM then in such situation to save time in re-tendering for procurement and to meet urgent requirement, JBVNL reserve right to purchase material at L-1 rate from other techno-commercially responsive bidder of this NIT. Temporally Suspension/ Debarment/ Blacklisting in JBVNL for supply of material of any manufacturer/ supplier may be made ground for rejection of bid.
68. JBVNL reserve right to cancel NIT at any stage without assigning any reason to bidders.
69. Lowest bidder (L-1 bidder) will be declared separately for each size of tender item as mentioned above irrespective of price format (Excel sheet) of NIT.
70. Bidder who participate as supplier must submit authorisation (on stamp paper) issue by manufacturer to supplier for participation in this NIT, failing which offer may be rejected.
71. **Request for time extension/ modification/ clarification on any ground by bidder on last date of bid submission may not be entertained.**

Sd/-
DGM (Purchase)

Enclosure -

- (i) Annexure 'A'
- (ii) Annexure 'B'
- (iii) Annexure 'C'
- (iv) Annexure 'D'
- (v) Annexure 'E'
- (vi) Annexure 'F'
- (vii) Annexure 'G'
- (viii) Annexure 'H'
- (ix) Annexure 'I'
- (x) Annexure 'J'
- (xi) Annexure 'K'
- (xii) Annexure 'L'
- (xiii) Annexure 'M'
- (xiv) Annexure 'N'



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADJC3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure – ‘A’

The following conditions are to be strictly fulfilled by the firm while submitting their tenders: -

1. Tenders not accompanied by the prescribed earnest money will be rejected outright. The firm registered with NSIC under single point registration for manufacture of the item/ undertaking of Govt. of Jharkhand/ Govt. of India are however exempted but for the proof of registration certified or attested copy should be submitted together with documentary evidence of validity period on the due date of tender alongwith the tender. Otherwise tender shall be liable to be rejected.
2. Tenderer has to accept the Guarantee clause, penalty clause, payment terms and security clause as per the terms and conditions of the tender otherwise tender will be considered as invalid.
3. The offers, which are not kept valid for acceptance, for at least 180 days from the date of opening of tenders, will be rejected.
4. Conditional/ Incomplete tenders which do not contain full details, technical particulars, literature test certificates, performance report, price of all equipments delivery period etc. will be rejected, **GTP must be filled up item wise**. Incomplete or mentioning ‘as per ‘IS’ shall not be acceptable.
5. The prices are specifically asked to be submitted as FOR destination and are not so furnished, the tender shall not be considered as valid and will be rejected.
6. Tender, which is not submitted in the NIGAM’s Prescribed proforma shall be rejected. Any additional particulars can be furnished in the accompanying letter of Statement.
7. Tender received in this Office after the due date and time shall be rejected.
8. Prices must be indicated bold in figure and Words failing which the tender may be rejected.
9. Tenderers have to quote **FIRM** price only.
10. Specification of the offered item must conform to the technical specification of NIT, failing which the offer shall be rejected.

Sd/
DGM (Purchase)



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(CIN: U40108JH2013SGC001702) / GSTIN-20AADJC3148A1ZD

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Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure-'B'

Specification for Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP

1. 33 KV OUTDOOR TYPE CURRENT TRANSFORMER

1. INTRODUCTION

This section covers the specification of 33 kV Current Transformer suitable for outdoor service. Any other parts not specifically mentioned in this specification but otherwise required for proper functioning of the equipment should be included by the tender in the offer. CT mounting structure shall be provided with CTs.

2 APPLICABLE STANDARDS

Unless otherwise modified in this specification, the Current Transformer shall comply with the latest version of relevant standards (IS 2165, IS 2705(I-IV), IS 2099, IS 5621, IS 2071, IS 335, IS 13947(part I), IEC 185, IEC 270, IEC 44(4), IEC 171, IEC 60, IEC 8263, IEC 815, Indian electricity Rules 2003) or better international standards. This list of standards is for guidance only.

3 AMBIENT CONDITIONS

The CT supplied against these specifications shall be suitable for satisfactory continuous operation under the tropical conditions. The detail condition is mentioned in General Technical requirement.

4 SYSTEM PARTICULARS

Sl no	Particular	For 33 KV CT
(a)	Nominal System Voltage	33kV
(b)	Highest system Voltage	36kV
(c)	Rated Frequency	50Hz
(d)	No of phases	Three
(e)	System neutral earthing	Solidly Earthed
(f)	One minute Power Frequency withstand voltage (rms)	70kV
(g)	Lighting Impulse withstand Voltage	170kVp
(h)	System fault level	25kA for 3sec

5 TECHNICAL PARAMETERS OF CT

- Type :-Single phase, dead tank, outdoor, oil filled & hermetically sealed
- Type of mounting :-Pedestal type
- Rated primary current:- As per BPS
- Rated Continuous thermal current :-120 % of rated Primary current
- Rated short time withstand Requirement for sec. Winding:- As per IS 2705 Pt. I
- Rated short time withstand 25kA(RMS) Current for 3 Second
- Rated dynamic withstand 62.5 Current (KA rms)
- Max temp rise As per IEC-185/ IS 2705
- Minimum creepage distance of porcelain housing(mm) :-25 mm /KV
- One minute power frequency 3 kV Withstand voltage between Secondary terminal & earth
- The requirement of ratio, VA capacity, class or accuracy, limit factor etc. for CTs is given below,

Item	Core/CT	Ratio	VA Burden(Min)	Instrument security Factor	ALF (Accuracy Limit Factor)	Class of accuracy
Incoming Panel	Protection	800-400-200/1A	30	≥ 10	PS
	Protection	800-400-200/1A	30	≥ 10	5P

	Metering	800-400-200/1A	2.5	≤5		0.5
Outgoing Panel	Protection	800-400-200/1A	30	≥ 10	5P
	Metering	800-400-200/1A	2.5	≤5		0.5

6 PORCELAIN HOUSING

It shall be single piece of homogeneous, vitreous porcelain of high mechanical & dielectric strength. It will be glazed with uniform Brown or Dark brown colour with smooth surface finish. The creepage distance for the porcelain housing shall be at least 25 mm per kV.

7 WINDING

(a) PRIMARY WINDING

It shall be made of high conductivity rigid copper wire. The primary winding current density shall not exceed the limit of 1.6 Amp per sq. mm for normal rating. The design current density for short circuit current as well as conductivity of metal used for primary winding shall be as per IS 2705. The calculation for the selection of winding cross section shall be furnished by contractor. The primary terminal shall be of standard size of 30 mm dia x 80 mm length of heavily tinned (min. thickness 15 micron) electrolytic copper of 99.9 % conductivity.

(b) SECONDARY WINDING

It shall be made of insulated copper wire of electrolytic grade. Type of insulation used shall be described in the offer. For multi ratio design, the multi ratio will be achieved by reconnection of the primary winding or secondary winding. The excitation current of the CT shall be as low as possible. The contractor shall furnish the magnetization curves for all the cores.

The terminal box shall be dust free & vermin proof. The size of the terminal box shall be big enough to enable easy access and working space with the use of normal tools.

The secondary terminals studs shall be provided with at least 3 nuts and two plain washers, these shall be made of brass duly nickel plated. The min. stud outer dia shall be 6 mm & length 15 mm. The min spacing between the centres of the adjacent studs shall be 1.5 time the outer dia of the stud.

(c) POLARITY

The polarity shall be marked on each CT at the primary and secondary terminals.

8 TANK & HARDWARES

The CT will be dead tank type. The tank shall be fabricated of MS steel sheet of min. 3.15 mm for sides & 5 mm for top & bottom. The tank will be finished with min. 2 coats of zinc rich epoxy paint externally. The inner surface shall be painted with oil resistance white enamel paint.

All ferrous hardwares, exposed to atmosphere shall be hot dipped galvanized.

9 INSULATION OIL

The first filling of oil in CT shall be in contractor's scope. The oil shall be as per IS 335.

To ensure prevention of oil leakage, the manufacturer will give following details supported by drawings:

- i) Location of emergence of Primary & Secondary terminals
- ii) Interface between porcelain & metal tanks
- iii) Cover of the secondary terminal box

Any nut & bolt and screw used for fixation of the interfacing porcelain bushing for taking out the terminals shall be provided on flanges cemented to the bushings & not on the porcelain.

If gasket joints are used, Nitrite Butyl Rubber gasket shall be used. The grooves shall be machined with adequate space for accommodating gasket under pressure.

The CT shall be vacuum filled with oil after processing. It will be properly sealed to eliminate breathing & to prevent air & moisture from entering the tank. The sealing methods/arrangement shall be described by the contractor & be approved by the owner.

10 OIL LEVEL INDICATOR

The CT shall be fitted with prismatic type oil sight window at suitable location so that the oil level is clearly visible with naked eye to an observer standing at ground level.

To compensate oil volume variation due to temperature variation, Nitrogen cushion or the stainless steel bellows shall be used. Rubber diaphragms are not permitted for this purpose.

11 EARTHING

Two earthing terminals shall be provided on the metallic tank of size 16 mm dia & 30 mm length each with one plain washer & one nut for connection to the station earth mat

12 Junction Box

The junction box shall be of MS sheet having thickness of 2mm, synthetic enamel painted as per procedure mentioned in General Technical Requirement (Min. thickness 55 micron). The shade of junction box shall be 697 of IS: 5. Disconnecting type terminal blocks for CT secondary lead shall be provided. The junction boxes shall be weather proof type with gaskets, conforming to IP-55 as per IS-13947 (Part-I).

One junction box shall be provided for 3 numbers of single phase CT's and PT's.

13 LIFTING & MOUNTING ARRANGEMENT

The CT shall be provided with two lifting eyes to lift the CT. This shall be so positioned so as to avoid any damage to the CT during lifting for installation or transportation purpose. This shall be detailed in General Arrangement drawing.

The CT shall be of pedestal mounting type suitable for outdoor installation on steel/cement concrete structures. All the clamps, bolts, nut and washers etc. required for mounting the CT on the structure shall be supplied along with the CT and shall be galvanized. The contractor shall supply all the terminal connectors etc. required for connection to the CT.

14 TESTING

All Type and Routine Tests shall be as per relevant IS and/or IEC.

2. 33 KV OUTDOOR TYPE POTENTIAL TRANSFORMER

1 INTRODUCTION

This chapter covers specification of 33kV Potential Transformer suitable for outdoor service. Any other parts not specifically mentioned in this specification but otherwise required for proper functioning of the equipment should be included by the tender in the offer.

2 APPLICABLE STANDARDS

Unless otherwise modified in this specification, the Potential Transformer shall comply with the latest version of relevant standards (IS 3156, IS 2099, IS 5621, IS 335, IS 13947(Part I), IEC 186, Indian electricity Rules 2003, IEC 815) or better international standards. This list of standards is for guidance only. The contractor shall be solely responsible to design & manufacture the PT suitable for 33 kV/11kV systems.

3 AMBIENT CONDITIONS

The PT supplied against this specification shall be suitable for satisfactory continuous operation under the tropical conditions as detailed in general technical requirement.

4 SYSTEM PARTICULARS

Sl no	Particular	For 33 KV PT
(a)	Nominal System Voltage	33kV
(b)	Highest system Voltage	36kV
(c)	Rated Frequency	50Hz
(d)	No of phases	Three
(e)	System neutral earthing	Solidly Earthed
(f)	One minute Power Frequency withstand voltage (rms)	70kV
(g)	Lighting Impulse withstand Voltage	170kVp
(h)	System fault level	25kA for 3sec

5 TECHNICAL PARAMETERS OF PT

Sl no	Particular	For 33 KV PT
(a)	Rated primary Voltage	36kV
(b)	Type	Three phase potential transformer
(c)	Voltage/ Ratio(kV)	33/0.11
(d)	Rated voltage factor	1.2continuous
(e)	One minute Power Frequency withstand voltage (rms)	Solidly Earthed
	Primary Terminals	70kV
	Secondary winding	36 KV

(f)	Min. Creepage Distance	25 mm/kV of Highest System Voltage
(g)	Detail of secondaries	170kVp
(h)	Accuracy	0.5
(i)	Burden(VA)	100

6 PORCELAIN HOUSING

It shall be single piece of homogeneous, vitreous porcelain of high mechanical & dielectric strength. It will be glazed with uniform Brown or Dark brown colour with smooth surface finish. The creepage distance for the porcelain housing shall be at least 25mm per kV.

The contractor shall clearly detail in his bid the details of attaching the metallic flange to porcelain, pressure release valve and also how primary & secondary terminals shall be brought out.

7 WINDING

(a) PRIMARY WINDING

It shall be made of insulated electrolytic copper wire. The neutral end of the winding shall be brought outside for earthing. The primary terminal shall be of standard size of 30 mm dia x 80 mm length of heavily tinned (min. thickness 15 micron) electrolytic copper of 99.9 % conductivity.

(b) SECONDARY WINDING

It shall be made of insulated copper wire of electrolytic grade. The terminal box shall be dust free & vermin proof. The size of the terminal box shall be big enough to enable easy access and working space with the use of normal tools.

The secondary terminals studs shall be provided with at least 3 nuts and two plain washers. These shall be made of brass duly nickel plated. The min. stud outer dia shall be 10 mm & length 15 mm. The min spacing between the centres of the adjacent studs shall be 1.5 time the outer dia of the stud.

(c) POLARITY

The polarity shall be marked on each PT at the primary and secondary terminals.

8 TANK & HARDWARES

It shall be fabricated of MS steel sheet of min. 3.15 mm for sides & 5 mm for top & bottom. The tank will be finished with min. 2 coats of zinc rich epoxy paint externally. The inner surface shall be painted with oil resistance white enamel paint. All ferrous hardware, exposed to atmosphere shall be hot dipped galvanized.

9 INSULATION OIL

The first filling of oil in PT shall be in contractor's scope. The oil shall be as per IS 335. To ensure prevention of oil leakage, the manufacturer will give following details supported by drawings:

- i) Location of emergence of Primary & Secondary terminals
- ii) Interface between porcelain & metal tanks
- iii) Cover of the secondary terminal box

Any nut & bolt and screw used for fixation of the interfacing porcelain bushing for taking out the terminals shall be provided on flanges cemented to the bushings & not on the porcelain.

If gasket joints are used, Nitrite Butyl Rubber gasket shall be used. The grooves shall be in machined with adequate space for accommodating gasket under pressure.

The PT shall be vacuum filled with oil after processing. It will be properly sealed to eliminate breathing & to prevent air & moisture from entering the tank. The sealing methods/arrangement shall be described by the contractor & be approved by the owner.

10 OIL LEVEL INDICATOR

The PT shall be fitted with prismatic type oil sight window at suitable location so that the oil level is clearly visible with naked eye to an observer standing at ground level.

To compensate oil volume variation due to temperature variation, Nitrogen cushion or the stainless steel bellows shall be used. Rubber diaphragms are not permitted for this purpose.

11 EARTHING

Two earthing terminals shall be provided on the metallic tank of size 16 mm dia & 30 mm length each with one plain washer & one nut for connection to the station earth mat

12 Junction Box

The junction box shall be of MS sheet having thickness of 2mm, synthetic enamel painted as per procedure mentioned in General technical Requirement (Min. thickness 55 micron). The shade of junction box shall be

697 of IS: 5. Disconnecting type terminal blocks for PT secondary lead shall be provided. The junction boxes shall be weather proof type with gaskets conforming to IP-55 as per IS-13947 (Part-I). One junction box shall be provided for 3 numbers of single phase CT's and PT's.

13 LIFTING & MOUNTING ARRANGEMENT

The PT shall be provided with two lifting eyes to lift the PT. This shall be so positioned so as to avoid any damage to the PT during lifting for installation or transportation purpose. This shall be detailed in General Arrangement drawing.

The PT shall be of pedestal mounting type suitable for outdoor installation on steel/cement concrete structures. All the clamps, bolts, nut and washers etc. required for mounting the PT on the structure shall be supplied along with the PT and shall be galvanized. The contractor shall supply all the terminal connectors etc. required for connection to the PT.

14 TESTING

All Type and Routine Tests shall be as per relevant IS and /or IEC.

3. 33 KV VACUUM CIRCUIT BREAKERS

1) SCOPE

This specification covers design, manufacturing, testing at manufactures works, supply of 11KV and 33 KV Vacuum Circuit Breakers complete with all accessories required for their satisfactory operation for the sub-transmission system. The Breakers shall be used for Transformer protection or Feeder Control, in the system.

2) TYPE AND RATING

The circuit breakers shall be suitable for outdoor operation under the climatic conditions, as specified in Tender specification, without any protection from sun and rain.

The circuit breakers shall have the following rating:-

S.No.	PARTICULARS	33 KV
i)	Number of Poles	3 Nos.
ii)	Frequency	50 Cycles
iii)	Nominal System Voltage	33 KV
iv)	Highest System Voltage	36 KV
v)	Interrupting Capacity at nominal system voltage	1500 MVA
vi)	Rated Continuous Current	1250 Amps
vii)	Short-time Current Rating for 3 Secs.	25 KA
viii)	Basic Insulation Level	170 KV
ix)	Power Frequency Withstand Voltage for one Minute	70 KV
x)	Total Break-time for any Current up to the rated breaking current	5 cycles (max.)
xi)	Control Circuit Voltage	30 Volt D.C.
xii)	Operating duty for gang operation	O – 0.3 Sec – CO – 3 Min – CO
xiii)	The VCBs shall be suitable for one reclosing followed by one delayed reclosing and lock out Minimum clearances	
a)	Between Phases	430 mm
b)	Between Live Parts & Ground	3700 mm
c)	Creepage Distance	900 mm

The above are our minimum requirements. The manufacturers may offer their standard design, keeping in view our minimum requirements.

3) STANDARDS

The circuit breakers shall comply with the requirements of IEC 56 or IS 13118 (1991) with latest amendment thereof, except wherein specified otherwise. Equipment, meeting any other authoritative standard, which ensures equal or better quality than the standard mentioned above, would also be acceptable. The bidders shall clearly indicate the applicable standards to which their equipments complies-with. A copy of such standard may also be enclosed.

4) GENERAL

The circuit breaker shall be of porcelain clad vacuum type. The breaker, complete in all respect, shall be supplied with all accessories in-place and all internal wiring installed and terminated in the mechanism housing and the equipment shall be complete in all respects.

The circuit breakers shall provide rapid and smooth interruption of current under all conditions, completely suppressing all undesirable phenomena, even under the most severe and persistent short-circuit conditions or when interrupting small currents or leading/ lagging reactive currents. The details of any device incorporated to limit or control the rate of rise of Restriking voltage across the circuit breaker contacts shall be stated. The over voltage caused by the circuit breaker switching on inductive or capacitive load shall not exceed 3.2 times the normal phase to neutral voltage. The total break-time for the circuit breaker, throughout the range of breaker operating duty, shall be stated in the tender and shall be guaranteed. The breaker shall be fit for capacitor switching for 5 MVar Bank.

The breakers shall be provided with trip free mechanism.

The circuit breakers shall be suitable for mounting on steel structures. The cost of necessary frames for mounting the circuit breakers shall be included in the offered prices- All the structures shall be hot dip galvanized with 3 dips. Please note that cantilever type supports for mechanism box are not acceptable. The mechanism box shall have firm supports from bottom. This is necessary to minimize vibration of mechanism box, which in turn may disturb various settings. The agency shall indicate clearly the vibration level of the breaker during fault / normal ON OFF operations in all three directions.

The owner intends to operate 33 KV feeders with automatic reclosing scheme, the arrangement envisaged is as under:-

5) SPECIFICATION FOR CIRCUIT BREAKERS

The circuit breakers shall consist of three identical phase units with a common operating mechanism. While offering the circuit breaker, the following details should be confirmed and furnished with the tender:-

- i) Complete construction details of the equipment offered. It should be noted that the breakers should be suitable for out-door duty. Indoor breakers accommodated in out-door kiosks are not acceptable.
- ii) Type, make & source of vacuum bottles with relevant details shall be indicated in the offer, clearly.
- iii) The capacity of breaker to interrupt inductive and capacitive currents shall be indicated in the offer (rating of capacitor bank should be stated and type test report shall be furnished).
- iv) Spare availability of vacuum interrupter should be confirmed by the bidder for the designed expected life of the breakers being offered.

6) VACUUM INTERRUPTER

The design of the vacuum interrupter shall be such that it gives trouble free operation under normal load and fault conditions throughout the life of the equipment. As the efficiency of the breaker depends on the degree of vacuum inside the interrupter, manufacturer shall ensure that the same is maintained consistently during service. To know the residual life of vacuum interrupter, an indicator to indicate the status of contact erosion shall be provided.

The insulating ceramic body of the interrupter should have high mechanical strength and it should be capable of withstanding high temperature without any significant deterioration in its mechanical and electrical properties. The metal/ alloy used for the fixed and moving contacts shall have very low resistivity and low gas content. They should be resistant to arc erosion and the contact should have no tendency to get cold-welded under the high vacuum in the interrupter.

