ASSAM ELECTRICITY GRID CORPORATION LIMITED

Regd. Office: 1st Floor, Bijulee Bhawan, Paltan Bazar, Guwahati – 781001
CIN: U40101AS2003SGC007238
Ph: 0361-2739520/ Fax: 0361-2739513 Web: www.aegcl.co.in

BID IDENTIFICATION NO: AEGCL/DGM/Bong/T&TC/T-1/2025/152; Dated: 27/06/2025

Bidding Document
For

Renovation & upgradation of a 33kV Bay at 132kV Kokrajhar GSS for charging of 33kV Adabari-Choibari line

DEPUTY GENERAL MANAGER,
BONGAIGAON T&T CIRCLE, AEGCL
DHALIGAON, CHIRANG-783385

Bidder's Signature & Seal

SECTION - 1

INSTRUCTION TO BIDDER

1.1.0 SCOPE OF BID:

1.1.1. The **Deputy General Manager, Bongaigaon T&T Circle, AEGCL** on behalf of **Assam Electricity Grid Corporation Ltd,** hereinafter referred to as AEGCL or Purchaser invites sealed tenders in prescribed form, from reputed firms/ contractors/ manufacturers with sound technical and financial capabilities for the following work. A single stage two envelope procedure (**Techno-Commercial and Price Bid**) will be adopted for this tender.

a) **NAME OF WORK**: **Renovation & upgradation of 33kV bay at 132kV Kokrajhar GSS for charging of 33kV Adabari-Choibari line.**

b) **ESTIMATED VALUE FOR THE WORK: ₹17,70,420.00 (Rupees Seventeen Lakhs Seventy Thousand Four Hundred and Twenty) only including taxes.**

c) **Fund: O&M HQ (LAR) for FY2025-26**

d) **Key Dates: Refer to NIT.**

e) **Bidding address:**
O/o The Deputy General Manager
Dhaligaon, Chirang-783385

[e-mail: dgmttc.bongaigaon@aegcl.co.in]

f) Bidders may obtain further information from the office of the Deputy General Manager, Bongaigaon T&T Circle, AEGCL, Dhaligaon, Chirang - 783385, Assam.

g) **Cost of Bidding:** The bidder shall bear all costs associated with the preparation and submission of its bid and AEGCL will in no case be responsible or liable for those costs. The cost of the tender paper is **₹1000/- (Rupees One Thousand) only** to be pledged in favour of "**AEGCL, Guwahati**" (in the form of A/C payee DD/Bankers Cheque).

1.2.0 BIDDING PROCEDURE:

Two envelope bidding procedure will be adopted. Bidders are to submit two sealed envelopes simultaneously, one containing the technical & Commercial proposal, Part–I (Technical & Commercial Bid) and the other containing the price proposal Part-II (Price Bid), enclosed together in one sealed envelope. Initially, only the Part-I bids shall be opened. Part-I proposals submitted by bidders, which do not conform to the specified requirement, may be rejected as deficient bids. The Part-II (Price Bid) proposals of technically qualified bidders will be opened at a date and time, which will be informed to all the qualified bidders of Part-I.

1.3.0 SCOPE OF WORK:

1.3.1 The brief description of the scope of work covered under this bidding document is furnished below:

a. Design, engineering, manufacture and supply of 33kV terminal equipment and accessories, viz., 33kV Vacuum Circuit Breaker, 33kV Current Transformers, 33kV Isolators with and without Earth switch, 33kV Lightning Arresters (**of reputed make**) including terminal connectors and marshalling box at 132/33kV Kokrajhar GSS.

b. Design, engineering, manufacture and supply of relays and accessories, viz., master trip relay, trip circuit supervision relay, ethernet switches, backup relays, BCU and patch cords (**of reputed make**) at 132/33kV Kokrajhar GSS.

c. Loading at manufacturer's works, transportation and delivery at the substation site, including unloading at destination site.

d. Freight & Transit Insurance, storage at site and site insurance of all materials at site shall be in the scope of the contractor.

e. Arrangements of any permits required for transportation and movement of supplied materials. However, AEGCL shall assist as far as practicable in the process.

f. Dismantling of existing 33kV equipment and proper staking (without dismantling mounting structure).

g. Erection, testing and commissioning of the newly supplied 33kV equipment and all associated works as per direction of Site-In charge.

1.3.2 The Bill of Quantities for indicative purposes is furnished in Price Schedules.

1.3.3 The bidder on its own responsibility may visit and examine the Site of Works and its surroundings and obtain information that

may be necessary for preparing the bid. Any permits or licenses that may be required to execute the works should also be obtained by the contractor.

1.3.4 The items mentioned in these Annexure shall only be used while quoting the bid prices. Any other items not specifically mentioned in the specification but which are required for installation, testing, commissioning and satisfactory operation of the cable as per Indian Standards/IE Rules/IE Act and concerned authority regulations are deemed to be included in the scope of the specification and no deviation in this regard shall be accepted.

1.3.5 No modifications/additions/ deletions shall be made by the bidder to the items and quantities given in these schedules.

1.3.6 The successful bidder will be expected to complete the works within **7 (Seven) months from the date of signing of the contract agreement.** Bidders should note that time is the essence of this bid.

1.4.0 ELIGIBILITY CRITERIA OF THE BIDDER:

1.4.1 A Bidder may be a private entity or a government-owned entity. However, **no Joint Venture Bid shall be allowed.**

1.4.2 A Bidder shall have Indian nationality. A Bidder shall be deemed to have the nationality of a country if the Bidder is a national or is constituted, incorporated, or registered and operates in conformity with the provisions of the laws of Republic Of India.

1.4.3 AEGCL considers a **conflict of interest** to be a situation in which a party has interests that could improperly influence that party's performance of official duties or responsibilities, contractual obligations, or compliance with applicable laws and regulations, and that such conflict of interest may contribute to or constitute a prohibited practice under Anticorruption Policy of Government of India and Government Of Assam. In pursuance Anticorruption Policy's requirement that Employer as well as bidders, suppliers, and contractors observe the highest standard of ethics. AEGCL will take appropriate actions if it determines that a conflict of interest has flawed the integrity of any procurement process.

1.4.4 A firm that is under a declaration of ineligibility by the AEGCL or any Government Entity or PSU at the date of the deadline for bid submission or thereafter i.e. on or before contract signing date shall be disqualified. Bidders shall provide such evidence of their continued eligibility satisfactory to the AEGCL, as the Employer shall reasonably request.

1.5.0 FINANCIAL CAPABILITY

1.5.1 Bidder will require to submit along with the bid the audited balance sheets and other legal financial statements acceptable to AEGCL, for the last 3 (three) years to demonstrate the current soundness of the Bidders financial position and its prospective long-term profitability. As a minimum, an Applicant 's net worth calculated as the difference between total assets and total liabilities should be positive. Wherever necessary the Employer may make enquiries with Bidder's bankers.

1.5.2 Average Annual Turnover: Minimum average annual turnover INR 6,00,000.00 calculated as total certified payments received for contracts in progress or completed, within the last 3 (Three) Years.

1.5.3 Financial Resources: Bidder need to demonstrate access to, or availability of, financial resources such as liquid assets, unencumbered real assets, lines of credit, and other financial means, other than any contractual advance payments to meet:

(1) the cash-flow requirement of atleast 70% of the work value and
(2) the overall cash flow requirements for this contract and its current works commitment.

1.5.4 Bidder must keep GST liabilities up to date and non-payment of GST liabilities and non-filing of relevant GST return more than 3 (three) months shall be reckoned as GST defaulter and this may be considered a cause for disqualification of a bidder and the bid may be rejected.

1.6.0 EQUIPMENT CAPABILITIES

1.6.1 The bidder should have assured access to supply of terminal equipment and Control & relay panel accessories and shall demonstrate that he or his supplier has capable of, manufacture & supply of such material. Bidders are required to demonstrate that based on known commitments the materials will be available for use in the proposed contract.

1.7.0 EXPERIENCE:

1.7.1 Experience on similar nature of works under contracts in the role of manufacturers, contractor, subcontractor, or management contractor for at least the last 5 (Five) years prior to the bid submission deadline.

1.7.2 Bidder may be manufacturer of the offered products or a firm/company having authorisation from a manufacturer. In case the bidder is <u>not</u> a manufacturer of the offered products, bidder must submit manufacturer's authorisation using for that purpose Form-MA provided in Section-3 Bidding forms.