The interrupter design should ensure rapid de-ionization of the gap so that normal electrical strength of the gap is restored instantaneously.

The metallic bellow or any other similar vacuum sealing arrangement should be provided at the moving contact and should have a long fatigue life.

Vacuum interrupter should have an expected life as following:

- i. **Minimum Mechanical life in no. of operations: 10,000**
- ii. **Minimum Electrical life in no. of operations at rated current: 10,000**
- iii. **Minimum Electrical life in no. of operations at 25KA: 100**

Manufacturer's catalogue on vacuum bottle, indicating all the details shall essentially be submitted with the tender.

7) TEMPERATURE RISE

The maximum temperature attained by any part of the equipment, when in service at site, under continuous full load conditions, exposed to the direct rays of the sun, shall not exceed 45° Centigrade, above ambient temperature. The limits of temperature rise shall be as per relevant standards. The corrections proposed shall be stated in the tender and shall be subject to approval of the owner.

8) INSULATION OF THE CIRCUIT BREAKER

The insulation to ground, the insulation between open contacts and the insulation between phases of the completely assembled circuit breaker shall be capable of withstanding satisfactorily di-electric test voltage corresponding to specified basic insulation level in the standard.

9) INSULATORS

The basic insulation level of the Insulator and insulating porcelains shall be as specified and porcelain shall be homogenous and free from cavities and other flaws. They shall be designed to have ample insulation, mechanical strength and rigidity for satisfactory operation under conditions specified above. All insulators of identical ratings shall be inter-changeable. The puncture strength of the insulators shall be greater than the flash over value.

10) OPERATING MECHANISM

The circuit breakers shall be designed for remote control from the control room and in addition there shall be provision for manual operation of circuit breakers during maintenance and for local tripping and closing by the normal means.

The circuit breakers shall have operation control and mechanical —open—close indicator, in addition to facilities for remote electrical indication.

The operating mechanism shall be of the spring charging type, by electric control under normal operation. The mechanism shall be trip free electrically and mechanically. The mechanism shall be capable of performing satisfactorily, the reclosing duty cycles indicated above, within the time specified. All working parts in the mechanism shall be of corrosion resistant material and all bearings, which require greasing, shall be equipped with pressured grease fittings. The mechanism shall be strong positive quick in action and shall be removable without disturbing the other parts of the circuit breaker. The mechanism and breaker shall be such that the failure of any spring will not prevent tripping and at the same time will not cause any false tripping or closing. The operating Mechanism should be motor operated spring charged type preferably without chain drive. The motor for spring charging shall be suitable to perform satisfactorily for input supply voltage of 230 Volt A.C. 50 Hz with a variation of plus 10 and minus 20 percent. The A.C. Motor should have overload protection. Provision should also be made for mounting of mechanism box at an adequate height and gear ratios shall be so chosen that one man should be able to charge the spring, without any additional efforts.

11) CONTROL CUBICLE

A common control cubicle shall be provided to house electrical, controls, monitoring devices and all other accessories, except those which must be located on individual poles. The cubicle shall be gasketed and shall have weather-proof construction, fabricated from sheet steel of minimum 2.5 mm thickness. The type test report on degree of protection test (IP-55) shall also be furnished.

The cubicle shall have front access door with lock and keys, space heater, internal illumination lamp, 3 pins 5 Amp socket with individual ON-OFF switches shall be provided in the cubicle.

For local operation following shall be provided:-

- a) LOCAL / REMOTE selector switch
- b) TRIP / NORMAL / CLOSE control switches with pistol grip handle

The control circuits shall be designed to operate on 30 Volt DC, as indicated in the schedule and it shall be possible to adopt to work on other voltages by simply changing the operating coils. The shunt tripping coils shall be designed to operate satisfactorily within 110% and 70% of the rated DC supply voltage and the shunt closing coils should operate up to 85% of the rated DC voltage. These checks shall be repeated during pre-commissioning checks at site before putting the breakers in service.

AC Power supply for auxiliaries will be available at 230 Volt (+/- 10% variation) single phases 50 C/s at substation. The agency shall be required to extend this supply, using proper protection, to desired location through cable.

- c) Necessary double compression type cable glands for the cables of the operating mechanism shall be provided. The cables used for operation are all un-armoured 2.5 sq. mm copper control cables of 1100 V grade. The cable glands shall be suitable for 1 no. 8 core and 2 nos. 4 core cables and cables as per site requirements. The gland plate should be made of non-magnetic materials and suitably drilled at site to suit the cable entry.

The Circuit breaker shall be provided with trip free Mechanism so that tripping instructions could over-ride the closing instructions. An additional tripping coil shall also be provided in the trip circuit. The second coil shall have separate tripping lever arrangements in the mechanism, so as to avail full advantage of second trip coil. Also the two trip coils shall have separate fuses in the DC circuit, so that in the event of any short circuit/damage in any one of the trip coils, the supply is available to the other one.

The circuit diagram of Control circuit of VCB along with operating instructions (DOS/ DON'T) shall be embossed on metallic plate duly laminated and the same shall be fixed on the rear door of the control cubicle from inside.

12) WIRING

Wiring shall be completed in all respects to ensure proper functioning of the control, protection, monitoring and interlocking schemes.

All the wiring shall be carried out with 1100 V grade, PVC insulated stranded copper conductor of 2.5 sq. mm as per IS: 1554.

Each wire shall be identified at both ends with permanent markers bearing wire numbers as per wiring diagram. Wire termination shall be done with crimping type connectors with insulating sleeves. Wires shall not be spliced between terminals.

All spare contacts of auxiliary switches etc. shall be wired up to terminal blocks in the control cubicle.

13) TERMINAL BLOCKS

Terminal blocks shall be of 1100 V grade, box clamp type ELMEX 10 sq. mm or approved equivalent. Not more than two wires shall be connected to any terminal. Spare terminals, equal in number to 20% of active terminals, shall be provided.

Terminal block shall be such located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.

14) TERMINAL CONNECTORS

6 Nos. Terminal bi-metallic connector suitable for ACSR Wolf Conductor /ACSRDog conductors shall be supplied with each breaker. For ensuring quality and uniformity, the owner may decide to specify the design of terminal connector, the material of terminal connector and thickness of clamps. Further compliance of which will have to be done by the agency without any extra cost. Suitable earth connector for earthing connections shall also be supplied. The connector drawing shall be got approved from the owner.

15) AUXILIARY CONTACTS

Eight numbers each of auxiliary contacts both of the normally open and normally closed types shall be provided in each circuit breaker for use in the remote indication and control scheme of the circuit breaker and for providing safety interlocking. Special contacts for use with trip coils, which permit for relative adjustment with respect to the travel of the circuit breaker contact, shall also be provided, wherever required. There shall be provision to add more auxiliary contacts at a later date, if required.

16) ACCESSORIES

The vacuum circuit breaker shall be supplied as a complete unit with internal wiring installed and terminated in mechanism box and equipped with the following accessories:

1	Motor operated spring charged mechanism (Motor voltage – 230 V AC)	1 No.
2	Trip coil suitable for 30 V DC	2 Nos.
3	Closing Coil suitable for 30 V DC	1 No.
4	Pistol grip C.B. Control switch having Trip/ Normal/ Close position	1 No.
5	Local/ Remote selector switch	1 No.
6	Spring Charged indicator	1 No.
7	Manual operating handle for maintenance	1 No.
8	Facility for manual charging of spring	1 No.
9	Operation counter	1 No.
10	Auxiliary contacts (8 NO-8 NC)	1 Set
11	Anti-pumping device suitable for 30 V DC	1 No.
12	Terminal connectors suitable for connecting Dog Conductor	6 Nos.
13	Cubicle illuminating lamp with cage and switch	1 No.
14	Spare terminals connectors	20% of Total Terminals
15	Mechanical ON/OFF Indicator	1 No.
16	MCB for both AC and DC supply	1 No. each
17	Space heater and ON-OFF switch in the mechanism box	1 No.
18	Power Type 3 Pin Socket with ON-OFF switch	1 Set
19	Earthing Terminals	2 Nos.
20	LED indicating lamps	Complete set

Indicating Bulbs: The indicating lamps should be supplied with Low Voltage protection Circuit (LVGP) and surge suppressor circuit having LED indication. Lamp assembly should be of fire – retardant glass epoxy PCB, industrial heat resistant, fire resistant, non- Hygroscopic DMC material , chrome – plated corrosion resistant solid brass bezel , polycarbonate lens in desired colour shades of Red , Green, Amber, Yellow etc. the intensity of light should be minimum 100 mcd at 20 mA . Indication lamp should be suitable to operate on 30 V Direct Current supply source.

17) TYPE TESTS

Type test certificates on VCB for the following tests, strictly as per IS 13118, with latest amendment thereof, from Laboratory specified in terms & conditions of NIT:-

- ❖ Short Circuit Duty Tests
- ❖ Short Time Current Rating Tests
- ❖ Extended Mechanical Endurance Test (M2)
- ❖ Temperature Rise Test
- ❖ Lightning Impulse Voltage withstand Test
- ❖ Capacitor Switching Duty Test for Single Bank of 5 MVAR capacity
- ❖ Power Frequency withstand Voltage Test dry & wet
- ❖ Degree of protection IP-55 for control cubicle
 - ❖ The above type test certificates must accompany drawing of type tested equipment, duly signed by type testing authority.
- ❖ The above tests must not have been conducted on the equipment earlier than 5 years from the date of opening of bids.
- ❖ In case of any change in design/type of Breaker already type tested and the one offered against this specification, the owner reserves the right to demand repetition of type tests, without any extra cost.

18) ACCEPTANCE AND ROUTINE TESTS

All acceptance and routine tests, as stipulated in relevant standards, shall be carried out by the manufacturer.

19) RATING PLATES

The detailed rating plate shall be as per IS and in addition, shall indicate serial number of the equipment, manufacturer's name, our order number and date.

4. CONTROL & RELAY PANEL FOR 33 KV FEEDER WITH NON-DIRECTIONAL O/C AND E/F PROTECTION AND 33/11 KV TRANSFORMER PANEL WITH & WITHOUT DIFFERENTIAL PROTECTION FOR VARIOUS 33/11 KV SUB-STATIONS

1.0 Scope:

This specification covers design, manufacture, assembly, testing before supply, inspection, packing and delivery and other basic technical requirements in respect of control and relay panels for 33 kV feeders, 33/11KV Power Transformers without differential protection and 33/11KV Power Transformers with differential protection to be installed at various 33/11 kV sub-stations. The equipment to be supplied against this specification is required for vital installations where continuity of service is very important. The design, materials and manufacture of the equipment shall, therefore, be of the highest order to ensure continuous and trouble-free service over the years. The Manufacturer has to design the Schematics for protection and Control of all equipments including monitoring indications, visual and audible alarm, interlocking schemes among different equipment. Any other requirement which are not specifically covered here but which are necessary for successful commissioning of the Sub stations are also within the scope of the Contract.

The equipment manufactured should conform to the relevant standards and of highest quality of engineering design and workmanship. The equipment manufactured shall ensure satisfactory and reliable performance throughout the service life. The Schedule of requirement of the Panel is furnished separately in details.

2.0 Service Conditions:

2.1. System particulars:

Nominal system voltage	33 kV
Corresponding highest system voltage	36 kV
Frequency	50 Hz±3%
Number of phases	3
Neutral earthing	33 kV Grounded through Earthing Transformer

2.2. Equipment supplied against the specification shall be suitable for satisfactory operation under the following tropical conditions:-

Max. ambient air temperature	60 ° C
Max. relative humidity	100 %
Max. annual rainfall	1450 mm

Max. wind pressure	150 kg/sq.m.
Max. altitude above mean sea level	1500 mtrs.
Iso ceraunic level	50
Reference Ambient Temperature for temperature rise	50 deg C
Climatic Condition	Moderately hot and humid tropical climate conducive to rust and fungus growth

2.3. The climatic conditions are prone to wide variations in ambient conditions and hence the equipment shall be of suitable design to work satisfactorily under these conditions.

2.4. Auxiliary supplies available at the various sub-stations are as follows:-

3.2.1 Rating:

A. C. Supply	230 volts, with $\pm 10\%$ variation, Frequency 50Hz with $\pm 3\%$
D.C. Supply	30 V DC. DC system is 2(two) wire with necessary earth fault annunciation scheme. DC supply shall be normally fed from Battery charger. In case of failure of AC supply to Battery Charger, DC supply voltage will be available from Lead Acid Battery

2.5. Unless otherwise specified all equipment and material shall conform to the latest IS applicable standards. Equipment complying with other internationally recognized standards will also be considered if it ensures performance equivalent or superior to Indian standards. In the event of supply of equipment conforming to any international \ internationally recognized standards other than the standard listed below.

2.6. The equipment provided shall also comply with the latest revisions of Indian Electricity act and Indian Electricity rules and any other applicable statutory provisions, rules and regulations.

2.7. All equipment provided under the specification shall generally conform to the latest issue of the following:-

a)	IS 12063/1987	Degree of Protection provided for enclosure of electrical equipment.
b)	IS 5/2004	Colour for ready mixed paints & enamels.
c)	IS 3231 / 1986 & 1987	Electrical relays for power system protection
d)	IEC 60255	Numerical biased protection relay
d)	IS 8686/1977	Static Protective Relays
e)	IS 1248/2003	Indicating instruments
f)	IS 14697/1999	HT Static Tri vector TOD Energy meter
g)	IS 6875 amended up to date	Control switches
h)	IS 4794/1968 & 1986	Push buttons
i)	IEC 337 & 337-1	Control Switches (LV Switching devices for control and auxiliary circuit
j)	IEC:60185	Current Transformers
k)	IEC:60186	Voltage Transformer
l)	IS 375	Marking and arrangement for Switchgear Bus
m)	IS:5578/1984	Marking of insulated conductors.

3.0 CONSTRUCTIONAL DETAILS :

3.1. CONTROL AND RELAY PANEL

The Control and Relay Panel shall be of Simplex type and the access door shall be provided at the back of each Panel where no instruments or relays shall be mounted. The indicating and signalling devices and relays etc. shall be mounted on the front side and the auxiliaries which shall be inside the Panel. The access door shall be at the back side and of double door type of height 1900 mm.

In front of Panel where relays and instruments are to be mounted shall be stretcher leveled steel plate 3 mm. thick and side panel, doors and top covers shall be of 2mm. thick steel plate. Light sections of structural steel shall be used for panel frame.

The individual panel shall be 2250 mm. in height with Channel base, 610 mm. in depth and of suitable width limited to 1000 mm to accommodate the equipment at a suitable height, suitable gaps to facilitate easy workability as specified hereafter. Individual piece of Channel base of C&R Panel is to be provided to obtain the flexibility of inter-changing the Panel, if any.

The complete panel shall incorporate all necessary instruments, meters, relays, auxiliary relays, control switches, indicating lamps, mimic, annunciator, audible alarms, horizontal and vertical wiring trough, wiring supports, interior lighting system, terminal blocks , fuses and links etc.

3.2. CONSTRUCTIONAL FEATURES

a. The Control and Relay Panel frame shall be suitable for erection of flush concrete floor and secured to it by means of evenly spaced grout bolt projecting through the base channels from members of the frame.

b. The manufacturer shall ensure that the equipment specified and such unspecified complementary equipment required for completeness of protection/control scheme be properly accommodated in the panels without

congestion and if necessary to provide panels with larger width. No price increase at a later date on this account shall be allowed.

c. Panels shall be completely metal enclosed and shall be dust, moisture and vermin proof for tropical use. The enclosure shall provide a degree of protection not less than IP-41 in accordance with IS-2147. Type test report in this respect shall be furnished with offer.

d. 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 panels** such as base frame, front sheets and door frames and **not less than 2mm for sides, door, top & bottom portions**. There shall be sufficient reinforcement to provide level surfaces, resistance to vibration and rigidity during transportation and installation.

e. Design, material selection and workmanship shall be such as to result in neat appearance, inside and outside with no welds, rivets or bolt head apparent front outside, with all exterior surfaces true and smooth.

f. All holes and extension windows in the Panel shall be blanked and access doors shall be lined with compressible liners at the edges. The EMPLOYER will shut off the bottom crevices with cream cement, the Cable Entry holes with weak concrete and the cable trench with present R.C. Slabs or checker plate. All control and supply cables will be laid in a distribution trench running under the panel. The Cable will branch off into each cubicle through entry holes in the concrete floor opening in the bottom cubicles. Necessary Drawings for concrete floor and trench shall be supplied by the manufacturer to enable the EMPLOYER to construct the foundation floor for these panels. The drawings shall show details of the distributing trench, cable entry holes, glands and positions of grouting bolts. The EMPLOYER will prepare foundation with pocket for grouting bolts. The manufacturer shall supply channel base, suitable grouting bolts, lock nut and washers.

g. Control Cable entries to the panel shall be from the bottom. Bottom plates of the panels shall be fitted with detachable gland plates to allow cable entries from the bottom. Gland plates shall be suitable for fixing the cable glands at an elevated height of at least 100 mm above the ground level. Terminal Connectors and Test terminal blocks for cables shall be fixed at an elevated height of at least 200 mm above the Bottom plate. Side blocks cut out to be arranged at the top of both sides of panel for inter panel bus wires. Dimensions of the cut out will be 300 mm X 50 mm, 255 mm from the top.

3.2.1 General

a. Materials shall be new; the best quality of their respective kinds and such as are usual and suitable for work of like character. All materials shall comply with the latest issues of the specified standard unless otherwise specified or permitted by EMPLOYER.

b. Workmanship shall be of the highest class throughout to ensure reliable and vibrations free operations. The design, dimensions and materials of all parts shall be such that the stresses to which they may be subjected shall not cause distortion, undue wear, or damage under the most severe conditions encountered in service.

c. All parts shall conform to the dimensions shown and shall be built in accordance with approved drawings. All joints, datum surfaces and meeting components shall be machined and all castings shall be spot faced for nuts. All machined finishes shall be shown on the drawings. All screw, bolts, studs and nuts and threads for pipe shall conform to the latest standards of the International Organization for Standardization covering these components and shall all conform to the standards for metric sizes.

d. All materials and works that have cracks, flaws or other defects or inferior workmanship will be rejected by EMPLOYER.

3.2.2 Assembly :-

Necessary items of equipment shall be assembled in the factory prior to shipment and routine tests shall be performed by the manufacturer as per the requirements of the latest issue of IEC/IS as specified under each equipment in these specifications to demonstrate to the satisfaction of EMPLOYER that the switchgear panels comply with the requirements of the relevant IEC/IS standards.

3.2.3 Casting :-

Casting shall be true to pattern, of workmanlike finish and of uniform quality and condition, free from blowholes, porosity, hard spots, shrinkage defects, cracks or other injurious defects, shall be satisfactorily cleaned for their intended purpose.

3.2.4 Welding:-

Wherever welding is specified or permitted, a welding process, including stress relieve treatment as required if necessary, conforming to an appropriate and widely recognized professional standard shall be used. All welders and welding operators shall be fully qualified by such a standard.

4.0 Mounting

4.1 All equipment on and inside the panels shall be mounted and completely wired to the terminal blocks ready for external connection.

4.2 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 and of permanent nature.

4.3 The manufacturer shall carry out cut out, mounting and wiring of the bought out items which are to be mounted in the panel in accordance with the corresponding equipment manufacturer's drawings.

4.4 The centre line of switches, push buttons and indicating lamps shall be not less than 750 mm from the bottom of the panel. The centre line of relays and meters and recorders shall be not less than 450 mm from the bottom of the panel.

4.5 The centre lines of switches, push buttons and indicating lamps shall be matched to give a neat and uniform appearance. Likewise the top of all meters, relays and recorders etc. shall be in one line.

4.6 The control switches for circuit breakers shall be located on the mimic diagram corresponding to their exact position of the controlled equipment in the single line drawing. The location of the switches shall be within working height from the floor level for easy and comfortable operation.

4.7 No equipment shall be mounted on the doors.

4.8 All the equipment connections and cabling shall be designed and arranged to minimise the risk of fire and damage.

The constructional details and mounting arrangement for various front mounted equipments shall be as per the enclosed drawings. The center lines of any relays, if additionally provided, shall not be less than 450 mm from ground level.

5.0 WIRING

5.1 All wiring shall be carried out with 1100 volts grade single core, multi strand flexible tinned copper wires with PVC insulation which has provided its utility in tropical region against hot and moist climate and vermin (Misc. white ant and cockroaches etc.) Rubber insulated wiring will not be accepted. Wire numberings and colour code for wiring shall be as per IS:5578/1984. The wiring should be encased in suitable width PVC casing. The wiring diagram for various schematics shall be made on thick and laminated durable white paper in permanent black ink and same should be pasted on the inside surface of the door.