1.7.3 Participation as manufacturer/ contractor Experience having successfully completed similar works (supply and installation of 220kV/132kV/33kV terminal equipments) during last 5 years ending last day of the month previous to the one in which applications are invited should be either of the following:

(a) Three (3) similar completed works costing not less than 40% of total estimated cost.
(b) Two (2) similar completed works costing not less than 50% of total estimated cost.
(c) One (1) similar completed works costing not less than 80% of total estimated cost.

Bidder's Signature & Seal

1.7.4 The Bidder must have experience of executing work of similar nature previously in AEGCL/APDCL/APGCL. The bidder must submit experience and completion certificate for scrutiny by AEGCL. Each of such project/ works should consist of completion certificate.

1.8.0 LITIGATION HISTORY

Bidders shall submit details of all litigation, arbitration or other claims, whether pending, threatened or resolved in the last five years, with the exception of immaterial claims with a cumulative impact of not more than 10% of their total assets. The Employer may disqualify bidders in the event that the total amount of pending or threatened litigation or other claims represent more than 50% of their total assets.

1.9.0 DOCUMENTS COMPRISING THE BID

1.9.1 The bid submitted by the bidder shall comprise two envelopes submitted simultaneously, one containing only the technical proposal and the other the price proposal.

1.9.2 **The Technical Bid submitted by bidders shall contain the following:**

a) Bid Submission Sheet

b) Documentary evidence to establish that the Bidder meet the qualifying requirements in accordance with Clause 1.5.0.

c) Documents to be furnished as per Clause 1.9.3

d) The Bid Guarantee (Bid Security) in accordance with Clause 1.19.0 & its sub clauses of this Section.

e) All Bidding Schedules properly filled up including Price Bid Schedules.

f) All other information and documents such as Guaranteed and Technical Particulars, type test reports, drawings, technical leaflets etc, as required in the Technical Specification

1.9.3 To establish its eligibility and qualifications to perform the contract, the bidder shall provide along with the above-mentioned documents the following additional documents (mandatory) on qualifying requirements such as:

a) *Copies of original documents defining the constitution or legal status, place of registration, and principal place of business, written power of attorney of the signatory of the Bid to commit the Bidder.*

b) *Copies of relevant Electrical Licence (updated) issued by competent authority in the State of Assam or in the State where the bidder's business is registered.*

c) *Copies of Labour Licence (updated) issued by competent authority in the State of Assam or in the State where the bidder's business is registered.*

d) *Copies of PAN, GST Registration Certificate as per Goods & Services Tax laws.*

e) *Total monetary value of similar work performed by the bidder in each of the last three years.*

f) *Experience in works of a similar nature and volume for each of the last three years, and details of works under way or contractually committed in AEGCL or any other Govt. entity/PSU who may be contacted for further information on those contracts.*

g) *Qualifications and experience of key site management and technical personnel proposed for the Contract.*

h) *Reports on the financial standing of the Bidder, such as profit and loss statements and audited annual accounts certified by CA of the company for the last three years including IT return duly acknowledged by the tax department for the last three years.*

i) *Evidence of adequacy of working capital for this contract (access to line (s) of credit and availability of other financial resources).*

j) *Information regarding any litigation, current or during the last five years, in which the Bidder is involved, the parties concerned, and disputed amount.*

1.9.2 Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements.

1.9.3 Notwithstanding anything stated herein above, AEGCL reserves the right to assess the capacity and capability of the bidder to execute the work, should the circumstance warrant such assessment in the overall interest of AEGCL.

1.10.0 DOCUMENTS ESTABLISHING CONFORMITY OF THE GOODS AND SERVICES

1.10.1 The documentary evidence of the conformity of the goods and services to the Bidding Document may be in the form of literature, drawings and data, and shall furnish:

a) A detailed description of the essential technical and performance characteristics of the goods and services, including the functional guarantees of the Goods, in response to the Specification;

b) A commentary on the Purchaser's Specification and adequate evidence demonstrating the substantial responsiveness of the plant and services to those specifications. Bidders shall note that standards for workmanship, materials and equipment designated by the Purchaser in the Bidding Document are intended to be descriptive (establishing standards of quality and

performance) only and not restrictive. The Bidder may substitute alternative standards, brand names and/or catalog numbers in its bid, provided that it demonstrates to the Purchaser's satisfaction that the substitutions are substantially equivalent or superior to the standards designated in the Specification.

1.11.0 SITE VISIT

The interested bidders are advised to visit any grid substation of AEGCL and examine the site of works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid. The costs of visiting the Site shall be at the bidder's own expense.

1.12.0 CLARIFICATION ON BIDDING DOCUMENTS:

1.12.1 A prospective bidder requiring any clarification of the bidding documents may notify AEGCL in writing at the following address-

Deputy General Manager, Bongaigaon T&T Circle, AEGCL, Dhaligaon, Chriang-783385

AEGCL will respond to any request for clarification which it receives earlier than 7 **(seven)** days prior to the deadline for submission of bids.

1.12.2 Verbal clarification and information given by AEGCL or its employee(s) or representative (s) shall not in any way be binding on AEGCL.

1.13.0 AMENDMENT OF BIDDING DOCUMENTS

1.13.1 At any time prior to the deadline for submission of bids, the AEGCL may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents by issuing addenda.

1.13.2 Any addendum thus issued shall be part of the bidding documents pursuant to Sub-Clause, and shall be communicated in writing or by fax to all purchasers of the bidding documents. Prospective bidders shall acknowledge receipt of each addendum by fax to AEGCL.

1.14.0 LANGUAGE OF BID

1.14.1 The bid, and all correspondence and documents related to the bid, exchanged between the bidder and AEGCL shall be written in the English language. Supporting documents and printed literature furnished by the bidder shall also be in English language.

1.15.0 BID FORM AND PRICE SCHEDULES

1.15.1 The Bidder shall complete the Bid Form and the appropriate Price Schedules furnished in the bidding documents in the manner and detail indicated therein.

1.16.0 BID PRICES

1.16.1 Bidders shall give a breakdown of the prices in the manner and detail called for in the **Schedules of Prices**.

1.16.2 In the Schedules, Bidders shall give the required details and a breakdown of their prices, including all taxes, duties, levies, and charges payable as of twenty-eight (28) days prior to the deadline for submission of bids, as follows:

(a) Plant and equipment (**Schedules of Prices**) shall be quoted on an EXW (ex-factory, ex-works, ex-warehouse or off-the-shelf, as applicable). All taxes and duties taxes as applicable and freight and insurance shall be indicated separately.

1.16.3 Price Adjustment: Prices quoted by the Bidder shall be FIRM during performance of the contract. Duties and Taxes shall be adjusted, except there is variation due to changes in legislation of the Country.

1.17.0 INSURANCE

The Bidder shall insure the Works/Materials (in transit and at the site) in accordance with the requirements of General Conditions of Contract. The Bidder shall provide details of the policies that he intends to take out as part of his Bid submission. **The bid price shall include all costs in pursuance of fulfilling insurance liabilities under the contract.**

1.18.0 BID VALIDITY

1.18.1 Bids shall remain valid for a period of **180 (One Eighty)** days after the date of opening of Technical Bids.

1.18.2 In exceptional circumstances, prior to expiry of the original bid validity period, AEGCL may request that the bidders extend the period of validity for a specified additional period. The request and the responses thereto shall be made in writing. A bidder may refuse the request without forfeiting its bid security. A bidder agreeing to the request will not be required or permitted to modify its bid, but will be required to extend the validity of its bid security for the period of the extension, and in compliance with Clause 1.19.0 in all respects.

1.19.0 BID SECURITY (EARNEST MONEY)

Bidder's Signature & Seal

1.19.1 The Bidder shall furnish, as part of its bid with the Technical Proposal, a bid security in the amount of **₹35,500.00 (Rupees Thirty-Five Thousand and Five Hundred) only pledged in favor of the DGM, Bongaigaon T&T Circle payable at Dhaligaon.**

1.19.2 For participation in the bidding procedure, participants must compulsorily pay the Bid Security / Earnest Money Deposit in the form of DD/Fixed Deposit/bank Guarantee/Banker's Cheque in favour of AEGCL, Guwahati. The bid security shall remain valid for 30 days beyond the original validity period for the bid, and beyond any period of extension subsequently requested.

1.19.3 Any bid not accompanied by an acceptable bid security shall be rejected as non-responsive.

1.19.4 The bid securities of unsuccessful bidders will be returned as promptly as possible, against written request from the unsuccessful bidders.

1.19.5 The bid security of the successful bidder will be returned when the bidder has signed the Contract Agreement and furnished the required performance security.