5.2 The sizes of wiring in different circuit shall not be less than these specified below:

TABLE-I

Circuit	Permissible size of wire
Metering and Relaying Circuits connected Current Transformer	2.5 mm ²
Potential Circuits for metering and Relaying, Control, Visual Audible Alarms and Signalling Circuit	1.5 mm ²

The following colour schemes shall be used for the Wiring:

TABLE – II

Circuit where used	Colour of Wire
Red Phase of Instrument Transformer Circuits	Red
Yellow Phase of Instrument Transformer Circuits	Yellow
Blue Phase of Instrument Transformer Circuits	Blue
Neutral connection, earthed or not earthed in the instrument Transformer Circuit	Black
A.C. Control Wiring Circuits using auxiliary supply and	Black
D.C. Control Wiring Circuit using Battery Supply	Grey
Earth Connection	Green

5.3

a) All internal wiring shall be securely supported, neatly arranged, readily accessible and connected to equipment terminals and terminal blocks. Wiring gutters & trough shall be used for this purpose.

b) Longitudinal troughs extending throughout the full length of the panel shall be used for inter panel wiring. Inter connections to adjacent panels shall be brought out to a separate set of terminal blocks wires. All bus wiring for inter panel connection shall preferably be provided near the top of the panels running throughout the entire length of the panels.

c) Wiring connected to the space heaters in the cubicles shall have porcelain beaded insulation over a safe length from the heater terminals.

d) 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 to 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 for any purpose. Termination shall be such that no strand of a conductor shall left loose or overhanging. Conductor termination shall be secured to the holding nuts/screws, terminal blocks etc. with washers interposed between the terminals/holding nuts/screw heads. The terminals shall be so connected that no conductor ferrule code gets masked due to overlay of conductors.

e) All spare contacts of relays shall be wired up to terminal blocks.

f) Each wire shall be continuous from end to end and shall not have any joint within itself individually.

g) Wires shall be connected only at the connection terminals or studs of the terminal blocks, meters, relays, instruments and other panel devices.

Terminal Ends of all wires shall be provided with numbered Ferrules. At point of inter-connection where a change of number is necessary, duplicate Ferrules shall be provided with the appropriate numbers on the changing end.

h) At the terminal connection, washers shall be interposed between terminals, wire terminals and the holding nuts. All holding nuts shall be secured by locking nuts. The connection stud shall project at least 6 mm from the lock nut surface. Wire ends shall be so connected at the terminal studs that no wire terminal numbered ferrule gets masked due to succeeding connections. All wires shall be suitable for bending to meet the terminal stud at right angles with the stud axis, and they shall not be skewed.

i) All studs, nuts, bolt_s screws etc. shall be threaded according to the British Standard practice unless EMPLOYER_s prior approval to any other practice of threading is obtained.

6.0 TERMINAL BLOCK CONNECTION

Terminal blocks shall be of clip-on design made out of non-trackable insulating material of 1100 V grade. All terminals shall be stud type, with all current carrying and live parts made of tinned plated brass. The studs shall be of min 4 mm dia brass. The washers, nuts, etc. used for terminal connectors shall also be of tinned plated brass. All blocks shall be shrouded by easily removable shrouds made of transparent die-electric materials.

The terminal connector/blocks shall be disconnecting type terminal connectors for PT and same with automatic shorting of C.T. secondary terminals shall be provided in CT secondary circuit. All other terminal connectors shall be Non-disconnecting type. Terminal should be shock protected in single moulded piece. Terminal block should have screw locking design to prevent loosening of conductor. Provision shall be made on each pillar, for holding 10% extra connection (5% incoming + 5% outgoing).

At least 20% spare terminals for each type shall be provided. All terminals shall be provided with ferrules indelibly marked or numbered and identification shall correspond to the designations on the relevant wiring diagrams. The terminals shall be rated for adequate capacity which shall not be less than 10 Amps for control circuit. For power circuit it shall not be less than 15 Amps.

7.0 SPACE FOR CONTROL CABLES AND CABLE GLANDS

Sufficient space for receiving the Control Cables inside the Panel at the bottom of the cubicles and mounting arrangement for the terminal cable glands shall be provided. Removable type separate cable entry plate (may be two) shall be fixed with bottom plate. The specification does not cover supply of control cables and cable glands for which the EMPLOYER will make separate arrangement.

8.0 SPACE HEATERS

240 V, 50 HZ Tubular Space Heaters suitable for connection to the Single Phase A.C. Supply complete with On-Off Switches located at convenient position shall be provided at the bottom of the Panel to prevent condensation of moisture. The Watt loss per Unit surface of heater shall be low enough to keep surface temperature well below sensible heat. A thermostat control unit with variable temperature shall be installed to control the heater. The 240 V AC supply for the heater shall be controlled by a suitably rated single pole miniature circuit breaker compartment to be mounted on an insulator. One AC Ammeter with 0-1.0 Amp range shall be provided in series with the heater to monitor the current drawal of the Heater.

9.0 DISTRIBUTION AND CONTROL OF AUX. POWER CIRCUIT

9.1. D.C. CIRCUIT

There shall be only one 30V D.C. for the entire Control and Relay Panel fed from a D.C. Distribution Panel. A continuous D.C. Bus shall be provided in the Control and Relay Panel and D.C. supply for control, protection, indication and supervision of circuit breaker and other equipment shall be teed off from D.C. bus through a set of 20 Amp rated H.R.C. Fuse on positive and negative side. D.C. supply to be teed off shall be distributed within the Panel as below:

- (a) Control DC scheme both positive and negative side with 16 Amp fuse
- (b) Close/Trip Ckt 1 and Trip Ckt 2 without fuse; closing circuit with 10A fuse.
- (c) Indication Circuit through a set of 6 Amp. HRC Fuse both at +ve and -ve side
- (d) Protective relay circuits through 6A fuse both at +ve and -ve side
- (e) Annunciation ckt with 6Amp fuse on both at +ve and -ve side
- (f) DC Emergency Lamp with 6Amp fuse both at +ve and -ve side

Three nos. of D.C. operated no-volt auxiliary relay(self reset type) provided with hand reset type flag with inscription — Main D.C. Fail , _Control Dc fail & Protection DC fail with 4NO+4NC in each relay. 2 NC contact for _DC fail_ alarm and Indication, 1NO wired upto SCADA TB and 1NO wired upto spare TB.

One Push button having N/C Contact used in Series with the above relay for _D.C. Fall Test_ purpose.

9.2. A.C. CIRCUITS

230 Volts, Single Phase A.C. Aux. Supply to the Control and Relay Panel will be fed from A.C. Distribution Panel through a 16Amp MCB provided there. One 16 Amps rated HRC Fuse shall be provided at the Control & Relay Panel for the Incoming A.C. Supply. Two A.C. operated no volt auxiliary relay (self reset type) rated for

230V shall be provided with hand reset flag with inscription — _A.C. Fail & DC Fail Accept with 4NO+4NC contacts for each relay. One push button having N/C Contact used in Series with above relay for—A.C. Fail Test_ purpose.

9.3. Intentionally left blank

9.4. FUSE AND LINK

Fuses shall be of cartridge type. Carrier and base for the fuse and links for all D.C. and A.C. Circuits shall have imprint of rating, voltage and circuit designation.

9.5. MIMIC DIAGRAMS

a) Provision shall be made for 10 mm. wide painted and overall drawing mimic diagram by the EMPLOYER on the exterior of the front panel to represent the single line arrangement of the station equipment. Provision shall be made in such a way that centre line of the mimic bus shall be at a suitable height from the bottom of the C&R Panel.

b) Colour scheme for mimic diagram as follows:-

KV Class	C o l o u r	Shade Index as per ISS
33 KV	Brilliant green	221
11 KV	Air Craft blue	108
400/230 V	Black	309
Earth	White	-
110 V	Canary yellow	-

c) In 33 KV simplex type C&R panels, Symbol marking for the position indication of isolators, earth switches etc, ON/OFF indication for Circuit breaker, PT supply indication, CB spring charge, auto trip, trip ckt healthy etc. shall be mounted along the mimic diagram at appropriate location. Non-Discrepancy type control switch for the C.B. shall be mounted within the mimic, indicating the C.B. ON/OFF status.

10.0 Labeling

All front mounted as well as internally mounted items including MCBs shall be provided with individual identification labels. Labels shall be mounted directly below the respective equipment and shall clearly indicate the equipment designation. Labelling shall be on aluminium anodised plates of 1 mm thickness, letters are to be properly engraved.

11.0 Earth Bus

Each panel shall be provided with two earth bus of size 25 x 6 mm (min) each. The earth bus shall be of tinned plated copper, and all metallic cases of relays, instruments etc. shall be connected to this earth bus independently for their effective earthing. The wire used for earth connections shall have green insulation.

12.0 Circuit breaker Control Switch:

12.1 PISTOL GRIP TYPE Non- discrepancy T-N-C spring return type switch shall be provided for remote operation of circuit breaker to ensure that manual pumping of closing solenoid not possible. The switch shall be mounted in the mimic diagram itself such that the stay-put ('N') position will render the continuity of the mimic. One green LED for 'breaker open' indication and one red LED for 'breaker closed' indication shall also be provided adjacent to the T-N-C switch.

12.2 Switches should have finger touch proof terminals. For the convenience of maintenance, screw driver guide should be from top/bottom of the switch and not from the side. Terminal wire should be inserted from the side of the switch terminal.

12.3 Terminal screws must be captive to avoid misplace during maintenance.

12.4 Switch shall be with 48 mm x 48 mm escutcheon plate marked with Trip & Close.

12.5 Trip-neutral-close, with pistol grip handle must be pushed in to spring return to either trip or close position from Neutral position for safety and not just turn to trip.

12.6 One contact to close in each position of Trip and Close. Contact rating shall be 12A at 30 V DC.

12.7 One spare contact is required in off & on position.

13.0 Local/Remote switch:

Local/Remote switch should be 4-pole, 2 way Lockable and stay put type.

14.0 INDICATING LAMPS & CONTACT MULTIPLIER

i) INDICATING LAMPS

L.E.D. Type Indicating Lamps shall be provided on the Control Panel to indicate the following:

S. No.	Functions	Quantity	Colour of Lamp
1	C.B. Spring charged indication	1 No.	Blue
2	C.B. trip Coil/Circuit healthy indication	2 No.	White
3	C.B. Auto tripped indication	1 No.	Amber
4	Panel D.C. Fail indication	1 No.	Amber
5	P.T. Supply indicating Lamp	2 sets	Red/Yellow/Blue
6	C.B. —ON indication	1 No.	Red
7	C.B. —OFF indication	1 No.	Green

All the lamps shall be connected to the auxiliary D.C. supply of the Sub-Station except Sl. No. (4) & Sl. No. (5) which should be connected to the auxiliary A.C. supply and P.T. Secondary supply respectively. The Lamp shall be suitable for Panel purpose and shall be Low Watt consumption. All indicators shall have bright LEDs having long life. Conventional bulbs are not acceptable. The indicating LEDs with resistors shall withstand 120% of rated voltage on a continuous basis. However, the specification of indicating lamps may likely to be changed/ modified as per requirement of EMPLOYER.

Lamps for circuit breaker —ON, —OFF, —TRIP CKT HEALTHY and —AUTO TRIP indications. LED indicating lamp complete with static circuits and features should be supplied with Low voltage protection circuit (LVGP) and surge suppressor circuit having LED indication. Lamp assembly should be of fire – retardant glass epoxy PCB, industrial heat resistant, fire resistant, non hygroscopic DMC material, chrome – plated corrosion resistant solid brass bezel, polycarbonate lens in desired colour shades of Red, Green, Amber, Yellow etc. the intensity of light should be minimum 100 mcd at 20 mA. Indication lamp should be suitable to operate on 30 V direct current supply source.

ii) Contact Multiplier

230 Volts, Single Phase, 50 hz A.C.. Supply operated Contact Multiplier to be provided, if required.

15.0 TERMINAL BLOCK / TTB

1. Terminal Blocks for incoming A.C and D.C. Circuit and C.T., P.T. & SCADA Circuit should be located on the left hand side and Transformer supervision, breaker control and spare in right hand side of the wall of the Panel seen from back side respectively.

2. 3-Phase, 4-Wire Link type Test Terminal Block having sealing provision shall be provided in Metering Circuit of each Panel.

16.0 Intentionally left blank.

17.0 PANEL LIGHTING

1. The Panel interior shall be illuminated by LED lamps connected to 230 Volt Single Phase A.C. The illumination of the interior shall be free from shadows and shall be planned to avoid any strain or fatigue to the wireman likely to be caused due to sub-normal or non-uniform illumination. One emergency D.C. light shall be provided for each panel with individual switch with proper identification mark.

2. A toggle switch or door operated switch shall be provided for control of A.C. lighting in each panel.

3. One combined 15 Amps. 3-Pin and 5 Amps. 2-Pin Power Socket outlet together with Plus

Pins shall be provided at convenient points in each Panel for A.C. Supply.

18.0 ANNUNCIATOR

A. ELECTRONIC ANNUNCIATOR

1. Suitable Multi-way Microprocessor based electronic Annunciator for the visual and audible alarm on the control panel using bright LEDs shall be provided in each panel to indicate over current and earth fault protection operated. In addition to above, each electronic annunciator of Transformer Control Panel shall have provision to indicate Transformer trouble trip/alarm function operated. Also one window of the Annunciator shall have to be used for Non-Trip A.C. Fail Alarm Indication and one window for Trip Circuit unhealthy indication. Each Electronic Annunciator shall have provision for connection with accept/reset/lamp test/mute Push buttons for proper functions. Electronic annunciator shall have provision for connection with Electronic Buzzer/Electronic Bell for Trip & Non-Trip Audio Alarm of common annunciation scheme. Electronic Annunciation shall have provision for flashing illuminating display with inscription for operation of respective Protection Relay. The Micro-Processor based Electronic Annunciator should have separate coloured windows for Trip & Non-Trip Annunciation for easy detection.

2. Annunciator fascia units shall have translucent plastic windows for each alarm point.

3. Electronic Annunciator shall have first Fault Indication Facilities & System Watch Dog

4. Annunciator fascia plate shall be engraved in black lettering with respective alarm inscription as specified. Alarm inscriptions shall be engraved on each window in not more than three lines and size of the lettering shall be about 5 mm. The inscriptions shall be visible only when the respective fascia LED will glow.

5. Annunciator fascia units shall be suitable for flush mounting on panels. Replacement of individual fascia inscription plate and LED shall be possible from front of the panel.

6. Unless otherwise specified, one alarm buzzer meant for non-trip alarms and one bell meant for trip alarms shall be provided in each control panel (mounted inside).

7. Each annunciator shall be provided with 'Accept', 'Reset' and 'Test' push buttons, in addition to external PB.

8. Special precaution shall be taken by the manufacturer to ensure that spurious alarm conditions do not appear due to influence of external magnetic fields on the annunciator wiring and switching disturbances from the neighbouring circuits within the panels.

9. In case 'RESET' push button is pressed before abnormality is cleared, the LEDs shall continue to glow steadily and shall go out only when normal condition is restored.

10. Any new annunciation appearing after the operation of 'Accept' for previous annunciation, shall provide a fresh audible alarm with accompanied visual alarm, even if the process of "acknowledging" or "resetting" of previous alarm is going on or is yet to be carried out.

B. Provision for testing healthiness of visual and audible alarm circuits of annunciator shall be available.

16 Window Annunciation Scheme for Power Transformer (individually controlled) to indicate following functions:-		
1	Differential protection(87) operated	1 no.
2	Non-directional protection (O/C+E/F) operated	1 no.
3	Oil Temp./Winding Temp/MOG Alarm for transformer	1 no.
4	Oil Temp./Winding Temp Trip for transformer	1 no.
5	REF 64R(HV side) tripped	1 no.
6	REF 164R(LV side) tripped	1 no.
7	Buchholz Alarm for transformer	1 no.
8	Buchholz Trip for transformer	1 no.
9	OLTC Buchholz/ Main Tank PRV Trip for transformer	1 no.
10	AC fail	1 no.
11	Trip Circuit/Coil 1or Trip Circuit/Coil 2 Unhealthy	1 no.
12	Non-directional O/C & E/F Relay Trouble	1 no.
13	Differential relay trouble	1 no.
14	Spare	1 no.
15	Spare	1 no.
16	Spare	1 no.
Mounting		Flush
No. of facia windows		16
Supply voltage		30 V DC
No. of LEDs per window		2
Lettering on facia plate		Properly engraved

12 Window Annunciation Scheme for Feeders to indicate following functions :-		
i)	Non-directional O/C operated	1 No
ii)	Non-directional E/F operated	1 No
iii)	Panel D.C. Fail	1 No
iv)	Trip Circuit Coil 2 Unhealthy	1 no.
v)	Panel AC fail	1 no.
vi)	Trip Circuit/Coil 1 Unhealthy	1 no.
vii)	Non-directional O/C & E/F Relay Trouble	1 no.
viii)	PT MCB Tripped	1 No
ix)	Spare	1 no
x)	Spare	1 no.
xi)	Spare	1 no.
xii)	Spare	1 no.
Mounting		Flush
No. of facia windows		12
Supply voltage		30 V DC
No. of LEDs per window		2
Lettering on facia plate		Properly engraved

C. PANEL D.C. FAIL ALARM SCHEME

Control & Relay Panel shall have a common — Panel D.C. Fail Alarm Scheme operated by 230 V Single phase A.C. Aux. Supply for audible as well as visual alarm in case of failure of D.C. incoming supply to the Panel.

Another Single Element Relay without Flag and 1 no. self-reset type N/O & 1 no. N/C contact having inscription Panel D.C. fail_ alarm accept Relay shall be provided. Besides above, 1 no. Indicating Lamp, 1 no. A.C. Operated Electric Hooter and 2 nos. Push Button, one having 1 no. N/C contact, the other having 1 no. N/O contact shall also be provided for successful operation of the scheme. All auxiliary relays required to render Annunciation System operative and shall be considered to be within the scope of the tender.

AC fail, DC fail scheme shall be operated by relay not contactor.

19.0 INDICATING INSTRUMENT AND METERS

a. All instruments shall be flush mounted, back connected type and provided with dust tight cases for tropical use with dull black enamel finish. All fixing screws, nuts and threaded parts shall be designed to Indian Standards.

- b. All instruments shall be of class 0.5 type. The calibration of the instruments shall function satisfactorily when mounted on steel panels or alternatively magnetically shielded instruments shall be used.
- c. Instruments shall be capable of indicating freely when operated continuously at any temperature from 0 to 50 degree C.
- d. All circuits of instruments shall be capable of withstanding applied load of 20% greater than the rated capacity for a period of eight hours.
- e. The instruments shall be capable of withstanding the effect of shock vibration and a di- electric test of 2000 Volts r.m.s. to ground for one minute as per relevant ISS.

19.1 Ammeters:

All ammeters shall be provided with direct reading scale. Full Scale Value of the Ammeters shall be 100% of the nominal current of maximum C.T. ratio. The ammeters shall be connected to measuring C.T. Core. Ammeters shall be suitable for R.Y.B. Phase measurements. However, the ammeters to be supplied shall be of type —DIGITALI. The auxiliary power of the ammeters should be 230V AC.

19.2 Voltmeters

Volt Meter shall be provided with direct reading scale. The maximum value of the volt-scale be 15% in excess of the normal Circuit Voltage. The rated voltage of the Volt Meter shall be 110V A.C. However, the voltmeters to be supplied shall be of type —DIGITALI. The auxiliary power of the voltmeters should be 230V AC.

a. Voltmeter Selector Switch:

One Voltmeter selector switch having 7 position 6 way stay-put type shall be provided.

b. PT Selector Switch: One PT selector switch, 2 position, stayput type shall be provided.

19.3 3-Phase 4-Wire AC Static DLMS Complaint Trivector Meter, Category A, Class 0.5s accuracy for control panel

1.0 SCOPE

This specification covers the design, engineering, manufacture, assembly, inspection, type testing, testing at manufacturers works before dispatch, packing supply and delivery at site, insurance during transit and storage, subsequent storage erection and commissioning at site, static energy meter of class 0.5s accuracy to be housed in C&R panels of 33 & 11 kV feeders.

The meter should be 3 phase 4 wire type, suitable for energy measurement of solidly earthed balanced / unbalanced 3-Phase system with a power factor range of zero lagging to zero leading.

The meter shall consist of measuring element, registers, operational indicators and test outputs enclosed together in the meter case.

2.0 STANDARDS APPLICABLE

Unless otherwise specified elsewhere in this specification, the performance & testing of the meters shall conform to the following Indian/International standards with updated and latest amendments/revisions thereof.