1.19.6 The bid security may be forfeited

(a) if the bidder withdraws its bid, except as provided in Sub-Clause 1.24.1;
(b) if the bidder does not accept the correction of its bid price, pursuant to Sub-Clause 1.29 or
(c) in the case of a successful bidder, if it fails within the specified time limit to
    (i) sign the Contract Agreement,
    (ii) furnish the required performance security.

1.19.7 No interest shall be payable by AEGCL on the above bid guarantee.

1.20.0 ALTERNATIVE PROPOSALS BY BIDDERS

1.20.1 Bidders shall submit offers, which comply with the Bidding Documents, including the basic AEGCL's Requirements as indicated in the bidding documents. Alternatives will not be considered. The attention of bidders is drawn to the provisions of Clause 1.29.0 regarding the rejection of bids which are not substantially responsive to the requirements of the bidding documents.

1.21.0 FORMAT AND SIGNING OF BID

1.21.1 The bidder shall prepare one original and two copies of the bid proposal, clearly marking each one as: "ORIGINAL - BID PROPOSAL, etc as appropriate. In the event of discrepancy between the original and any copy, the original shall prevail.

1.21.2 The original and all copies of the bid shall be typed or written in indelible ink (in the case of copies, Photostats are also acceptable) and shall be signed by a person or persons duly authorized to sign on behalf of the bidder. All pages of the bid where entries or amendments have been made shall be initialed by the person or persons signing the bid.

1.21.3 The bid shall contain no alterations, omissions or additions, except those to comply with instructions issued by AEGCL, or as necessary to correct errors made by the bidder, in which case such corrections shall be initialed by the person or persons signing the bid.

1.21.4 The Bidders must submit the Bid Guarantee in separate sealed envelope, super-scribed as under:

"BID GUARANTEE (Name of the Package)"

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

1.21.6 Bids by Corporation / Company must be signed with the legal name of the Corporation/Company by the President, Managing Director or by the Secretary or other person or persons authorized to Bid on behalf of such Corporation/Company in the matter.

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

1.21.8 Satisfactory evidence of authority of the person signing on behalf of the Bidder shall be furnished with the Bid.

1.21.9 The Bidder's name stated on the proposal shall be exact legal name of the firm

1.21.10 Bids not conforming to the above requirements of signing may be disqualified.

1.21.11 If the outer envelope is not sealed and not marked as above, AEGCL will assume no responsibility for the misplacement or premature opening of the bid.

1.21.12 The Bid must be accompanied with requisite BID SECURITY in a separate sealed cover.

1.21.13 The Bidders have the option of sending the Bids by post/courier or in person. Bids submitted by Telex/ Telegram/Fax will not be accepted. No request from any Bidder to AEGCL to collect the proposal from Airlines/Cargo Agents etc shall be entertained by AEGCL.

Bidder's Signature & Seal

1.22.0 DEADLINE FOR SUBMISSION OF BIDS

1.22.1 Bids must be received by AEGCL at the address specified above no later than refer to NIT.

1.22.2 AEGCL may, at its discretion, extend the deadline for submission of bids by issuing an addendum in accordance with Clause 1.13.0, in which case all rights and obligations of AEGCL and the bidders previously subject to the original deadline will thereafter be subject to the deadlines extended.

1.23.0 LATE BIDS

1.23.1 Any bid received by AEGCL after the deadline for submission of bids prescribed in Clause 1.22.0 will be rejected and returned unopened to the bidder.

1.24.0 WITHDRAWAL OF BIDS

1.24.1 The bidder may withdraw its bid after bid submission, provided that written notice of the withdrawal is received by AEGCL prior to the deadline for submission of bids.

1.24.2 The bidder's withdrawal notice shall be prepared, sealed, marked and delivered with the envelopes additionally marked "WITHDRAWAL".

1.24.3 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in Sub-Clause 1.18.0 may result in the forfeiture of the bid security pursuant to Sub-Clause 1.19.6.

1.25.0 OPENING OF BIDS

1.25.1 AEGCL will open the Technical Bids (Part-I), in the presence of bidders' representatives who choose to attend; at the following location:

Deputy General Manager.
Bongaigaon T&T Circle, AEGCL,
Dhaligaon, Chirang-783385

The bidders' representatives who are present shall sign a register evidencing their attendance.

1.25.2 Envelopes marked “WITHDRAWAL” shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Claus 1.24.0 0shall not be opened.

1.25.3 The bidders' names, the Bid Prices, the presence or absence of Bid Security, and such other details as AEGCL may consider appropriate, will be announced and recorded by AEGCL at the opening. The bidders' representatives will be required to sign this record.

1.26.0 PROCESS TO BE CONFIDENTIAL

1.26.1 Information relating to the examination, clarification, evaluation and comparison of bids and recommendations for the award of a contract shall not be disclosed to bidders or any other persons not officially concerned with such process. Any effort by a bidder to influence AEGCL's processing of bids or award decisions may result in the rejection of the bidder's bid.

1.27.0 PRELIMINARY EXAMINATION OF BIDS AND DETERMINATION OF RESPONSIVENESS

1.27.1 Prior to the detailed evaluation of bids, AEGCL will examine the bids to determine whether they are complete and all documents as per Clause 1.9.0 are provided or not, whether the documents have been properly signed, whether the required security is included, and whether the bids are generally in order and provides any clarifications and/or substantiation that AEGCL may require pursuant to Clause 1.27.0.

1.27.2 A substantially responsive bid is one which conforms to all the terms, conditions and requirements of the bidding documents, without material deviation or reservation and includes the amendments and changes, if any. AEGCL may waive any minor non-conformity or irregularity in a Bid which does not constitute a material deviation or reservation, provided such deviation or reservation does not (i) affect in any substantial way the scope, quality or performance of the Works; (ii) limit in any substantial way, inconsistent with the bidding document, AEGCL’s rights or bidder’s obligations under the contract; or (iii) whose rectification would affect unfairly the competitive position of other bidder’s presenting substantially responsive bids.

1.27.3 Any bids found to be non-responsive for any reason or not meeting the minimum levels of the performance or other criteria specified in the bidding documents will be rejected by AEGCL and not included for further consideration.

1.28.0 CLARIFICATION OF BID PROPOSALS AND CONTACTING AEGCL

1.28.1 To assist in the examination, evaluation and comparison of Bids, AEGCL may, at its discretion, ask any bidder for clarification of its bid. The request for clarification and the response shall be in writing or by mail, but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by AEGCL in the evaluation of the bids in accordance with Clause 1.28.0.

Bidder's Signature & Seal

1.28.2 Subject to Sub-Clause 1.28.1, no bidder shall contact AEGCL on any matter relating to its bid from the time of opening Bids to the time the contract is awarded. If the bidder wishes to bring additional information to the notice of AEGCL, it should do so in writing.

1.28.3 Any effort by the bidder to influence AEGCL in AEGCL's evaluation of price proposals, bid comparison or contract award decisions may result in the rejection of the bidder's bid.

1.29.0 CORRECTION OF ERRORS

1.29.1 Price Proposals determined to be substantially responsive will be checked by AEGCL for any arithmetic errors. Arithmetic errors will be rectified on the following basis. If there is a discrepancy between the unit rate and the total cost that is obtained by multiplying the unit rate and quantity, the unit rate shall prevail and the total cost will be corrected unless in the opinion of AEGCL there is an obvious misplacement of the decimal point in the unit rate, in which case the total cost as quoted will govern and the unit rate corrected. If there is a discrepancy between the total bid amount and the sum of total costs, the sum of the total costs shall prevail and the total bid amount will be corrected.

1.29.2 The amount stated in the Form of Bid for Price Proposal will be adjusted by AEGCL in accordance with the above procedure for the correction of errors and, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount of bid, its bid will be rejected, and the bid security may be forfeited in accordance with Sub-Clause 1.19.6 (b).

1.30.0 EVALUATION AND COMPARISON OF BID PROPOSALS

1.30.1 AEGCL will evaluate and compare only the bids determined to be substantially responsive in accordance with Clause 1.27.0.

1.30.2 For equipments and materials, the comparison shall be of the ex-factory price of equipments and materials offered (such price to include all costs as well as duties and taxes paid or payable on components and raw material incorporated); plus the cost of transportation, local taxes and duties, civil works, installation and other services required under the contract with due corrections as per Clause 1.29.0, AEGCL's comparison will also include the costs if any, resulting from application of the evaluation procedures described in Sub-Clause 1.30.4.