S. No.	Standard No.	Title
1	IS 14697-1999	AC Static Watthour HT Meters for active energy Class
2	IS -15959	DLMS
2	BIS 12063	Specification for degree of protection
3	CBIP Report No.-88	Specification for AC Static Electrical Energy Meters

3.0 CLIMATIC CONDITION

The meters be supplied against this specification shall be suitable for satisfactory continuous operation under the following tropical conditions. Meters shall be capable of maintaining required accuracy under hot, tropical and dusty climate.

- i) Maximum Ambient Air Temperature in shade : 55°C
- ii) Minimum Ambient Air Temperature : -10°C.
- iii) Maximum Relative Humidity(condensing) : 95%
- iv) Minimum Relative Humidity : 10%
- v) Height above mean sea level* : Upto 2200 meters
- v) Average number of tropical monsoon (conditions/annum) : 5 months
- vi) Annual Rainfall : 100 mm to 1500 mm
- vii) Wind Pressure : 200 kg/sqm
- viii) Noise level : 45 DB

The meter should be able to perform satisfactorily in moderately hot and humid climate, conducive to rust and fungus growth. The climate conditions are also prone to wide variations in the ambient conditions. The meter shall work satisfactorily even under lightning conditions and also the meter performance and life shall not be affected due to smoke present in the atmosphere.

The specifications are applicable for meter installation upto an altitude of 2200 meter above mean sea level. For meters to be used for an altitude of above 2200 MSL necessary corrections shall have to be carried out in BIL and one minute power frequency with stand voltage capability as per relevant standard.

4.0 SUPPLY SYSTEM

Type of Installation	:	Indoor in panels
System	:	3-phase, 4-wire
System Voltage (Vref)	:	3 x 110 volt ph-ph
System frequency	:	50 Hz
No. of Phases	:	3
System of Earthing	:	Solidly grounded

The voltage signal shall be taken from PT. The PT secondary voltage shall be 110 volts ph-ph. The CT's shall be of secondary current 1A/5A. However the contractor shall confirm the PT and CT ratios used for multiplying factor. The meter shall be suitable for balance as well as unbalance loads at all power factors.

5.0 POWER FACTOR RANGE

The meter shall be suitable for full power factor range from Zero (lag) to Unity to Zero (lead).

6.0 POWER SUPPLY VARIATION

Energy meter along with its accessories shall withstand following extreme operating conditions.

Voltage	:	70% to 120 % of V ref
Frequency	:	45 Hz to 55 Hz

The manufacturer can also offer meters, which can withstand higher variations.

7.0 ACCURACY

The class of accuracy of the meter shall be 0.5s. The accuracy should not drift with time.

8.0 POWER CONSUMPTION

8.1 The active and apparent power consumption on each voltage circuit including power supply of the meter at ref. Voltage, temperature and frequency shall not exceed 1.5 watts/phase or 8VA / phase. (as per IS 14697:1999)

8.2 The apparent power drawn by each current circuit of the meter shall not exceed 1 VA/phase at basic current, reference frequency and reference temperature (as per IS 14697:1999).

9.0 STARTING CURRENT

The meter shall start registering energy at 0.1% of basic current at unity power factor and shall be fully functional within five seconds after the rated voltage is applied.

When the voltage is applied with no current flowing in the current circuit, the meter shall not register any energy and the test output of the meter shall not be more than 1 pulse per count on no load.

10.0 MAXIMUM CONTINUOUS CURRENT

The maximum continuous current in meters shall be 200% of rated basic current (Ib) at which the meter purports to meet the accuracy requirements as per the relevant standards.

11.0 GENERAL & CONSTRUCTIONAL REQUIREMENTS

11.1 Meters shall be designed and constructed in such a way so as to avoid causing any danger during use and under normal conditions. However, the following should be ensured.

- a) Personal safety against electric shock
- b) Personal safety against effects of excessive temperature.
- c) Protection against spread of fire
- d) Protection against penetration of solid objects, dust & water
- e) Detection against fraud
- e) Detection against pilferage

11.2 The meter shall be designed with application specific integrated circuit and shall be manufactured using SMT (Surface Mount Technology). Power supply and voltage divider circuits may be of PTH technology. The meter should be housed in a safe, high grade engineering plastic / polycarbonate casing, which is of projection mounting type and is dust/moisture proof, conforming to IP-51 of BIS 12063 / IEC 529.

11.3 All insulating material used in the construction of meters shall be non-hygroscopic, non-ageing and of tested quality. All parts that are likely to develop corrosion shall be effectively protected against corrosion during operating life by providing suitable protective coating.

11.4 The meter shall be supplied with a transparent extended terminal block cover (ETBC). The meter base, meter cover, terminal block and ETBC shall be made of unbreakable high grade fire resistant non-flammable reinforced, polycarbonate (not bakelite) or equivalent high grade engineering plastic, which should form an extension of meter cases and have terminal holes and shall be of sufficient size to accommodate insulation of the conductors, meeting the requirement of CBIP technical report CBIP.88.

The extended terminal block cover should be separately sealable at two places and housed at the bottom of the meters and once sealed should prevent unauthorized tampering.

The terminal block should have sufficient insulating properties, mechanical strength and should have tin plated solid brass terminals with two fixing screws per terminal. The terminals should be designed to withstand high overload.

11.5 The meter should not get damaged or substantially influenced by the electromagnetic disturbances and electrostatic discharges caused by harmonics, voltage dips and short interruptions, transients, DC and AC magnetic field.

11.6 The meter shall have an operation indication device such as a blinking LED/ LCD. The operation indicator shall be visible from the front window and capable of being monitored conveniently with suitable testing equipment.

11.7 The meter shall conform to the degree of protection IP 51 but without suction in the meter as per IS:12063/IEC:529 for protection against ingress of dust, moisture and vermin's.

11.8 The meter-base, meter cover, terminal block and ETBC shall be made of unbreakable, high grade, fire resistant, reinforced, non-flammable, polycarbonate or equivalent high grade and good quality engineering plastic.

11.9 The meter cover shall have one window. The window shall be of transparent, high grade engineering plastic for easy reading of all the displayed values/parameters, name plate details and observation of operation indicator. The window shall be ultrasonically welded with the meter cover such that it cannot be removed undamaged without breaking the meter cover seals.

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

11.11 The meter shall have tin plated brass terminals. The terminals shall have suitable construction with barriers and cover to provide firm and safe connection of current and voltage leads of stranded copper conductors or copper reducer type terminal ends (thimbles).

11.12 The manner of fixing the conductors to the terminal block shall ensure adequate and durable contact such that there is no risk of loosening or undue heating. Screw connections transmitting contact force and screw fixing which may be loosened and tightened several times during the life of the meter shall be such that the risk of corrosion resulting from contact with any other metal part is minimized. Electrical connections shall be so designed that contact pressure is not transmitted through insulating material. The internal diameter of the terminal holes shall be 5.0 mm minimum. The clearance and creepage distance shall conform to relevant clause of IS 14697:1999/CBIP technical report No.88.

11.13 The meter shall be compact in design. The entire construction shall be capable of withstanding stresses likely to occur in actual service and rough handling during transportation. The meter shall be convenient to transport and immune to shock and vibration during transportation and handling.

11.14 The meter shall have a design to operate satisfactory for 10 years under normal electrical condition and guaranteed life of 18 months from the date of commissioning against manufacturing and design defects. The meters found defective within guaranteed period shall be replaced by supplier free of cost within one month of intimation.

11.15 The meter shall be provided with accurate quartz crystal based real time clock and calendar with the accuracy limit as per relevant standards. Meter shall have provision to synchronise the meter time with standard time through CMRI with proper security system.

11.16 The integration period shall be set as 15 minutes and subsequently can be changed on real-time basis.

11.17 Vendor will give predefined copies (Qty. indicated in Bid Proposal Sheets) of all the software's (meter reading software for CMRI, Base computer software for meter data analysis and technical details).

11.18 It should be possible to check the healthiness of phase voltages by displaying all the voltages on the meter display.

11.19 The meter shall have provision to be read in the absence of power. A capacitor-resistor combination of suitable capacity be included in the circuit which may provide energy for reading the meter display in absence of power supply, or through an external source as per provision of G-14 of IS 14697-1999. An inductive coupling arrangement shall be preferred so that it should not be possible to damage the circuitry of the meter by applying excess voltage directly in the meter.

11.20 The meter should work accurately irrespective of phase sequence of the mains supply.

11.21 The meter should remain powered up and functional even when either any two phases are available to the meter

11.22 Data Security: The Meter shall have multilevel password for data protection and security. The meter data retrieval shall be possible through authenticated CMRI. The meter shall support the event of change of TOD register timings / no. of TOD registers, demand integration period and /or setting the meter time through authenticated transaction and shall be logged as an event. The transaction events shall be available for viewing at BCS end.

11.23 The meter data shall be retrievable through CMRI and will be downloaded in the Base computer software for viewing, analysing and printing. The meter data downloaded at BCS end should be in user-friendly formats. The supplier shall supply the required software for base computer system. The base computer software shall have the facility to convert the required data (For billing, Energy Audit, tamper analysis purpose) in to ASCII format. This data should be possible to be used as input data for any other software to generate desired reports as per the utility requirement.

11.24 The meter shall have radio interference suppression such that it should not generate noise, which could interfere with the other equipment.

11.25 The meter shall have three fixing holes, one at the top and two at the bottom. The top hole shall be provided with a special clip at the back of the meter so that holding screw is not accessible to the consumer after fixing the meters. The lower fixing screws shall be provided under the sealed terminal cover. The requisite fixing screws shall be supplied with each meter.

12.0 SEALING OF METER

Reliable sealing arrangement should be provided to make the meter tamper proof and avoid fiddling or tampering by unauthorized persons. For this, at least Two no. of seals on meter body, Two no. of seals on meter terminal cover and One no. of seal on each communication port shall be provided. All the seals shall be provided in front side only.

13.0 NAME-PLATE MARKING OF THE METER

The marking on every meter shall be in accordance with relevant clauses of IS 14697/1999.

Every meter shall have name plate beneath the meter cover such that the name plate cannot be accessed without opening the meter cover and without breaking the seals of the meter cover and the name plate shall be marked distinctly and indelibly. The basic marking on the meter nameplate shall be as follows:

- a) Manufacturer's name & trade mark
- b) Type Designation
- c) No. of phases & wires
- d) Serial number
- e) Month and Year of manufacture
- f) Reference Voltage
- g) Rated secondary Current of CT
- h) Reference Standard : 14697
- i) Principal unit(s) of measurement
- j) Meter Constant (imp/kwh, kvARh,KVAh)
- k) Class index of meter
- l) "Property of _____"
- m) Purchase Order No. & Date
- n) Guarantee period

14.0 CONNECTION DIAGRAM & TERMINAL MARKINGS

The terminals shall be marked properly on terminal block for giving external connections. A diagram of connections should be provided inside the cover of terminal block. The terminal cover shall be extended such that when it is placed in position it is not possible to approach the connections or connecting wires. The terminals and the screws shall be suitable to carry upto 150% of I_{max} safely. The terminals shall have suitable construction with barriers and covers to provide secure and safe connections.

15.0 COMMUNICATION CAPABILITY

A) The meter shall be provided with a galvanically isolated optical communication port as per IEC 1107/PACT/ANSI with sealing arrangement so that it can be easily connected to a CMRI (Common Meter Reading Instrument) for data transfer or transfer of data through remote metering device such as modem / multiplexer, etc. The optical communication port shall also have sealing provision.

16. Software

Licensed copies of the following softwares shall be made available and shall be installed on each common meter reading instrument (CMRI) and Base computer software (BCS) by the supplier.

17.0 CALIBRATION AND TEST OUTPUT

The meter should have test output accessible from the front and be capable of being monitored with suitable testing equipment. The operation indicator must be visible from the front. Test output device shall be provided

in the form of one common LED for KWh, KVARh and KVAh with provision of selecting the parameter being tested. The test output device should have constant pulse rate in terms of pulse/unit energy.

The meter shall be tested, calibrated and sealed at works before dispatch. Further, no modification or calibration shall be possible at site by any means.

The resolution of the test output shall be sufficient to enable the static current test in less than 10 minutes.

18.0 DISPLAY

A real time quartz clock shall be used in the meter for maintaining time and calendar date. The maximum drift shall not exceed 5 minutes per year. The uncertainty of setting initial time shall not exceed ± 30 Seconds with respect to Indian standard time (Ref NPL New Delhi).

Facility for adjustment of real time shall be provided through CMRI with proper security.

The meter shall have a minimum 7 digit, 7 segment display of liquid crystal display (LCD) or light emission diode display (LED) with another digit for legend. The minimum character height shall be 10 mm. Provision shall be made to read consumption in either whole units or decimal multiples or sub-multiples of one possible to display content of relevant parameters with another digit displaying legend for identification.

The display shall remain on the screen till operator presses button for subsequent display or 10 sec whichever is earlier.

The meter should have non-volatile memory, so that the registered parameters will not be affected by loss of power. A provision shall be made to read the meter parameters such as MD and consumption, etc., through the meter cover without actually opening the meter box cover. The non-volatile memory should have a minimum retention time of 10 years under unpowered condition.

19.0 DISPLAY SEQUENCE

The meter shall display the required parameters in two different modes as follows :

A. Auto Display Mode

Display test (LCD/LED Segment check)

- Real time & date
- Active energy (KWh) forwarded
- Reactive energy lag (kVARh)
- Reactive energy lead (kVARh)
- Apparent energy forwarded (kVAh)
- Maximum Demand forwarded (kVA)
- MD occurrence date and time
- Rising demand with elapsed time
- MD reset count
- Cumulative MD kVA forwarded
- Instantaneous average 3 ϕ PF
- Instantaneous frequency
- Phase voltages R,Y,B
- Phase currents R,Y,B
- Cumulative power on hours of current month

B. Push Button Mode

All above & the following

- Tamper and fraud details
- Present CT status
- Last occurrence tamper ID
- Date and time of last tamper occurrence
- Last restoration tamper ID
- Date and time of last tamper restoration
- Cumulative tamper count
- TOD Register [Active forwarded energy (8 Nos)]
- TOD Register [Apparent forwarded energy (8 Nos)]
- TOD Register [Apparent forward MD (8 Nos)] □
- Cumulative power on hours

i. Read Out Parameters with CMRI

All above including following

- Energy registers
- Billing registers

- TOD Registers
- Load survey data
- Tamper and fraud (all event details with date and time)
- Self diagnostic details
- Real time calendar clock fail
- Battery bad flag
- History of monthly Energy Flow, Maximum Demand, Average power factor for the last 12 months

20.0 MAXIMUM DEMAND REGISTER

The maximum demand is to be monitored during each demand interval set with 30 minutes integration and the maximum of these in a month shall be stored. Whenever MD is reset the maximum demand value so registered shall be stored along with date and time. Under the current integration period, the rising demand should be displayed continuously along with the elapsed time. The registered demand and the number of times the MD is reset shall also be displayed and the information stored.

21.0 MAXIMUM DEMAND RESET

Facility for auto reset of MD at 00.00 hrs of first of every month shall be provided for which minimum 10 years calendar shall be programmed by the manufacturer.

The meter shall display the maximum demand reset count.

22.0 LOAD SURVEY CAPABILITY

Load survey shall be available for at least 60 days with 15 minutes load survey integration period. Vendor shall provide necessary facility to transfer data through CMRI/Public Switch Telephone Network-PSTN/Low Power Radio (LPR). Load Survey shall be run time configurable and shall be able to choose any of the below mentioned parameters. The survey shall be factory programmable and parameter & integration period will be informed to the supplier at the time of ordering.

- a) Daily average (0 to 24 hours data) for last 60 days
 - i) kWh forwarded
 - ii) kVAh forwarded
 - iii) kVARh lag
 - iv) kVARh lead
- b) Daily peaks and lows of last 60 days as:-
 - i) Voltage (average of 15 minutes period phase-wise)
 - ii) Current (average of 15 minutes period phase-wise)

c) Daily maximum demand 15 minute periods.

The load survey data should be available in the form of bar charts as well as in spread sheets. The BCS shall have the facility to give complete load survey data both in numeric and graphic form.

It shall be possible to select either demand or energy view at the BCS end. The above load survey data should be available in the form of bar charts as well as in spreadsheets. The BCS shall have the facility to give complete load survey data both in numeric and graphic form.

The load survey data, abnormality event information and instantaneous parameters data shall all be retrievable through the meter's communication port from a common meter reading instrument (CMRI)/ Hand Held Unit and shall be transferred (downloaded) to a PC with user friendly Windows based software to get complete details in numerical and/or graphic form. The necessary base computer software (BCS) for this purpose shall be provided by the supplier with complete details.

The meter shall have sufficient non-volatile memory for recording history of energy parameters for last twelve billing cycles (Bill date shall be 00 hrs of the 1st date of the calendar month by default – programmable) and information should be made available at the BCS end:

23.0 TIME-OF-DAY (TOD) TARIFF/DEMAND

The meter should have provision of registering the time-of-day energy and maximum demand. It shall be possible to define TOD register for active forwarded, apparent forwarded energy type.

Schedule of TOD :-

5am to 5 pm

5pm to 11 pm

11pm to 5 am

The meter should have in-built capacity to define up to eight (8) time zones through operation of CMRI. The change of the TOD time-period(s) or changing number of TOD zones should be possible through CMRI with

special authenticated command from the BCS so that only authorised person(s) can make such changes. The main control of this system along with proper security password/code should be available on one or more computers located at the authorised location(s) as per the directions to be given by the Purchaser

24.0 SELF DIAGNOSTIC FEATURE

24.1 The meter shall be capable of performing complete self diagnostic check to monitor the circuits for any malfunctioning to ensure integrity of data memory location at all times. The meter shall have indications for unsatisfactory/nonfunctioning/malfunctioning of the following:

- Real Time and Date
- All display segments as per the requirement
- Nonvolatile memory (NVM) failure indication at BCS
- Low battery indication at BCS

24.2 While installing the meter, it should be possible to check the correctness of Current and Voltage Transformer connections to the meter and their polarity from the functioning of the meter for different voltage injections with the help of vector/phaser diagrams. For this purpose a suitable software for field diagnosis of meter connections with the help of Meter Reading Instrument should be supplied.

25.0 TAMPER & FRAUD PROTECTION

The meter shall function properly under following common abnormal conditions :

1. Phase sequence reversal	The meter shall keep working accurately irrespective of the phase sequence of the supply.
2. Current reversal/CT polarity reversal	The meter shall log energy in forward direction even if the current is flowing in reverse direction in one or more phases.
3 External magnetic influence	The metering system shall be provided with adequate magnetic shielding so that any external magnetic field (AC Electro Magnet or DC Magnet) as per the values specified in CBIP Technical Report No.88 (with latest amendments) applied on the metering system shall not affect the proper functioning and recording of energy as per error limits prescribed by CBIP.

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

- Missing Potential & Potential imbalance:** The meter shall be capable of detecting and recording occurrence and restoration with date and time the cases of Potential failure which could happen due to disconnection of potential leads (one or two), failure of phase line fuse from the Potential Transformer primary side. Meter shall also detect and log cases of voltage unbalance (from 5% for more than 5 minutes or more (programmable)) of voltages.
- Voltage High / Voltage Low:** In case the average 3 phase voltage remains less (below 0.75Vref by default) than or above (above 1.15Vref by default) for a predefined period (30 minutes by default), the meter shall log such incidences with date & time. The voltage thresholds & persistence time shall be programmable using the CMRI & BCS. This abnormal condition shall be logged only when all the three-phase voltage is available.
- Current imbalance:** The meter shall be capable of detecting and recording occurrence and restoration with date and time of Current unbalance (30% or more for more than 15 minutes, or as programmable).
- Current Circuit Short:** The meter shall be capable of detecting and recording occurrences and restoration of shorting of any one or two phases of current circuit to identify events like CT saturation, CT lead shorting, CT inter turns short etc.
- Current Circuit Open:** The meter shall be capable of detecting and recording occurrences and restoration of opening of any one or two phases of current circuit which can happen due to intentional / accidental disconnection of current circuits. The meter shall be able to log abnormality conditions in current open event like CT leads burns, loose connection, CT winding open etc in the meter memory. No load condition should not be recorded in meter memory as a Current circuit open event.
- Power on/off:** The meter shall be capable to record power on /off events in the meter memory. All potential failure should be recorded as power off event.
- High Neutral Current :** The meter shall be capable of recording incidences of excess neutral current (if I_n is in excess of $x\%$ of I_b – programmable). The limits shall be define by the purchaser during the time of final supply.

The meter shall record the total duration of the above abnormalities , time and date of their occurrences & restorations with a snap shot of electrical conditions viz. Voltage , current ,PF etc

Logic for calculation of voltage and current imbalance shall be furnished by the tenderer.