1.30.3 AEGCL will carry out a detailed evaluation of the bids in order to determine whether the bidders are qualified and whether the technical aspects are substantially responsive to the requirements set forth in the bidding documents. In order to reach such a determination, AEGCL will examine the information supplied by the Bidders and other requirements in the bidding documents, taking into account the following factors:

(a) Qualification

(i) the determination will take into account the Bidder's financial and technical capabilities and past performance; it will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to Clause 1.5.0 as well as such other information as AEGCL deems necessary and appropriate; and

(ii) an affirmative determination will be a prerequisite for AEGCL to continue with the evaluation of the proposal; a negative determination will result in rejection of the Bidder's bid.

(b) Technical

(i) overall completeness and compliance with AEGCL's Requirements; the technical merits of materials and equipments offered and deviations from AEGCL's Requirements; suitability of the facilities offered in relation to the environmental and climatic conditions prevailing at the site; quality, function and operation of any process control concept included in the bid;

(c) Commercial

(i) Deviations and omissions from the contractual and commercial conditions as identified in the Bid.

(ii) compliance with the time schedule called for in the Bidding Document and evidenced as needed in a milestone schedule provided in the bid; and

(iii) the functional guarantees of the facilities offered against the specified performance criteria of the plant and equipment.

1.30.4 Pursuant to Sub-Clause 1.30.4, the following evaluation methods will be followed:

(a) **Time Schedule:** The plant and equipment covered by this bidding are required to be shipped, installed and the facilities completed within the period specified in Sub-Clause

Bidders submitting bids which deviate from the time schedule specified will be rejected.

(b) **Deviations from the Bidding Document:**
Bidders shall base their Bid price on the terms & conditions specified in the Bidding Documents.

Bids with material deviations and omissions shall be rejected.

(c) **Functional Guarantee of the facilities:**

Bidder's Signature & Seal

Bidders shall state the functional guarantees (e.g. guaranteed performance or ratings or efficiency) of the proposed Goods in response to AEGCL's Requirements (Technical Specifications). Goods, Plant and equipment offered shall have a minimum performance (functional guarantees/ratings) specified in the Technical Specifications to be considered responsive. Bids offering Goods, plant and equipment with functional guarantees less than the minimum specified shall be rejected.

1.30.5 **Bid Evaluation Process for Abnormally Low Bids:**

The following methodology will be practiced for identification and treatment of the Abnormally Low Bids (ALB) in this tender process of AEGCL:

(a) Identification:

For the identification of the Abnormally Low Bids, two approaches as applicable shall be adopted:

i. ***Absolute Approach*** when there is fewer than five substantially responsive bidders and if the bid price is 20% or more below AEGCL's cost estimate then AEGCL's tender evaluation committee should clarify the Bid price with the bidder to determine whether the Bid is abnormally low.

ii. ***Relative Approach*** is a statical comparison method which will be applied when there are more than five nos. of substantially responsive bids. A potential ALB is identified where the low Bid is more than one standard deviation below the average of substantially responsive bids received.

In this approach first the Average bid price is determined and then by deducting the standard deviation from the average bid price, potentially ALB may be determined.

(b) In case of ALB, the tender evaluation committee of the respective tenders shall undertake the following three stage review which are as follows:

i. Identify ALB as per the step mentioned in Clause No.(a).(i) and 10.b).(ii) whichever is applicable.
ii. Clarify and analyse the bidders resource inputs and pricing, including overheads, contingencies and profit margins. In that respect committee may seek the reference of the guidelines of World Bank, AIIB, ADB etc.
iii. Decide whether to accept or reject the tender.

(c) Additional Performance Security in case of acceptance of ALB:

i. If any abnormally low bid is accepted under point no. (b) (iii), after taking of additional performance security as per the assessment of the committee, however the total performance security should not have to exceed 20% of the total contract value.

ii. The additional performance security shall be treated as part of the original performance security and shall be valid for a period coextensive with the applicable defect liability period of the contract.

iii. Non submission of the additional performance security shall constitute sufficient ground to rejection of the bid and similar assessment shall be initiated for the next ranked bidder identified as ALB.

1.30.6 AEGCL reserves the right to accept or reject any variation or deviation. Variations, deviations, and other factors which are in excess of the requirements of the bidding documents or otherwise result in the accrual of unsolicited benefits to AEGCL shall not be taken into account in bid evaluation.

1.31.0 AWARD

1.31.1 AEGCL will award the Contract to the bidder whose bid has been determined to be substantially responsive to the bidding documents provided that such bidder has been determined to be qualified in accordance with the provisions of the Bid.