The meter shall keep records for the minimum last 250 events (occurrence + restoration) for above of abnormal conditions . It shall be possible to retrieve the abnormal event data along-with all related snap- shots' data

through the meter's optical port with the help of a hand held unit (HHU) and download the same to the BCS where it shall be available for viewing. All this information shall be made available in simple and easily understandable format.

26.0 TAMPER LOGIC

Properly designed meter event logic should be provided. There shall be separate compartments for logging of potential related event, current related event and power on/off event. The bidder should explain the events details in each compartment under their offer.

The logging of various events in each compartment should be as under:

Once one or more compartments have become full, the last event pertaining to the same compartment will be entered and the earliest (first one)-event should disappear. Thus, in this manner each succeeding event will replace the earliest recorded event, compartment wise. Events of one compartment/category should overwrite the events of their own compartment/category only.

A properly defined meter tamper logic should be provided. The tamper logic should be capable of discriminating the system abnormalities from source side and load side and it should not log/record tamper due to source side abnormalities.

There shall be three separate compartments for logging of different types of tampers as follows:

Compartment No. 1 :

50 % of the tamper memory space shall be allocated for the following current related tampers

- CT polarity reversal
- CT open circuit
- CT short (bypass)

Compartment No. 2 :

25 % of the tamper memory space shall be allocated for missing potential tampers.

Compartment No. 3 :

25 % of the tamper memory space shall be allocated for current unbalance tampers

27.0 TESTS

27.1 Acceptance Test

i) Acceptance test shall be carried out as specified in table 18 of CBIP Technical Report No. 88

27.2 Routine Test

i) All routine tests as specified in table 18 of CBIP Technical Report No. 88 shall be carried out on each individual meter.

28.0 FIXING OF METERS

The meters shall be mounted in the panels.

29.0 OTHER SALIENT FEATURES

a) **It should be possible to check the healthiness of phase voltages by displaying all the voltages on the meter display.**

a) The meter shall have provision of reading through communication port in the absence of power through an external source. An inductive coupling arrangement shall be provided so that it should not be possible to damage the circuit of the meter by applying excess voltage directly in the meter. The meter should be powered up using an external battery pack only in absence of power supply to the meter to enable taking of meter readings through display & communication port.

b) The meter should work accurately irrespective of phase sequence of the mains supply

c) The meter should remain powered up and functional even when either of the two phases or one phase along with neutral is available to meter.

30.0 INSTALLATION AND COMMISSIONING

The Bidder shall be responsible for total installation and commissioning of the meters (along with test blocks, if supplied separately) as per Owner's advice, including unpacking and inspection on receipt at site, mounting the meters, connection of input & output cables to the meters including any required rewiring, functional testing, commissioning and handing over. The Bidder's personnel shall procure/carry the necessary tools, equipment, materials and consumables (including insulated wires, lugs, ferrules, hardware etc.).

20.0 NAME OF IDENTITY PLATES

a) All instruments, relays and such other similar electrical devices mounted on the control and relay panel shall be provided with name plates bearing the manufacturer's name, serial identifying number and the Electrical rating data.

b) 3 mm thick and 25mm X150mm brass or plastic plates bearing suitable identification marks shall be fixed under the terminal wiring at the test blocks, at the fuse blocks and at the cable terminals. Similar plates shall be fixed on the exterior of the panel in appropriate places to indicate function of control switches, push button etc. such as isolator control switch, breaker control switch, DC fail test, accept reset etc. Suitable identification marks shall be provided for individual casing part of the relays and other equipment. Plates should be screwed and riveted to the Panel.

c) 50 mm wide brass or plastic plate bearing suitable circuit description (which will be furnished after order is placed) etched in 30 mm size letters shall be provided for each panel and mounted on the top of both outer of the front panels. These plates shall be removable type.

d) Schematic Diagram of CT, PT, CB circuitry & AC, DC Ckt, Indication and Annunciation Ckt along with protection circuitry giving the terminal nos. and Bus wire details shall be printed in laminated durable stickers and pasted inside the panel Door page wise of the respective panel.

e) Each unit of control and relay panel shall be provided with a label located at the bottom on the front and shall contain the following details :

i) Manufacturer's name

ii) P.O.no. and date

iii) Drg. ref. no. pertaining to the panel.

21.0 PAINTING

Panel painting shall be done by the modern process of painting. All unfurnished surface of the steel panel and frame work shall be sand blasted or suitably cured to remove rust, scale, foreign adhering matter or grease. A suitable rust resisting primer shall be applied on the interior and exterior surface of steel, which shall be followed by application of an undercoat suitable to serve as base and binder forth finishing coat.

Details of Painting:-

Surface treatment	by seven tank process
Paint type	Powder coated. Pure polyester base grade A structure finish
Paint shade	RAL 7032 for external & internal surface
Paint thickness	Minimum 80 microns

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Details of Painting:-

Surface treatment	by seven tank process
Paint type	Powder coated. Pure polyester base grade A structure finish
Paint shade	RAL 7032 for external & internal surface
Paint thickness	Minimum 80 microns

22.0 RELAYS:

A. GENERAL REQUIREMENT

The main protective relays SCADA Compatible Numerical Non Directional O/C & E/F Relays shall be of reputed make. However, multinational company manufacturing panel in India may import required/desired

relays from their foreign counterpart with same brand name at their own risk, cost and responsibility without hampering the stipulated delivery schedule as stated in the tender notification.

All numerical relays shall be provided with Relay Failure Annunciation contact.

B. SCADA COMPATIBLE NUMERICAL NON DIRECTIONAL O/C & E/F RELAYS

The primary requirements of the relays are to protect the respective single circuit or double circuit feeders and 33/11KV Power Transformers in the event of fault. The Non Directional E/F relays shall provide suitable sensitivity for limited earth fault current.

The relay should be suitable for substation automation, primary circuit breaker operation through SCADA from remote control room.

THE DETAILED SPECIFICATION OF Non-Directional O/C and E/F RELAY IS AS PER ANNEXURE-I OF SPECIFICATION:

C. OTHER PROTECTIVE RELAYS

Differential relay shall be of numerical type

REF relay etc. may be of static type.

D. OTHER PARTICULARS RELATED TO ALL RELAYS

1) All shall conform to the requirement of IS: 3231 / IEC 255 and shall be suitable for operation within a temperature range 0°C to 55°C and 95% relative humidity. Relays shall be suitable for flush / semi flush mounting on the panel with connections from the rear, protected with dust tight cases for tropical use and with transparent cover removable from the front.

2) All A.C. relays shall be suitable for operation at 50Hz. The current coils shall be rated for a continuous current of 1 amp and the voltage coil for 230V normal. The contacts of the relays shall be properly designed to prevent or minimise damage due to arcs which have to be broken successfully against 30V +/- 10% volt DC. When open, the contacts shall withstand a voltage of 115% of the normal circuit voltage. The relays shall be designed for satisfactory operation between 70% to 110% of rated D.C. voltage of the sub-station. The voltage operated relays shall have adequate thermal capacity for continuous operation.

3) Timers shall be of static type. Pneumatic timers are not acceptable.

4) The Relays shall preferably be provided with suitable Seal-in-Devices. Relays should be immune to all types of external influences like Electro static, Electromagnetic, Radio interference, shock etc.

5) All the numerical relay should have provision for setting all the features available in the relay and viewing those setting as well as different other parameters through both built in display unit as well as through PC. All numerical relays shall have self monitoring feature with watch dog contact. The supply of relay should be inclusive of necessary software and hardware for interfacing with a PC, to be supplied by the manufacturer

E. PROTECTION SCHEMES

E-1 PROTECTION SCHEMES FOR 33 KV FEEDER

NON-DIRECTIONAL OVER CURRENT AND E/F PROTECTION :

This relay shall be used for 33KV radial feeder. The relay shall

- a) be three O/C & one E/F element type.
- b) have IDMT characteristics with time current characteristics of 3 sec at 10 times current setting.
- c) have variable current setting of 50% to 200% of rated current and adjustable time setting.
- d) have high set unit with current setting 500%-2000% for protection and 33 KV feeder protection, with very low transient overreach.
- e) Definite Time Sensitive Earth Fault Protection may be inbuilt function of Numerical over- current Relay and shall have a variable current setting range minimum 1% to 40% in very small steps of CT secondary current and wide range of definite time setting range minimum. 0.1 to 10 Sec. This relay shall be used in 33 KV feeder for detection of line to ground fault current of both very low and high magnitude where the 33 KV system is grounded through earthing transformer.
- f) LED indication for numerical relays of different type of faults including phase identification.

E-3 PROTECTION OF 33 KV INDIVIDUAL TRANSFORMERS

For protection of H.V. Side of the Transformers, following main protective relays are required

- i) Numerical O/C protection.
- ii) 2 sets Restricted E/F Relay shall be provided for HV and LV side of individual control transformer panel.
- iii) 1 set Differential Relay in addition to above, shall be provided for 10 MVA 33/11KV transformer panel.

Differential Relay shall be

- a) Provided at 33KV panel of the transformers to be protected. It shall be numerical adjustable/variable percentage biased type differential relay.

Necessary software, cables, connectors and other accessories as required for download, analyze data etc. shall be within the scope of successful manufacturer.

- b) The relay shall be very fast in operation with an operating time less than 40 millisecond at 5 times setting.

- c) The relays shall be inherently stable for external through fault conditions without affecting the speed of operation for internal faults.
- d) The relay shall have either a built in facility of ratio and phase angle correction or necessary interposing Auxiliary current transformers of universal type, shall be provided in the respective panel.
- e) The relay shall be provided with 2nd harmonic restraint or any other inrush proof feature to prevent operation due to magnetizing inrush current when the transformer is charged either from HV or LV side. But this shall not affect the speed of operation for internal fault.
- f) It shall be provided with 5th harmonic restraint features to prevent operation due to possible over excitation of the transformer. This shall also not affect the speed of operation for internal fault.
- g) The relay shall have adjustable bias setting range 20% to 50% and adjustable operating setting range of 10% to 50% at zero bias.
- h) It shall have three instantaneous high set over current units for clearing heavy internal fault.
- i) The relay shall be with 2-bias winding.
- j) The relay shall be such that there will not be any necessity of changing the setting of the relay whenever the transformer taps are changed from +5% to -10%.
- k) Differential relay shall have facility for setting, parameterization, downloading the storage data, data captured by disturbance recorder etc. locally through PC. The necessary PC, Windows based Licensed software for establishing the facility to be considered in the scope of the supply by the Manufacturer.
- l) The relay shall have disturbance recording (with time stamping) function with suitable no. of analog and digital channels, Memory size and number of disturbances stored in the relay shall be clearly indicated in the offer. No. of site selectable BI, BO and watchdog contact details, communication port details (front, rear) along with necessary hardware and software details shall be furnished.

E-4 RESTRICTED EARTH FAULT PROTECTION

The above protection shall be provided for 33/11 KV transformers at HV and LV side. The Relay shall be:

- a) Single pole type.
- b) Current/voltage operated high impedance type with a suitable setting to cover the maximum portion of transformer winding. Necessary calculation to prove the above winding coverage shall be furnished along with the tender.
- c) Tuned to the system frequency.
- d) Have suitable nonlinear resistor to limit the peak voltage and stabilizing resistance.
- e) Operating time shall be less than 40 ms.
- f) Shall be standalone type.
- g) Have suitable stabilizing resistor to prevent mal operation during external faults if necessary.

E-5 A set of D.C. Voltage Operated Aux. Relays with coil cut-off arrangement and 4NO and 4 NC contacts, hand reset with flag indicator type shall be provided for each Transformer for

- (a) Buchholz Alarm
- (b) Buchholz Trip
- (c) Winding Temp. Trip & winding temp. alarm
- (d) Oil Temp trip & Oil Temp. Alarm
- (e) Low Oil Level Alarm
- (f) Pressure Release Device Trip
- (g) OSR for OLTC trip

Each Transformer Panel shall be provided with a High Speed Tripping Relay with coil cut- off arrangement having 6 NO and 4 NC electrical reset with flag indicator type.

E-6 AUXILIARY RELAYS, TRIP RELAYS and TRIP COIL/ CIRCUIT SUPERVISION RELAYS

Auxiliary Relays- D.C. Voltage operated auxiliary relays provided with mechanically operated hand reset indicator and sufficient no. of hand reset contacts shall be provided for protection and supervision against transformer internal trouble/faults. No of elements and number of relays shall be as per requirement of individual transformer.

For Trip Circuit Supervision Relays - All Panels should be provided with D.C. Voltage operated Trip Circuit Supervision Relay having provisions for pre & post close supervision of Trip Circuit with set of self-reset contacts provided for Trip Circuit Healthy Indication and Trip Circuit unhealthy indication & Alarm in respect of Trip Coil/circuits of respective Breakers.

Tripping Relays- All Panels should be provided with D.C. Voltage operated High Speed Tripping Relays having self reset contacts capable to make, carry and break trip coil current. Sets of Trip Contacts shall be provided for Inter-tripping function of corresponding 11 KV Incoming Switchgear and closing blocking function of 33 KV & 11 KV Breakers in respect of Transformer Control Panels. Each set of trip relay shall have minimum two nos. NO and 1No. NC contact as SPARES. The operating time of master trip relay shall be less than 40 ms and electrical reset type.

E-7 TRIP CIRCUIT/COIL SUPERVISION SCHEME :

Trip circuit supervision scheme shall be such that testing of trip circuit healthiness is possible irrespective of whether the C. B. is in the closed or open position. The Trip Circuit Healthy LED should glow continuously in CB _ON_ Position and on demand in C.B. _OFF_ position. The rating of dropping resistance in series with Trip Circuit Healthy LED shall be such that the Trip Coil should not get damaged because of continuous current flowing through it.

E-8 Principal requirements of protective relays, metering equipments, auxiliary relays breaker control switches etc. are as follows:

E-8-1 Ammeter:

Each circuit one ammeter shall be provided with the following :

Mounting	Flush
Size	96 x 96 mm. case
Response Time	1 second
Operating Temperature	Up to 55°C
Dielectric Strength	2 kV RMS for 1 minute
Auxiliary Supply	230 volt A.C, 50 Hz
Operating Current	1 A from CT Secondary.
Type	Panel Mounting with 3 1/2 Digital Display

E-8-2 Volt Meter :-

Mounting	Flush
Size	96 x 96 mm. Case
Response Time	1 second
Operating Temperature	Up to 55°C
Dielectric Strength	2 kV RMS for 1 minute
Auxiliary Supply	230 V A.C., 50 Hz
Frequency	50 Hz
Operating Voltage	110 V from PT Secondary.
Type	Panel Mounting with 3 1/2 Digital Display

E-8-3 Buzzer

One DC buzzer shall be provided in the panel for non-trip alarm. One DC Bell shall be provided for Trip alarm and one AC Bell for Panel DC fail alarm.

E-8-4 High speed tripping relay electrically resettable type confirming to IS – 3231

Aux. voltage	30 V or 110 V D.C to be decided during detailed engineering stage
Coil rating	30V D.C., voltage band for satisfactory operation : 50 to 120% of rated voltage
Operating Time	40 m. seconds nominal at rated voltage
Burden of relay coil watts (Max)	Low burden 40 Watt at rated voltage
Operating temp	-10 deg C to 55 deg C.
Operational indication for each element	Mechanical red colour Flag : Electrical Reset Type
Contact Configuration	6 NO + 4 NC combination with additional hand reset coil cut of contact (Seal in contact)

Contact ratings:

Make and carry	A.C. 1250 VA with max 5 amp & 660 Volts D.C. 1250 W dc with max 5 amp & 660 Volts
Make and carry for 3 sec.	A.C. 7500 VA with max 30 amp & 660 Volts D.C. 7500 W dc with max 30 amp & 660 Volts
Break	A.C. 1250 VA with max 5 amp & 660 Volts D.C. – 100 W resistive 50 watt inductive with max 5 amp & 660 Volts
Insulation	2 KV RMS, 50Hz for 1 min. 2.5 KV/1 sec between all terminals & case as per IS 3231. 1 KV RMS, 50Hz for 1 min. across open contact
Type of mounting	Flush

24.0 TESTS :

24.1 Type Test :

24.1.1 The Manufacturer should submit the Type test report from laboratory as per EOI. The Type tests for Numerical Relays is to be submitted as specified in Annexure-I & II of Relays specification.

24.1.2 Test at Factory:

The Equipments shall only be dispatched after approval of the test certificates.

1. Checking of wiring of circuits and the continuity.
2. One minute applied voltage test. All Equipment on panel and small wiring shall be tested for withstand voltage of 2000Volts to earth & between different voltage circuits.
3. Insulation resistance of the complete wiring, circuit by circuit with all equipments mounted on the Board before and after H.V. test mentioned under 2 above.
4. Routine tests according to relevant National standard are on the Instruments, relays & other devices.

25: Intentionally left blank

26: Intentionally left blank

27.0 DRAWING & LITERATURE

Triplicate copies of the following drawings and literature shall be submitted along with the order copy:-

- (a) Principal dimension details of each unit cubicles, complete assembly of panel and proposed arrangement of the Panel in a Control Room.
- (b) Front and rear views of the Panel with instrument and device positions marked.
- (c) Pictorial views of the Control Switches Terminal Blocks, Indication Instruments, Test Blocks and exploded views of draw out type instructions and Fuse Blocks.
- (d) Schematic Wing Diagram for Test Terminal Block.
- (e) Illustrative, descriptive literature, General Technical Data & Specification of Devices.
- (f) make, type, particulars, literatures of each and every relay (protective & auxiliary), meters, annunciators, switches, lamps, TBS, TTBS etc. along with bill of material in line with specification.

28.0 CONTRACT DRAWINGS & LITERATURE

In the event of an order materializing, the Supplier also submit four prints of each drawing for approval of the EMPLOYER along with 2 sets of literature as mentioned in the spec. The Contract drawings shall cover the followings:-

- (a) Details of construction and dimensions of a cubicle and of the complete Panel.
 - (b) Template for foundation and details of Cable Trench and Cable Entry Holes in the Foundation Platform.
 - (c) Elementary diagrams of all controls, metering, protection annunciation and other circuits. All devices shall be numbered according to ASA or international usage, which shall be separately coded.
 - (d) Cabling and wiring diagram of the cubicles and inter-connections between them. Ferrule numbers, device number and grouping for cable take off shall be distinctly shown.
 - (e) Dimensional outline drilling diagram and special mounting arrangement if any, of such type of various devices on the Panel.
 - (f) Inter-connection diagram between Control Panel and C.B. power and instrument transformer etc.
 - (g) Wiring Schedule for Control & Relay Panel.
 - (h) Internal wiring diagram of all devices and elementary wiring diagram of relays where internal wiring is in triplicate. Construction details of switches, terminal blocks and test blocks etc.
 - (i) After approval, 10 sets of the final contract drawing for each set of Control & Relay Panels are to be supplied by the Manufacturer. One set reproducible tracing of the above drawings in soft format shall also be supplied.
- In the event of contract being awarded, 4 copies of the following literatures shall be supplied along with the drawings as mentioned:-

- (a) Literature describing construction, operation, adjustment and rating specifications of all the protective and auxiliary relays, recording instruments, metering instruments and control switches.
- (b) Literature giving rating data, details and adjustments for calibration of the indicating instruments.
- (c) Calibration instruments for the metering instruments.
- (d) List of spare parts, identification number of renewable parts of relays, instruments and switches etc. with the help of which the EMPLOYER will be able to procure spare parts from the manufacturer at any subsequent time.
- (e) It is desired that the complete schematic drawing is provided on a permanently laminated/engraved plate of suitable thickness which has to be bolted/riveted at the four corners on the inside face of rear door. In addition, one more plate of similar type and dimension shall be provided on the outside of the rear door providing guidelines and instructions for operation. The guidelines and schematic to be provided on the plates shall be as per approved drawings.

29,30,31: Intentionally left blank

32.0 Bus Configuration and Bill of material

32.1 33/11KV delta star individual control transformer panel having HV side control and protection. Single main bus with bus section isolator scheme.

2 nos.	Circuit label engraved suitably at front and inner side
1 no.	Section of painted and overlaid mimic diagram
1 no.	Circuit breaker control switch.
6 nos.	Indicating lamps for circuit breaker ON/OFF, spring charged, trip circuit 1 & 2 healthy and auto trip indication.
2 nos.	Trip circuit supervision relay to supervise the TC 1 & 2 both under pre close and post close condition.
3 nos.	96 mm x 96 mm ammeter scaled suitably.
1 no.	volt meter of 96 mm x 96 mm
1 no.	<u>3-Phase 4-Wire AC Static DLMS Complaint Trivector TOD Meter, Category A, Class 0.5s accuracy for control panel (one trivector meter with one set of VCB)</u>
1 set	Three phase 4 wire test terminal block for above.
1 no	Auxiliary relay with test push button for panel DC supervision relay.
16 way	Fascia window type annunciator complete with accept reset and test PB but without audible bell.
1 no	Triple pole, IDMTL, non-directional over current relay with setting range 50% - 200% for IDMTL units and 500% - 2000% for high set unit.
2 nos	Restricted Earth Fault Relay current operated having setting range 10% to 40% both for HV & LV side of the Transformer.
1 no	High speed master tripping relay with contacts as required with lock out and coil supervision scheme complete.
1 set	Two bias Transformer differential relay (for 10 MVA only) with Interposing auxiliary CTs (universal type) where ever necessary.
1 no.	PT selector switch, two position PT-1/PT-2 switch, stay put type (16 A)
no.	Space heater with On/OFF switch and thermostat.
1 no.	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Buchholz trip and Buchholz alarm function. Each element with 4NO+2NC Contact.
1 no.	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer winding temp. trip and alarm function. Each element with 4NO+2NC Contact.
1 no.	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Low Oil Level(Main Tank) and OSR(OLTC) alarm function. Each element with 4NO+2NC Contact.
1 no.	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Oil Temp. Trip and alarm function. Each element with 4NO+2NC Contact.
1 no.	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for transformer Main tank PRV trip and OLTC PRV Trip function. Each element with 4NO+2NC Contact.
1 no	Two element DC operated auxiliary relay having hand reset type contact with hand reset operating flag for OLTC Buchholz trip and spare. Each element with 4NO+2NC Contact.
1 no.	DC operated emergency lamp with switch.
1 no.	Cubicle illumination lamp operated from door switch.
1 no.	15A, 3 phase plug & socket with switch.
1 set	Panel accessories as necessary.
1 set	Other equipment, relays etc. as required to fulfill the scheme Requirement.
1 no	Local/Remote switch

32.2 33KV single feeder line C&R Panel with Non directional O/C & E/F protection Single main bus with bus section isolator scheme.

2 no.	Circuit label engraved suitably at front and inner side
1 no.	Section of painted and overlaid mimic diagram
1 no.	Circuit breaker control switch.
6 nos.	Indicating lamps for circuit breaker ON/OFF, spring charged, trip circuit 1 & 2 healthy and auto trip indication.
2 nos.	Trip circuit supervision relay to supervise the TC 1 & 2 both under pre close and post close condition.
3 nos.	ammeter of 96 mm x 96 mm scaled suitably.
1 no	Voltmeter of 96 mm x 96 mm scaled suitably
1 no.	Suitable space and wiring for non-tariff TVM for energy management.
1 no.	Three phase 4 wire test terminal block for above.

1 no.	Auxiliary relay with test push button for panel DC supervision relay.
12 way	Fascia window type annunciator complete with accept reset and test PB but without audible bell.
1 no	Triple pole, IDMTL, non-dir- over current relay as per clause 23
1 no.	Single pole definite time sensitive E/F relay current operated having wide setting range for single circuit line.
1 no	Single pole directional definite time sensitive E/F relay current operated having wide setting range for single circuit line. NECESSARY IPTs ARE WITHIN THE SCOPE OF MANUFACTURER
1 no.	High speed master tripping relay with contacts as required with lock out and coil supervision scheme complete.
1 no.	Space heater with On/OFF switch and thermostat.
1 no.	DC operated emergency lamp with switch.
1 no.	Cubicle illumination lamp operated from door switch.
1 no.	15A, 3 phase plug & socket with switch.
1 set	Panel accessories as necessary.
1 no	Local/Remote switch
1 set	Other equipment, relays etc. as required to fulfill the scheme Requirement

32.3 Common items :(where ever mentioned)

1 no.	96 mm x 96 mm voltmeter scaled suitably.
3+3 nos.	PT supply Indicating lamps, red-yellow-blue for each PT.
1 no	Voltmeter selector switch, 4-position, RY—YB—BR—OFF.
1 set	Audible bell and hooter for trip and non-trip fascia annunciation.
1 no	AC operated single element, auxiliary relay having only self reset contacts and with reverse flag for incoming AC supply supervision with test push button.
1 no	DC operated, two element, auxiliary relay having only self reset contact and with reverse flag for incoming DC and alarm bus DC fail supervision.
2 nos.	Test push button for above.
1 no	Single element AC operated auxiliary relay having self reset contact only for incoming DC and alarm bus DC fail alarm cancellation.
1 no	Push button for incoming DC and alarm bus DC fail alarm accept.
1 no	Indicating lamp for incoming DC and Alarm bus DC fail indication.
1 no	AC operated buzzer for incoming DC and Alarm bus DC fail audible alarm.

Annexure - IV

Standard Make of Relay and Fitments

1.	Relays	Schneider, ABB, Siemens, Alstom
2.	Breaker Control Switch/ Local- Remote switch	Kaycee/Recom/Switron
3.	Ammeter/Voltmeter Selector switch	Kaycee/ Recom
4.	Static Ammeter/ voltmeter	AE/RISHAV/Secure
5.	Push Buttons	Vaishno/Teknic/Lumen/STS
6.	Indicating Lamps with lenses	Vaishno/Teknic/Lumen/STS
7.	Panel wiring	Finolex /Havvels/ KEI/ R. R. kables
8.	Hooter/Buzzer/Bell	Vaishno/STS/JVS/Bharani
9.	Annunciator	MINILEC/ALAN/ INSTALARM/EAPL

Annexure-V

Legend of Devices associated with 33kV C & R Panel

Symbol Reference	Description	Particulars
A1-A2-A3, Ah	Ammeter	As specified
V	Voltmeter	As specified
EM	Tri-Vector Meter	As specified
CS	Control switch T-A/T-N-A/C-C spring return type	As specified
L/R	Local/Remote switch	As specified
IL-R	CB „ON“ Indication Red lamp	As specified
IL-G	CB „OFF“ Indication Green lamp	As specified
IL-W	„Trip /Close signal received from Remote Indication white lamp	As specified
IL-B	—Spring charged Indication Blue lamp	As specified

IL-A	CB — Auto trip Indication Amber lamp	As specified
PB	Push Button	As specified
ANN	DC operated electric Buzzer and Microprocessor based Electronic annunciator with built in watch dog and first fault indication facility. The annunciator shall have provision for trip and non trip alarm functions and Accept/Test/Reset/Mute Push buttons	As specified
H,HS,TH	Heater, Heater Switch, Thermostat	As specified
FS	Fuse	As specified
LK	Link	As specified
MCB1	MCB 2 pole 32 A for DC supply	As specified
MCB2	MCB 2 pole 16 A for AC supply	As specified
MCB3	MCB 2 pole for spring charging motor supply	As specified
IR-I	Remote inter tripping contact from 33 kV Transformer Control and relay Panel	As specified
TC	Tripping Coil	As specified
CC	Closing Coil	As specified
86	Tripping Relay for Tripping function	As specified
52	Vacuum Circuit breaker	As specified
52a,52b	NO and NC contacts of Breaker Auxiliary switch respectively	As specified
PT	Potential Transformer	As specified
CT	Current Transformer	As specified
TTB	Test Terminal Block	As specified
51/50 R-Y-B-N	O/C and E/F protection	As specified
64	Restricted Earth Fault Protection	As specified
87	Differential Protection	As specified

SCHEDULE-I A

(To be submitted, duly filled in, along with the offer) Bill of materials for 33 KV feeder C&R panels

Sr. No	Description	Quantity	Make, Type & design
1	Circuit label	1 No.	
2	Mimic section(Brilliant green paint to shade No.221 of IS 5 to be used)	1 No.	
3	T-N-C type control switch for circuit breaker.	1 No.	
4	Indicating LEDs for Spring charge indication(Blue) Trip circuit healthy indication(white) one each for Trip ckt 1 and Trip Ckt 2 Breaker 'ON' indication(Red) Breaker 'OFF' indication(Green)	1 No. 2 Nos. 1 No. 1 No.	
5	Push button for Trip circuit test Alarm Accept/Reset/Test/Mute	1 No. 4 Nos.	
6	Numerical non-directional IDMT over current and earth fault relay with high set instantaneous trip feature	1 No.	
7	High speed Master tripping relay (Electrically resettable)	1 No.	
8	12 window annunciation scheme with accept, reset and LED test push button with self resetting audible alarm.	1 Set	
9	Ammeter (96 mm x 96 mm.)	3 Nos.	
10	Voltmeter (96 mm x 96 mm.) & selector switch.	1 Set	
11	Local / Remote switch	1 Set	
	Internally mounted		
1	Space heater and control switch	1 Set	
2	Cubical illumination lamp and door switch	1Set	
3	Power Plug, socket and control switch	1 set	

4	Alarm bell for trip	1 No.	
5	Alarm cancellation relay	1 No.	
6	Alarm buzzer for non trip with auto-stop feature (with variable time setting 0-60 seconds)	1 No.	
7	MCBs	As required	
8	Fuse and Links	As required	
9	Control wire	As required	

SCHEDULE-I B

(To be submitted duly filled in alongwith the offer)

Bill of materials for 33/11KV Transformer C&R panels without differential protection.

Sr. No	Description	Quantity	Make and Type desig
	Circuit label	1 No.	
2	Mimic section (Brilliant green paint to shade No.221 of IS 5 to be used)	1 Set	
3	T-N-C type control switch for circuit breaker	1 No.	
4	Indicating LEDs for		
	Spring charge indication(blue)	1 No.	
	Trip circuit healthy indication (white) one each for Trip Ckt 1 and Trip Ckt 2	2 Nos.	
	Breaker 'ON' indication (Red)	1 No.	
	Breaker 'OFF' indication (Green)	1 No.	
5	Push button for Annunciation AC/RE/TEST/MUTS & Trip Circuit Healthy	5 Nos	
6	Numerical non-directional IDMT over current and earth fault relay with high set instantaneous trip feature.	1 No.	
7	High speed tripping relay (electrically resettable)	1 No.	
8	HT TOD Tri-vector Energy meter and TTB.	1 No.	
9	Ammeter (96 mm x 96 mm.)	3 Nos. & 1No	
10	Voltmeter (96 mm x 96 mm.) & selector switch.	1 Set	
11	16 window annunciation scheme with accept, reset and LED test push button with self resetting audible alarm.	1 No.	
12	Auxiliary relay for main tank Buchholz Alarm/trip (2- element)	1 Set	
13	Aux. relay for winding temp Alarm/trip (2- element)	1 Set	
14	Aux. relay for OLTC Buchholz Alarm/trip (2-element)	1 Set	
15	Aux. relay for low oil level alarm(Main tank)	1 Set	
16	Aux. relay for oil temp alarm/trip (2- element)	1 Set	
17	Aux. relay for Main tank PRV	1 Set	
	Internally mounted		
1	Space heater and control switch	1 No.	

2	Cubicle illumination lamp with door switch.	1 No.	
3	Power plug with control switch	1 No.	
4	MCBs, fuses, links, control wiring, etc.	As required	
5	Fuse and Links	As required	
6	Control wire	As required	

NOTE: THE MANUFACTURERS MUST HAVE TO SUBMIT SEPARATE BILL OF MATERIAL FOR DIFFERENT TYPE OF PANELS WITH THE GUIDELINE AS MENTIONED ABOVE, FURNISHING THE TYPE AND MAKE OF EACH ITEM.

SCHEDULE - II

DETAILS OF RELAYS, METERS, EQUIPMENT& DEVICES AS OFFERED IN SCHEDULE OF 33 KV SIMPLEX TYPE CONTROL AND RELAYS PANEL – TO BE FILLED UP BY THE MANUFACTURERS

ALONGWITH SUBMISSION OF SUPPORTING DOCUMENTS

Sl. No.	Description	Make And Country Of Manufacture	Type (Catalogue to be enclosed)	Brief Description, with CT/PT details, contact configuration, Input/ Output details, characteristics, range, suitability etc. for clear perspective
A	SURFACE MOUNTING DEVICES			
1	Circuit Level			
2	Mimic Diagram			
3	Circuit Breaker Control Switch Spring return lost motion type			
4	Ammeter 96 mm sq. for C.T. Secondary rated Current 1A Scale 0-100/0-200A Scale 0-200A / 0-400A			
5	Voltmeter 96 mm Sq. for P.T. Secondary 110 VAC (L/L) Scale 0-40			
6	Voltmeter Selector Switch 6 way & off position having break before make contact			
7	Test Terminal block suitable for 3 phase 4 wire system with wire rear connecting studs having provision of sealing arrangement			
8	Multi way micro processor based Electronic Annunciator with building-system watchdog first fault indications and red & yellow coloured windows with inscription for Trip & Non Trip Alarm functions			
9	Indicating Lamps led type 63.5 VAC for P.T. Supply indication with			
10	Indicating Lamp LED type 230 VAC for Panel D.C. Fail Common Indication			

11	Indicating Lamp LED type 30 VDC for CB ON/OFF Auto up Spring Charge Trip Circuit Healthy Indication with RED/GREEN/AMBER /BLUE Colours			
12	Push Button for Panel DC fail test			
13	Push Button for including AC fail test			
14	Push Button for non trip Panel DC fail Alarm Accept			
15	Push Button for Annunciator Alarm Test / Mute/Accept/Reset			
16	3 Element normal IDMTL over current Relay with instantaneous high set unit			
17	Single Element Instantaneous sensitive Earth Fault Relay with Timer			
18	Hi balance Instantaneous Restricted Earth Fault Circulatory Current Fault Relay (a) HV side of Power Trf. (b) LV			
19	Single Element High Speed Tripping Relay with electrically reset Contact & H/R flag/indication with required numbers of contracts			
20	Two Element 30 V DC Voltage Actuated Auxiliary Relay with HR Contacts & HR/LED Flag/indication for Transformer Internal Trouble functions			
21	Single Element 30V DC Voltage Actuated Auxiliary Relay with self Reset Contact & Reverse Flag indication for Panel DC Supply fail function			
22	Single Element 230V AC Voltage Actuated Auxiliary Relay with self Reset Contacts & Reverse Flag indication for incoming AC Supply fail function			
23	30 V DC Voltage operated Relay for Trip Circuit supervision purpose with self reset contact			
24	Single Element 230V AC Voltage Actuated Auxiliary Relay with self Reset Contacts without Flag indication for panel DC fail Alarm, Accept			
25	Additional Involvement of Single Element 30V DC Voltage Actuated Auxiliary Relay			
26	Extra Involvement of Auxiliary Relay for not having sufficient contacts to achieve required functions			

27	Space & wiring for housing purchaser's projection mounting type Energy meter(not within the scope of manufacturer			
28	Common Electronic DC bell/Buzzer Trip & Non-Trip Alarm functions			
29	Common Electronic AC Bell for Panel DC fail Alarm functions			
30	Biased differential relay for 10 MVA Trf. Control & Relay Panel			
B	Inside Mounting Devices			
1	230V AC Cubicle illuminating lamp with door operated Switch/Toggle Switch			
2	30V DC Emergency Lamp with Toggle Switch			
3	230C AC 60W space heater with thermostat & Toggle Switch			
4	15A Double V AC Combined 2/3 pin plug and socket with Switch			
5	15A Double Pole MCB for Incoming AC Supply			
6	Fuse			
7	Links			
8	Terminals			
9	Earthing Arrangement			
10	Interposing Universal type CT for Differential Relay if required			

Note: All surface mounting devices excepting Energy meter,TTB & Bells are flush mounting type As per Schedule requirement

Schedule-V
GTP for Numerical Feeder Protection Relay

Sl. No.	Feature and Function	Supplier's details
1.1	Make, Type, Model No and Version No and Ordering Code	
1.2	Conformance to i. IEC255-4 i. ii. IEC 61850 Edition 2 ii. PRP and HSR support	
1.3	No. of CT inputs for O/C and E/F Protection	
1.4	Type test report submitted(y/n)	
1.5	Relay shall be of Numeric Design	
1.6	Relay designed for bay protection and Control	
1.7	Size of Relay LCD screen	
1.8	Relay is equipped with CB close and open key/push buttons	
1.9	Relay has following protection functions: a. Three phase over current b. Earth fault c. Thermal overload function d. Broken conductor protection function e. Circuit Breaker Maintenance function	
2	a. One time delayed element and two high set elements b. Setting range and step for IDMT element for both current and Time Multiplier Setting	
	c. Selectable Current/Time Curve for IDMT element	
	d. Setting range and step for high set elements for both current and time delay	
10.	Sampling rate and frequency of analog signal	
11.	Whether remote controllable from SCADA	
12.	a. No. of Digital Inputs b. Voltage rating of Digital Inputs c. Provision of testing without current injection	
13.	Supervision for CB open and Closed status	
14.	No. of programmable LEDs and no. of Latched LEDs	
15.	Analog Measurement and display supported	
16.	Fault Record storage capacity	
17.	Event storage capacity	
18.	Disturbance record storage capacity	
19.	MMI with keypad and LCD provided	

20.	Rated DC Supply and tolerance	
21.	Rating of CT/PT secondary	
22.	Rated frequency	
23.	a. Operating ambient temperature & humidity	
	b. Withstanding capability of Electromagnetic Interference as per relevant part of IEC 61850	
24.	Mounting	
25.	Watchdog	
26.	a. Nominal Feeder current	
	b. CT Ratio setting	
	c. Earth fault current with time delay IEC Curves, 2nd stage for instantaneous trip(less than 50 ms)	
	d. High set with delay	
	e. IEC Curves for all O/C and E/F have user selectable?	
27.	a. No. of Digital Output Contacts	
	b. Contact rating	
28.	Mode of Time Synchronization	
29.	Type of Lugs and terminators (CT Ring Type, Other Ring or PIN Type)	
30.	MTBF	
31.	Lifespan	
32.	Compliance to Type Test	
33.	Communication Port a. Rear port- details b. Front port-details	
34.	Whether Communication Ports are native to the Relay	
35.	Protocol supported for Rear Port	
36.	Protocol supported for Front port	
37.	Start and trip output contacts are freely programmable	
38.	Cable for connection of Relay to laptop(USB port) along with converter and power supply if required for relay local setting	
39.	Basic application software for setting change, parameterisation	
40.	CD with software(licensed) to download disturbance recorder, event log and evaluation of those records	
41.	Graphical configuration tool for I/P, O/P and functional building block for protection and control	
42.	Any other software required for integration with SCADA.	

Schedule-VI**GTP for Master Trip Relay**

Sl. No.	Description	Manufacturer's Response
01.	Manufacturer Name	
02.	Type and designation	
03.	Electrical reset	
04.	Mounting	
04.	High Burden relay	
05.	Operating Time	
06.	Rated DC supply and tolerance	
07.	No. of NO Contact	
08.	No. of NC Contact	

Schedule-VII**GTP for Numerical Based Differential Relay**

Description	Manufacturer's Response
Manufacturer Name	
Type and designation	
Rated DC supply and tolerance	
C.T. secondary current	
Adjustable bias setting	
Operation philosophy	
Whether Programmable HV/LV CT ratio of T/F vector group provided	
Inbuilt REF protection provided	
Inbuilt HV & LV side over current & earth fault protection provided	
Inbuilt transformer trouble auxiliary relay provided	
Display Type and details	
Whether Harmonic restrain feature available	
Details of Event Recording and storing facility	
Password protection	
DC burden	
AC burden	
Contact arrangements	
Contact rating	
Current Input	
Self diagnosis feature provided	
Mounting Arrangement	
Communication port Details	

ANNEXURE-I

Technical specification for IEC 61850 edition-2 compliant non- Directional three O/C and one E/F Relay with Bay control features

Sl. No.	Feature and Function	Technical requirement
1	Purpose and application	<p>It is intended to automate the Switchgears specified in the scope of supply and use Communicable Numeric relays for Protection, Control, Metering and Status monitoring. This specification is based on the understanding that an integrated Automation System along with protections shall be provided and same shall have provisions for Integration with SCADA system. All the feeders shall be remote controlled from EMPLOYER's SCADA and from the local console of the numerical relays.</p> <p>Numerical multifunctional combined Microprocessor based Feeder protection and management relay to protect the 33kV/11 KV Feeder from all electrical and other faults along with reporting system, Disturbance record for fault analysis. Manufacturer should comply with any especial requirement or feature asked for retrofitting the relays. Relay should be IEC 61850 Edition-2 compliant. Relay should have 4 CT input for O/C and E/F protection. There should be option for derivation of E/F internally. Relay should have 3VT input for measurement of voltage , Active & reactive power, power factor, frequency.</p>
2.	Main Protection Feature	<ol style="list-style-type: none"> 1. Relay should have minimum two group of setting. Setting group changeover required from digital status input. 2. Electrical over load protection with selectable IEC curves with two stage, first stage to be used as IDMT and second stage to be used as high set for short circuit protection. Offered relay should have total 4 stages of Non directional over current protection with site selectable IEC curves. 3. Earth fault protection in two stages with IEC characteristics. First stage to be used as IDMT and second stage to be used as instantaneous elements. Earth fault element should be suitable for both CBCT and residual type CT connection. 4. Negative phase sequence Protection with IEC Curves. 5. CB Fail Protection & time settable as per user. 6. The relay should be immune to DC switching while carrying current i.e. no spurious trip should be generated if relay DC is made On and Off 7. The relay should conform to the IEC255-4 or BS 142 for Inverse time characteristics. 8. The relay should have features to monitor for broken conductor and CB opening time
3.	Processor feature	Relay shall be completely Numerical with protective elements having software algorithm based on sampling of Analog inputs. Sampling Rate of Analog Signal: The sampling rate should be 1600 Hz for 50 Hz signal or better for each analog channel.
4.	Operational Philosophy	The operation of Relay shall be possible both locally from the Switchgear and remote & Local Work station . The local position shall be displayed in remote / local workstation and remote operation shall be blocked if the switch is in Local. Clear control priorities shall prevent initiation of operation of a single switch at the same time from more than one of the various control levels and there shall be interlocks among various control levels. The priority shall always be with the lowest enabled control level. Relay accuracy shall not be affected by system frequency fluctuation.
5.	Status/Optical Inputs/Digital inputs	<ol style="list-style-type: none"> 1. Minimum 16-number status inputs are required 2. All status inputs should be 30 V DC

		<p>3. Setting group is required to be changed with any Digital input status.</p> <p>4. Trip circuit supervision with DI status</p> <p>5. The digital inputs shall be acquired by exception with 1ms resolution. Contact bouncing in digital inputs shall not be assumed as change of state.</p> <p>6. Relay should have comprehensive self diagnostic feature with remote indication of relay failure and alarm shall be generated without tripping of circuit</p> <p>7. Provision of Testing output relays without any current injection.</p> <p>8. No. of programmable LEDs - at least 8 nos. with latching option.</p>
6.	Main measuring and reporting feature	<p>All measurements should be in primary quantities. Minimum following displays are required in alpha numeric:-</p> <ol style="list-style-type: none"> 1. Three phase (Positive sequence) current 2. Neutral(zero sequence) current 3. All the trips should have clear indication on the relay terminals 4. Resetting should be selectable as hand reset or auto reset. 5. The default relay LED shall be user defined to display primary circuit loading. 6.3Phase voltage, Active & reactive power, power factor, frequency
7.	Memory and Recording Feature	<ol style="list-style-type: none"> 1. The relay setting and programming should be stored in EEPROM so that during Aux. Power failure the said data is not lost. 2. Relay should have event log, trip log and DR record. All logs should go in to history. 3. All tripping of relay should initiate DR in auto without extra binary input. Triggering of DR with binary input should be user configurable. 4. The last 2 fault DR records should be in flash memory and DR will not erase in case of DC supply fail for more than 2 days. 5. Should be able to record at least 5 oscillographic disturbances and 5 fault records and 1000 event records. 6. Minimum Four no. of latest trip log with cause of trip should be stored in memory along with date and time stamping. The memory should not be lost with the switching off of DC. 7. The relay should have fault-recording feature with current waveform and Digital Input status. The fault waveform should consist of minimum four current waveforms of three phase current and zero sequence current and DI status. Triggering time for Pre and Post should have user selectable. This record should be in flash memory for minimum 7(seven) days even after switching off the DC supply. 8. The fault should be date and time stamped. 9. Communication protocol IEC 61850 Edition-2. <p>10.FIFO feature</p>
8.	Auxiliary Supply	30 V to - 30% to + 10%, 2 wire unearthed system. Necessary software shall be in-built for proper shutdown and restart in case of power failure. Auxiliary supply burden will be around 20Watt.
9.	Rated CT/PT secondary	5/1 Amp(User selectable) , CTs used to be protection class
10.	Rated frequency	50 HZ +/- 5%
11.	Ambient condition	<ol style="list-style-type: none"> 1. Operating ambient temperature upto 55 Deg C 2. Operating Humidity upto 100 % 3. Relay shall meet the requirement for withstanding electromagnetic interference according to relevant parts of IEC 61850. Failure of single component within the equipment shall neither cause unwanted operation nor lead to a complete system breakdown.
12.	Module and Mounting	<ol style="list-style-type: none"> 1. Relay should be flush mounted type 2. If module is drawout type then it should have CT shorting facility of make before break type. 3. Mounting in switchgears located in non AC rooms.

		4. Galvanic isolation between field connection and relay hardware should be there.
13.	Watchdog and self monitoring	The relay should have facility to monitor the healthiness of its circuits and components by own monitoring system. In case of any problems, the alarm should be generated by one of the output contacts. The alarm as soft signal to be sent to SCADA system as well. Necessary support documentation explaining the self diagnostic feature shall be furnished Watch dog contact shall be provided in addition to required 16 BI and 7 BO.
14.	Settings	Approximate settings possible should be as follows:- 1. Nominal Feeder current 2% to 110 % 2. CT Ratio setting 10-1000(approx.) 3. Earth fault current 1 to 40% with time delay IEC Curves, 2nd stage for instantaneous trip(less than 50 ms) 4. Over current trip- 50% to 200% in step of 1% for 1/5 Amp with time delay as per IEC Curves. 5. High set with delay 200% to 2000% in step of 1%. 6. IEC Curves for all O/C and E/F have user selectable.
15.	Output Relays	Minimum 7 number output relays are required out of which 1. One potential free change over contact should be provided for start inhibit of relay. 2. All o/p contact should be freely programmable. 3. Rating of trip contacts:- a) Contact durability>10K operation b) 15 Amp make and carry for 3 sec for trip contact c) Make and carry for trip contacts L/R<=40ms 4. Rating of Alarm contacts:- a) 8 Amp make and carry continuously for 5 sec. Testing of Output relays through keypad on relay fascia and relay HMI software. Output relay dwell time shall be user programmable or fixed at 100ms.
16.	Relay software and Man Machine Interface	1. The relay should have native IEC 61850 Edition-2 Communication Protocol with HSR and PRP redundancy support . 2. Should have password protected key padlock. 3. Necessary software for relay setting , retrieving DR, event log, trip log should be supplied by the Manufacturer. Necessary License is to be issued for EMPLOYER, if required. 4. Manufacturer has to supply communication hardware for relay setting, DR downloading from front port. This device should be compatible to USB/Ethernet port. 5. It shall be possible to transfer the data stored in the DFR to computer on IEEE/COMTRADE format. The data format shall be compatible for dynamic protection relay testing on relay test kit. COMTRADE data viewing software to be provided. 6. Multiuser/Corporate license for installation on minimum 11 nos. of PCs:- Bidder should supply 7 nos of full version of relay software(should work on Windows XP, Windows 7 & Windows 10) with all the necessary applicable license to configure & manage the relay using dedicated front communication port or rear ethernet port. Bidder should also supply 11 nos. of communication cable along with necessary hardware (Like Serial to USB converter in case the relay has serial type front port) Any additional software if required for remote communication and for other facilities available in the Relay.
17	WEB HMI	<i>Relay should have WEB HMI function. There should be provision of monitoring the measurement of various analog values, status of input & output etc. by using a standard web browser (Google Chrome, Mozilla Firefox, Internet explorer etc.) instead of using dedicated relay software.</i>

18	MIMIC Display	Offered relay shall have large LCD backlit display which supports mimic (e.g. user configurable single line diagram which may include various objects like Circuit breaker, busbar, isolator, earth switch etc.) and should display freely assignable analogue values. The device shall have control buttons for direct or select-before-execute type CB control.
19	Date and time	Date and Time stamping with faults and record. The clock should be powered from internal cell and should not required setting after every DC switching. The internal cell life minimum 5 years. Time synchronization by IRIG-B or SNTP. For time synchronization through SNTP is to be provided from clock signal coming from RTU. In case of IRIG-B, time synchronization will be done with GPS clock signal from GPS receiver located at substation.
20	Lugs and terminators	All CT and PT terminals shall be provided as fixed (screwed) type terminals on the relay to avoid any hazard due to loose connection leading to CT opening or any other loose connection. Necessary amount of lugs should be supplied along with each relay for CT connection and control wiring.
21	Manuals, Drawings and Literature	<ol style="list-style-type: none"> 1. The relays should be supplied with manuals with all technical and operating instructions. 2. All the internal drawings indicating the logics and block diagram details explaining principle of operation should be given at the time of supply. 3. Mapping details shall be submitted in IEC format.
22	Standard documentation per Relay, according to IEC 61850 Edition-2	<ol style="list-style-type: none"> 1. MICS document (model implementation conformance statement) 2. PICS(protocol implementation conformance statement) 3. Conformance Test certificate from KEMA/CPRI. 4. PIXIT document <p>All the above mentioned certificates shall be submitted.</p> <ol style="list-style-type: none"> 5. ICD file 6. SCD file
23	Extendibility in Future	The Manufacturer shall provide all necessary software tools along with source codes to perform addition of bays in future and complete integration with SCADA by the User. These software tools shall be able to configure relay, add analog variable, alarm list, event list, modify interlocking logics etc. for additional bays/equipments which shall be added in future.
24	Lifespan	<p>The supplier should mention following:-</p> <ol style="list-style-type: none"> 1. Product maturity: The Manufacturer should mention the time period for which the product is in the market 2. Expected production life 3. Hardware/Firmware change notification process. Upgrades to be provided free of cost within the Guarantee period/5 years whichever is later, if needed. 4. Lifespan of standard tools and processes for relay configuration, querying and integration.
25	Standards	<p>The relay should conform to the IEC255-5 or equivalent BS / ANSI for following:-</p> <ol style="list-style-type: none"> 1. Overload withstand test 2. Dielectric withstand: 2kV in common, 1 kV in differential mode 3. Impulse Voltage: 5kV in common, 1kV in differential mode 4. Insulation resistance>100 M-ohm. 5. Vibration: Shock and bump and Seismic 6. Storing and transportation 7. Radio Interference: IEC 61000 for high frequency disturbance, Transient disturbance, Electrostatic discharge 8. KEMA Certification for the particular model offered with respect to IEC61850 Edition-2 Protocol.

26	Communication Port	<p>1. Two nos. IEC 61850 Edition-2 protocol compliant Ethernet RJ45/F.O port for communication with SCADA system through two managed Ethernet Switches operating in redundant mode. The communication shall be made in 1+1 mode between individual IED to Switch and IED should support PRP and HSR redundancy, such that failure of one set of LAN shall not affect the normal operation of SCADA. However, it shall be alarmed in SCADA.</p> <p>2. Functioning of Relay shall not hamper to fault occurring any interconnected relay.</p> <p>3. One Front port Ethernet RJ45/USB 2.0 for relay parameterization and configuration etc. with the help of PC. In case RS-232 port offered, suitable interfacing cable with one end having RS 232 port and other end USB 2.0 to be provided to connect with PC free of cost.</p> <p>4. Relay should generate GOOSE message as per IEC 61850 Edition-2 standard for interlocking and also ensure interoperability with third party relays.</p>
27	Name Plate and marking	Each IED shall be clearly marked with manufacturer's Name, type, serial no. and electrical rating data. Name plates shall be made of anodized aluminium with white engraving on black surface.
28	Performance Guarantee	Relays will be guaranteed for the period of five years from the date of last dispatch. Any problem in the said period should be attended free of charge inclusive of repair/replacement of relays/ component (both H/W, S/W).
29	Type Test	<p>Dielectric Withstand Test—IEC 60255-5</p> <p>High Voltage Impulse Test, class III --- IEC 60255-5(5kV peak, 1.2/50 micro Sec;3 Positive and 3 negative shots at interval of 5 Sec.)</p> <p>DC Supply Interruption ---- IEC 60255-11</p> <p>AC Ripple on DC supply ---- IEC 60255-11</p> <p>Voltage Dips and Short Interruptions --- IEC 61000-4-11</p> <p>High frequency Disturbance ---- IEC 60255-22-1, Class III</p> <p>Fast Transient Disturbance ---- IEC 60255-22-4, Class-IV</p> <p>Surge withstand capability ---- IEEE/ANSI C 37.90.1(1989)</p> <p>Degree of Protection</p> <p>Electromagnetic compatibility</p> <p>Mechanical stress/vibration test</p> <p>Temperature withstand</p> <p>Type test reports for the above tests shall be submitted for the approval of EMPLOYER along with Tender, failing which order may be rejected. Wherever the above mentioned standards and IEC 61850 Edition-2 overlap, the latter will prevail.</p>
30	Training	<p>Suitable training to be imparted to employer persons on the following items:-</p> <ol style="list-style-type: none"> 1. Relay setting and parameterization 2. Relay configuration with respect to I/P, O/P and functional block for protection. 3. GOOSE configuration. 4. Configuration and Interfacing required for third party SCADA System Integration. 5. Diagnostic features <p>The details of syllabus to be finalized with EMPLOYER.</p>
31	Password Protection	Relay shall have password protection for changes of settings/ configuration/test/setting group.
32	Setting	<p>(a) Three Phase Non Directional Over Current Protection</p> <p>(i) Plug Setting</p> <p>Low Set Stage - $0.05...5.00 \times I_n$, in steps 0.01</p> <p>High Set Stage - $0.10...40.00 \times I_n$ in steps 0.01</p> <p>Inst Stage - $1.00...40.00 \times I_n$ in steps 0.01</p>

		<p>(ii) Time Setting Time multiplier Low Stage and High Set stage 0.05...15.00 in step 0.01 Operate delay time For Low stage and high stage 40...200000 ms in step 10 Operate delay time For Inst Stage 20...200000 ms in step 10 (iii) Operation accuracy: $\pm 1.5\%$ of the set value or $\pm 0.002 \times I_n$ (b) Three Phase Non Directional Earth Fault Protection (i) Plug Setting Start value Low Stage - $0.010...5.000 \times I_n$, in step 0.005 High stage - $0.10...40.00 \times I_n$, in step 0.01 Inst Stage - $1.00...40.00 \times I_n$, in step 0.01 (ii) Time Setting Time multiplier Low and High stage - 0.05...15.00 in step 0.01 Operate delay time Low & High stage - 40...200000 ms in step 10 Inst Stage - 20...200000 ms in step 10 (iii) Operation accuracy: $\pm 1.5\%$ of the set value or $\pm 0.002 \times I_n$</p>
33	Conformal Coating	All the PCBs in the Relay shall be provided with a transparent epoxy (conformal) coating for environment protection and topicalization.
34	Measurement	The measured values are true RMS for current and voltage. All measured and derived values can be displayed on front panel LCD display or transferred locally or remotely on user request.
35	Inter-operability test and Demonstration:	<p>The demonstration and inter –operability test will be an integral part of the evaluation process, for which due intimation will be sent to the bidders. The manufacturer shall have to demonstrate inter –operability test with other bidders participating in the tender in presence of JBVNL’s officials. All the necessary arrangement to perform the inter-operability test will be under the scope of the bidders. The following points to be checked during the interoperability test :-</p> <ol style="list-style-type: none"> Necessary user friendly configuration tool shall be provided to configure the RELAY. It should be compatible with SCD / ICD files generated by a third party system Goose signals shall be freely configurable for any kind of signals using graphic tool/user friendly software. Time synchronization from the SNTP server. Signal exchange over GOOSE communication from one make of relay to the other make of relays. Binary signals to be exchanged. Control command to be published. One LED to be configured with GOOSE signal received from the other RELAY for checking quick indication of the signal receipt. Protection operation signal to be configured to other relays. Disturbance recorder needs to be configured for the signal exchange. GOOSE receiving time to be shown in the relay display from event recorded and disturbance recorder. GOOSE transfer time should be less than message type 1A, Performance Class P1 i.e. 10 ms. One of protection stage should be set to minimum time value (e.g. 20 ms) and injecting the current value in all relays in series. Checking the protection function blocking with published GOOSE signal of protection start from other relay. This shall ensure that GOOSE communication signal from other relay reaches before 20 ms. Disturbance fault records to be captured in COMTRED format (.DAT and .CFG). Each relay DR function needs to be configured for protection start, protection trip,

		<p>breaker control commands as well as waveform recording of current and voltage signals.</p> <p>m) Port redundancy to be checked.</p> <p>n) Communication failure is to be checked by opening the communication cable while GOOSE message transfer.</p> <p>All the Bidder has to bring the following equipment to demonstrate the Interoperability testing.</p> <p>a) Each Type of offered relay (Relay Type and complete article no should match as per tender offering) – 1 no. each</p> <p>b) Ethernet Switch (Type of Port as offered in Numerical Relays) – 2 nos.</p> <p>c) GPS / SNTP Server – 1 no.</p> <p>d) Required Patch Chord – 1 set</p> <p>e) Power Supply Modules – as required.</p>
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Checklist for Bill of Material for supply

Sl. No.	Material	
1.	Relay (Model No.)	Qty as per Tender
2.	Lugs suitable for current and control, wiring	Qty as per Tender X Number of TBs in relay + 20% extra.
3.	Cable for connection of Relay to laptop(USB port). Along with converter and power supply if required for relay local setting	10 set
4.	Manual, Hard copy in good quality paper properly bounded	10 set
5.	Copy of Type Test certificate along with manual	With offer
6.	Basic application software for setting change,	10 nos.
7.	CD with software(licensed) to download disturbance recorder, event log and evaluation of those records	10 nos.
8.	Graphical configuration tool for I/P, O/P and functional building block for protection	10 nos.
9.	Any other software required for integration with SCADA.	10 nos.

Checklist for Bill of Material for supply

Sl. No.	Material	
1.	Relay (Model No.)	Qty as per Tender
2.	Lugs suitable for current and control, wiring	Qty as per Tender X Number of TBs in relay + 20% extra.
3.	Cable for connection of Relay to laptop(USB port). Along with converter and power supply if required for relay local setting	10 set
4.	Manual, Hard copy in good quality paper properly bounded	10 set
5.	Copy of Type Test certificate along with manual	With offer
6.	Basic application software for setting change,	10 nos.
7.	CD with software(licensed) to download disturbance recorder, event log and evaluation of those records	10 nos.
8.	Graphical configuration tool for I/P, O/P and functional building block for protection	10 nos.
9.	Any other software required for integration with	10 nos.

	SCADA.	
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➤ **Free of cost items to be supplied :-**

- i) Closing coil – 01 No. per 05 Set VCB
- ii) Tripping coil – 01 No. per 05 Set VCB
- iii) Earth fault relay – 01 No. per 05 Set VCB
- iv) O/C relay – 01 No. per 05 Set VCB
- v) Interrupter – 01 No. per 10 Set VCB
- vi) Spring charging limit switch – 01 No. per 05 Set VCB
- vii) Spring charging motor – 01 No. per 10 Set VCB

Note:-

- I) Bidder must be manufacturer of 11KV VCB but bidder may be or may not be manufacturer of Interrupter, CT, PT & CRP. Bidder shall supply the VCB with compatible CT, PT & CRP. It is responsibility of bidder/supplier to ensure supply of CRP, CT & PT which shall be compatible with VCB for smooth commissioning and operation of protection system.
- II) All the above tools/ Software should be compatible to WINDOWS XP/WINDOWS NT/WINDOWS 7 Operating System.
- III) Differential relay is not required with VCB and therefore its specification or requirement mentioned anywhere in above technical specification shall be read as **deleted**.
- IV) If desired, the supplier may be asked to provide detailed in house training of personnel of JBVNL, at their manufacturing site regarding working/ operation of VCB and fittings of main parts, replacement of spare parts etc. The in house training will be imparted in one or two batch and each batch will consist of 10 personnel or as decided by JBVNL. In such case supplier will be bound to provide training of personnel of JBVNL.

Sd/
DGM (Purchase)



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADCJ3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure – ‘C’

Tender Proforma for Part – I (Technical & Commercial)

- | | | | |
|-------|--|---|------------------------|
| 1. | Name & Full address of the tenderer | : | To be filled by bidder |
| | With Tele.no..... fax no..... | | |
| 2. | Name of Materials with HSN code | : | |
| 3(a). | Whether bidder is participated as
manufacturer /Authorized supplier | : | |
| 3(b) | If bidder is Authorized supplier, then | : | |
| | (i) Name & address of supplier | : | |
| | (ii) Name & address of OEM | : | |
| 3(c). | If bidder is Manufacturer, then name & address | : | |
| 4. | Quantity offered | : | |
| 5. | Whether the F.O.R. destination price has
been quoted giving freight element | : | |
| 6. | Whether quoted price is FIRM | : | |
| 7. | Delivery period | : | |
| 8. | Validity of the offer
(it should not be less than 180 days) | : | |
| 9. | Acceptance of the terms of payment | : | |
| 10. | Acceptance of terms of security deposit | : | |
| 11. | Details of deviation from the tender
Specification, if any | : | |
| 12. | Acceptance of the technical specification of
the materials for which offer is | : | |
| 13. | Guaranteed performance particulars:
(copies of performance & Purchase order
certificates should be attached) | : | |
| 14. | Guarantee | : | |
| 15. | Acceptance of penalty clause | : | |
| 16. | Particulars of payment made for Purchase of
BOQ and specification (online transaction ref.
no. & date) | : | |
| 17. | Amount of earnest money paid (online
transaction ref. no. & date) | : | |

18. Whether the firm is registered MSES unit of Jharkhand or registered with NSIC/ UDYAM (give details of Registration etc. along with photo State copy of certificate.) : For NSIC, Monetary Limit Rs. valid up to
19. Full address of place where the materials will be manufactured and will be available for inspection by the Nigam's representative :
20. Whether latest GST return and Income Tax certificate submitted : Yes / No
21. GST Registration No. :
22. Whether proof of financial capability Submitted : Yes / No
- 23(A). Details of past performance (for OEM)
- i) Whether list of past POs executed submitted : Yes / No
- ii) Whether copies of past Pos submitted : Yes / No
- iii) Whether copies of performance certificate enclosed : Yes / No
- 23(B). Details of past performance (for Authorized supplier)
- i) Whether list of past POs executed submitted : Yes / No
- ii) Whether copies of past Pos submitted : Yes / No
- iii) Whether copies of performance certificate enclosed : Yes / No
24. Re-inspection charges accepted : Yes / No
25. List of enclosures :
26. Whether type-test report submitted : Yes / No
27. Whether BIS license certificate (If applicable) : BIS license no..... dt..... valid up to.....
28. Annual turnover as on 31.03.2025 : For OEM, Rs.....
For Authorized supplier, Rs.....
28. Whether bidder is accepting Extension order clause of General Terms and conditions of NIT :
29. Factory license of OEM :
30. Notarized Authorization certificate issued to supplier from OEM on stamp paper of Rs.100/- or more :
31. CIN No./ UDYAM Registration No. :
32. Remarks :

Signature of tenderer with full name

Designation:.....

Seal:.....

- Note: 1) Must be filled in Nigam's proforma only, Otherwise offer may be liable for rejection.
2) Failure to upload Annexure – C alongwith bid may be liable for rejection of bid.



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e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure – ‘D’

TENDER PERFORMA FOR PART – II (PRICE BID)

	Unit landed price break-up	Amount in Rs.
A	Ex-factory price Ex-works price shall be quoted after considering benefit under input tax credit or any other benefit to be availed by the supplier	To be quoted in price part-II (Excel sheet) only.
B	Freight (Loading, unloading at stores, packing forwarding etc)	-----do-----
C	Other charges, if any (please specify)	-----do-----
D	Discount if any	-----do-----
E	GST (please specify HSN code & rate also)	-----do-----
F	Insurance will be arranged by the Nigam	
	Total landed price	Rs.

Signature of tenderer with full name

Designation:.....

Seal:.....

NOTE:- The quoted rate shall be inclusive of loading, un-loading.

This is proforma of price part and filled up price part should not be uploaded in technical part failing which offer is liable for rejection



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Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure – ‘E’

Guaranteed Technical Particulars of Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP

1. Name of manufacturer.
2. Manufacturer's type and designation
3. Governing Standard.
4. Rated Voltage (KV)
5. Maximum continuous rated service Voltage (KV)
6. Frequency (H/z)
7. Class (Out door)
8. **Normal current rating (Amps)**
 - i. Under standard condition
 - ii. Under site conditions
 - iii. Derating factor, if any, for sites conditions
9. **Short time current rating (KA)**
 - i. For 1 second.
 - ii. For 3 second.
- 10.
11. Maximum temperature rise over ambient 50°C due to rated current in main contacts. Measured after breaking test.
12. **Rated short circuit breaking current. KV.**
 - a. Rated short circuit current (A.C. component)- KA (rms) at KV
 - b. Percentage D.C. component
 - c. Asymmetrical breaking current (including D.C. component) at KV.
13. Making capacity (KV)
14. **Total break time (mili Seconds)**
 - a. For interruption of 10% of the rated capacity.
 - b. For interruption of 30% of the rated capacity.
 - c. For interruption of 60% of the rated capacity.
 - d. For interruption of the full rated capacity.
15. Arcing time (milli second).
16. Making time (milli second).
17. Minimum reclosing time at rated interrupting capacity from the instant of the trip coil energisation (milli second).
18. **Minimum dead time.**
 - a. 3 phase reclosing (milli second).
 - b. 1 phase reclosing (milli second).
 - c. Limit of adjustment of dead time for 3 phase reclosing
 - d. Limit of dead time for 1 phase reclosing
19. **Data on restriking voltage for 100, 50% or 30% rated capacity.**
 - a. Amplitude factor
 - b. Phase factor
 - c. Natural frequency (Hz)
 - d. Rated of rise of restriking Voltage (V) micro sec.

20. Maximum interrupting capacity under phase opposition conditions (MVA)- indicate value as per test report.
21. Maximum line charging current breaking capacity without over- voltage exceeding 2.5 times the rated phase to neutral voltage (Amps- indicate value as per test report).
22. Maximum line charging current breaking capacity and corresponding over Voltage recovered in test. (Indicate value as per test report)
 - a. On supply side
 - b. On line side
23. **Maximum cable charging current breaking capacity and corresponding over-voltage recorded in test.(Indicate value as per test report)**
 - a. On supply side
 - b. On line side
24. Maximum shunt capacitor/Reactor Bank switching capacity (single bank MVA).
25. Maximum breaking capacity on kilometric faults (MVA)
26. Maximum over-voltage on switching transformer on no load and the charging current.
27. **Dry 1 minute power frequency test withstand voltage for complete circuit breaker.**
 - a. Between line terminal and grounded parts (KV) rms
 - b. Between terminals with breaker contact open (KV) rms
28. Wet 1 minute power frequency test withstand test voltage for complete circuit breaker.
29. **1.2/50 microsecond wave impulse withstand test voltage for complete circuit breaker:-**
 - a. Between the terminal and ground (Kvpeak)
 - b. Between terminal with circuit breaker contacts open (KV peak).

Supporting insulators

30. Make and type
31. Weight
32. Transport dimension.
33. Insulation class.
34. Visible corona discharge voltage
35. Dry- 1 minute power frequency flashover voltage
36. Wet- 1 minute power frequency flashover voltage
37. 1.2/50 microsecond impulse flashover voltage.
38. **Creep age distance to ground (mm) for heavily polluted atmosphere.**
 - i. Total
 - ii. Protected
39. **Minimum Clearance in air.**
 - a. between phase (mm)
 - b. Live parts and earth (mm)
 - c. Live parts to ground level (mm).

CONSTRUCTION FREATURES

40. No. of poles per circuit breaker.
41. No. of breaks per pole
42. Total length of breaks per phase (mm).
43. Type of main contacts.
44. Materials of main contacts
45. Whether main contacts silver plated (Yes/no)
46. Thickness of silver coating on main contacts (mm)
47. Contact pressure on main contacts (Kg/m2)

48. Type of arcing contacts
49. Contact pressure on arcing contacts (Kg/m²)
50. Type of auxiliary switches.
51. Material of switch contacts.
52. Whether contacts silver plated (Yes/no)

53. **No. of auxiliary switch contacts operating with all three poles or single pole of breaker.**
 - a. Which are closed when breaker is closed
 - b. Which are open when breakers in closed.
 - c. Those adjustable with respect to the position of main contacts.

54. **No. of Auxiliary switch contacts operating with individual pole of breaker.**
 - a. Which are closed when breakers is closed.
 - b. Which are open when breaking is closed.
 - c. Those adjustable with respect to the position of main contact.

55. **No. of spare auxiliary switch contacts operating with all three poles or single pole of breaker.**
 - a. Which are closed when breaker is closed
 - b. Which are open when breakers in closed.
 - c. Those adjustable with respect to the position of main contacts.

56. **No. of spare auxiliary switch contacts operating with individual pole of breaker.**
 - a. Which are closed when breaker is closed
 - b. Which are open when breakers in closed.
 - c. Those adjustable with respect to the position of main contacts.

57. **No. of operation possible without maintenance**
 - a. At full rated interrupting capacity
 - b. At 50% of rated interrupting capacity
 - c. At 100% of rated current
 - d. At 50% of rated current

58. Mounting flange details
59. **Type of operating mechanism**
 - a. Operating
 - b. Closing

60. Tripping and closing circuit Voltage (V)
61. power required for tripping coil
62. Power Required for closing coil.
63. Details of various selector switches
64. Details of push button switches.
65. Rated operating duty.

66. **CURRENT TRANSFORMER**
 1. Make
 2. Type
 3. Manufacturer type designation
 4. Rated Voltage
 5. Rated primary current
 6. Rated Secondary current
 7. No of cores
 8. Rated output (to be indicated separately for different cores)
 9. Insulation level
 10. Class of accuracy (to be indicated separately for different cores)
 11. Short time current
 12. Applicable standard
 13. Over all mansion
 14. Total weight of CT complete with oil.

67. POTENTIAL TRANSFORMER

1. Make
2. Type
3. Manufacturer type designation
4. Rated primary Voltage
5. Rated Secondary Voltage
6. No of Secondary Cores
7. Rated Burden
8. Accuracy Class
9. Basic Insulation level.
10. Ratio
11. Applicable standard
12. Overall dimension
13. Total weight of PT complete with oil.

68. CONTROL RELAY PANEL

A. Relays

1. Type
2. Make
3. Applicable standard

B. Meters/Volt meters

1. Type
2. Shape & Size
3. Standard

C. KWH Meter

1. Type
2. Shape & Size
3. Standard

D .Details of other components &

Accessories Any other particulars, which may need to be mentioned, please mention.

Dated:

Place:

Signature

Name

Designation

Name of the tendering company.

Note:- GTP must be filled up by the bidders in the above Nigam's proforma only, failing which offer shall be rejected.

Signature of tenderer with full name

Designation:.....

Seal:.....



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AAD CJ3148A1ZD

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e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure – ‘F’

SCHEDULE OF DEVIATIONS FROM SPECIFICATIONS

Sl. No.	SPECIFICATION / CLAUSE	DEVIATION FROM SPECIFICATION (commercial & Technical)	JUSTIFICATION FOR DEVIATION

Place:

Signature of tenderer

Date:

Stamp

NOTE:- *Incase of not mentioning deviations in this deviation sheet & mentioning it elsewhere in the offer except in the tender proforma for part-1 (techno commercial), will be treated as no Deviations.*



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Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

DETAILS OF TESTING FACILITIES

Annexure – ‘G’

<u>Name of Test</u>	<u>Details of testing facilities available</u>	<u>Remarks</u>
1. Test on Raw Material		
i.		
ii.		
iii.		
iv.		
2. Routine Tests		
i.		
ii.		
iii.		
iv.		
3. Acceptance Tests		
i.		
ii.		
iii.		
iv.		
4. Type-tests		
i.		
ii.		
iii.		
iv.		

NOTE:- In case testing facilities are not available for certain tests, indicate in the remarks columns from which testing House (S) / Institution (S) these tests will be got carried out.

Signature & Seal of Tenderer



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADJC3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure- 'H'

PROFORMA FOR SCHEDULE OF REQUIREMENT & SPECIFIED DELIVERIES FOR **Type-tested, 33 KV, 1250 Amp. Outdoor type VCB with CT, PT & CRP**

Offered quantity	1 st month	2 nd month	3 rd month
Monthly delivery schedule for tender quantity i.e. 201 Set	41 Set	80 Set	80 Set

- NOTE : - 1. Priorities of despatches will be as notified by the Purchaser at the time of pre-despatch inspection.
2. Commencement of delivery period shall be reckoned from the date of issue of Purchase Order.
3. The delivery schedule may be changed (by the purchaser) as per requirement.
4. However, early delivery will be appreciated.

Signature of tenderer :

Name :

Designation :

Seal :



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADCJ3148A1ZD

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e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure- 'I'

Notarized affidavit on Indian Non-Judicial Stamp of Rs. 100/- or more

Self-declaration as per clause no. 30 (iii) of general term & condition of NIT.

Date:

Name & Signature of the

Tenderer & Seal



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADCJ3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure- 'J'

SELF DECLARATION CERTIFICATE

It is hereby declared that payment of GST of M/sis
update & nothing is due with GST

Date:

Name & Signature of the
Tenderer & Seal



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADJ3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure- 'K'

SELF DECLARATION CERTIFICATE

It is to undertake that M/s will supply additional quantity, if required by Board on same rate, terms and conditions, if extension order is placed within 12 month from the date of acceptance/ placement of order.

Date:

Name & Signature of the

Tenderer & Seal



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AADCJ3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure- 'L'

DECLARATION CERTIFICATE

It is hereby declared that none of the persons employed in the Subsidiary JBVNL or his/her close family member/blood relations / proxies are related to M/s
..... directly or indirectly.

Date:

Name & Signature of the
Tenderer & Seal



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AAD CJ3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure- 'M'

SELF DECLARATION CERTIFICATE

Sri of M/s
with head office
being their authorized signatory, do hereby solemnly affirm and declare that in the event the order is
placed upon to M/s, the firm will honour the purchase
order as per terms of NIT. The supply of material will not be affected by any pending payment or
claim of the firm in JBVNL. M/s will not slow/
stop supply of material on pretext of pending payment or claim, if any exist, at time execution of the
order.

Date:

Name & Signature of the
Tenderer & Seal



JHARKHAND BIJLI VITRAN NIGAM LIMITED

(CIN: U40108JH2013SGC001702) / GSTIN-20AAD CJ3148A1ZD

Regd. Office:- Engineering Building, HEC, Dhurwa, Ranchi-834004.

e-mail : cesp.jseb@rediffmail.com

Short e-procurement NIT No. 139/PR/JBVNL/2026-27

Annexure- 'N'

List of Purchase Orders

Sl. No.	Purchase Order No. & dtd.	Name of Item	Quantity	Utility
Total				

Note:- Only above mentioned list of P.Os along with its order copies by the firms will be considered for bid evaluation.

Date:

Name & Signature of the
Tenderer & Seal

Performance Bank Guarantee

Name of the Bank :
Address :
Guarantee No. :
A/c :
Date of Expiry :
Limit to Liability :
Purchase Order No. :
Name of Work :

Subject : Performance Bank Guarantee.

Date :

To,

**Sr. Manager
JBVNL,
Engineering Building, HEC Dhurwa,
Ranchi – 834 004
Jharkhand.**

Dear Sir,

Whereas you have entered into a P.O. No. Dated with M/s (hereinafter called the Suppliers) for the supply of performance guarantee hereinafter referred to as “the said contract” and have agreed to make an Performance Guarantee to M/s a sum of Rs. only) payment. Our agreeing to furnish you with our guarantee in the manner hereinafter contained, we (name of the Bank) do hereby covenant and agree with you as follows:

1. We hereby undertake to indemnify you and keep you indemnified to the extent of the sum of Rs. only) from and against the Supplier or otherwise in the observance and performance of any.
2. Notwithstanding anything to the contrary we agree that your decision as to whether the Contractor has made any such default or defaults and the amount or amounts to which you are entitled by reason thereof will be binding on us and we shall not be entitled to ask you to establish your claim or claims under this Guarantee but shall pay the same forthwith without any objection, or excuse.
3. We undertake to pay to you any money so demanded notwithstanding any complain regarding performance of supplied material.
4. The payment so made by us under this Guarantee, shall be valid discharge of our liability for payment hereunder.

This Guarantee shall come into force simultaneously with your making the said Performance Guarantee to the supplier and shall not be revoked by us at any time during its currency without your previous consent in writing.

5. You will have fullest liberty without affecting this guarantee to postpone for anytime or from time to time any of your rights or power against the Contractor and either to enforce and we shall not be released from our liability under this guarantee by the exercise of your part or any indulgence shown by you to the Contractor or by any variation or modification of the said contract or any other act, matter, or thing whatsoever which under the law relating to sureties would but for the provisions hereof have the effect of so releasing us from our liability hereunder. PROVIDED ALWAYS that nothing herein contained will enlarge our liability hereunder beyond the limit of Rs. only).
6. All compensations and payments that may be received by your from the Contractor or any person firm or company whosoever for on account of the Contractor in any war in respect of the said contract shall be regarded as payments in gross and you will be entitled to proceed against the assets of the contractor, should be Contractor be wound up or dissolved or declared insolvent in respect of the whole of the suppliers indebtedness to you without any right on our part to stand in your place in respect of or to claim the benefit of such compensation or payment or any security that may be held by you until you shall have received the full guarantee shall not in any way be affected by your taking

- or varying or giving up any securities from the contractor or any other person, firm or company on its behalf or by the winding up, dissolution, insolvency or death as the case may be of the Contractor.
7. Subject to the maximum limit of our liability aforesaid this guarantee will cover all your claim or claims against the contract from time to time arising out of or in relation to your such advance payment to the Contractor as aforesaid and in respect of which your demand or notice in writing be issued to us before the date of expiry of this guarantee mentioned above.
 8. This guarantee and the power and provisions herein contained are in addition to and not by way of limitation of or substitution for any other guarantee or guarantees hereto given to you by us (whether jointly with other or alone) and now existing uncanceled and that this guarantee is not intended to and shall not revoke or limit such guarantee or guarantee.
 9. This guarantee shall be continuing guarantee and shall not be discharged by an change in the constitution or by any amalgamation or absorption thereof or therewith but will ensure for and be available to and enforceable by the absorbing or amalgamated company or concern. We shall not revoke this guarantee during its currency, except with your prior consent in writing.
 10. Notwithstanding anything contained herein:-
 - (a) Our liability under this guarantee shall not exceed Rs. only).
 - (b) This Bank Guarantee shall be valid up to
 - (c) We are liable to pay the guaranteed amount or any part thereof under this Bank Guarantee only if you serve upon us a written claim or demand on or before (mention period of Guarantee as found under clause (ii) above plus claim period if any).
 11. We have power to issue this guarantee under our Bank Norms.

Yours faithfully,

Dated.....Day of

For.....

(Indicate the name of Bank).

Note: Claim period should be three months more from validity of BG

SBG

To,

.....

**JBVNL,
Ranchi – 834 004
Jharkhand.**

In consideration of the JBVNL. (hereinafter called the “Nigam”) having agreed to exempt(hereinafter called “the said contractor (S)”) from the demand, under the terms and conditions of an agreement/Letters of Intent No..... dated..... made between JBVNL, Ranchi andfor supply of(hereinafter called the “the said agreement”), of security deposit for the due fulfillment by the said contractor (S) of the terms and conditions contained in the said agreement on production of a Bank Guarantee for Rs..... We,(hereinafter referred to as “the Bank”) at the request of contractor (S) do hereby undertake to pay to the Nigam an amount not exceeding Rs..... against any loss or damage caused to or suffered or would be caused to or suffered by the Nigam by reason of any breach by the said contractor (S) of any of the terms or conditions contained in the said agreement.

2 We, do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Nigam stating that the amount claimed is due by way of loss or damage caused to or would be caused to or suffered by the Nigam by reason of breach by the said contractor (S) of any of the terms or conditions contained in the said agreement or by reason of the contractor (S) failure to perform the said agreement. Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs.....

3) We, undertake to pay to the Nigam any money so demanded notwithstanding any dispute or disputes raised by the contractor (S) in any suit or proceeding pending before any court or Tribunal or arbitration relating thereto our liability under this presents being absolute and unequivocal. The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the contractor (S) shall have not claim against us for making such payment.

4) We, Further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said agreement and that it shall continue to be enforceable till all the dues of the Nigam under or by virtue of the said agreement have been fully paid and its claims satisfied or discharged or till the Nigam certifies that the terms and conditions of the said agreement have been fully and properly carried out by the said contractor (S) and accordingly discharges this guarantee. Unless a demand or claim under this guarantee is made on us in writing on or before theWe shall be discharged from all liabilities under this guarantee thereafter.

5) We, Further agree with the Nigam that the Nigam shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said agreement or to extend time of performance by the said contractor (S) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Nigam against the said contractor (S) and to forbear or enforce any of the terms and conditions relating to the said agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said contractor (S) or for any forbearance, act or omission on the part of the Nigam or any indulgence by the Nigam to the said contractor (S) or any such matter or thing whatsoever which under the law relating to sureties would, but for this provision, have effect of so relieving us.

6) This guarantee will not be discharged due to the change in the constitution of the bank or the contractor (S) supplier (S).

7) We, State Bank..... . Lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Nigam in writing.

Notwithstanding anything contained herein above:

- a) Our liability under this Bank Guarantee shall not exceed Rs.....
- b) This Bank Guarantee shall be valid upto
- c) We are liable to pay the guaranteed amount or any part thereof under this Bank guarantee only if you serve upon us a written claim or demand on or before

Note: Claim period should be three months more from validity of BG