1.32.0 EMPLOYER'S RIGHT TO ACCEPT ANY BID AND TO REJECT ANY OR ALL BIDS

1.32.1 Notwithstanding Clause 1.31,0, AEGCL 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 or any obligation to inform the affected bidder or bidders of the grounds for AEGCL's action. AEGCL is not bound to accept the offer of the lowest bidder.

1.33.0 NOTIFICATION OF AWARD

1.33.1 Prior to expiration of the period of bid validity prescribed by AEGCL, AEGCL will notify the successful bidder by fax, confirmed by letter, that its bid has been accepted. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") shall name the sum which AEGCL will pay the Contractor in consideration of the execution, completion and maintenance of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called "the Contract Price").

1.33.2 The notification of award will constitute the formation of the Contract.

Bidder's Signature & Seal

1.34.0 SIGNING OF CONTRACT AGREEMENT

1.34.1 At the same time that it notifies the successful bidder that its bid has been accepted, AEGCL will send the bidder the Form of Contract Agreement incorporating all agreements between the parties.

1.34.2 Within **15 (fifteen) days** of receipt of the Form of Agreement, the successful bidder shall sign the Form and return it to AEGCL.

1.35.0 WARRANTY

1.35.1 The contractor warrants that all goods are new, unused and of the most recent or current models, and that they incorporate all recent improvements in design and materials, unless provided otherwise in the Contract. The term period of warranty shall mean the period of 18 months from the date of the materials are received at site in good and acceptable condition. If during the period of warranty, any defect is found, the Contractor shall rectify all defects in design, materials and workmanship that may develop under normal use of the equipment upon written notice from the Purchaser who shall indicate in what respects the equipment is faulty. The rectification / free replacement must be carried out within a reasonable time period and at free of cost.

1.35.2 In the event of any emergency, where in the judgment of AEGCL, delay would cause serious loss or damages, repairs or adjustment may be made by the engineer or a third party chosen by the engineer without advance notice to the contractor and the cost of such work shall be paid by the contractor. In the event such action is taken by the engineer, the contractor will be notified promptly and he shall assist wherever possible in making necessary corrections. This shall not relieve the contractor of his liabilities under the terms and conditions of the contract.

1.35.3 If it becomes necessary for the contractor to replace or renew any defective portions of the works, the provision of this clause shall apply to portion of the works so replaced or renewed until the expiry of eighteen (18) months from the date of such replacement or renewal.

1.35.4 The repaired or new parts will be furnished and erected free of cost by the contractor. If any repair is carried out on his behalf at the site, the contractor shall bear the cost of such repairs.

1.35.5 The acceptance of the equipment by the Employer shall in no way relieve the contractor of his obligation under this clause.

1.35.6 In the case of those defective parts, which are not repairable at site but are essential for the commercial operation of the equipment, the contractor and the engineer shall mutually agree to a programme of replacement or renewal, which will minimize interruption to the maximum extent in the operation of the equipment.

1.36.0 PERFORMANCE SECURITY (Contract Performance Guarantee)

1.36.1 As a Contract Performance Security, the successful Bidder, to whom the work is awarded, shall be required to furnish a Performance Guarantee from a Nationalized Bank, in the form attached with the Bidding Document (Section –5) in favour of the AEGCL. The guarantee amount shall be equal to ten percent (10%) of the Contract Price and it shall guarantee the faithful performance of the contract in accordance with the terms and conditions specified in these documents and specifications. The guarantee shall be valid up to 30 (thirty) days after the end of Warranty Period.

1.36.2 In case the bidder fails to submit the Performance Security in the form of Bank Guarantee, an amount equivalent to 10% of the Contract Price shall be retained as Security Deposits which shall be retained up to 30 (thirty) days after the end of Warranty Period

1.36.3 The performance guarantee shall cover additionally the following guarantees to the owner:

a) The successful Bidder guarantees the successful and satisfactory operation of the equipment furnished and erected under the contract, as per the specifications and documents.
b) The successful Bidder further guarantees that the equipment/material provided and installed by him shall be free from all defects in design, material and workmanship and shall upon written notice from the Owner fully remedy must be guaranteed.

1.36.4. The Contract performance Guarantee will be returned to the Contractor without any interest at the end of warranty period and written request from the contractor.

1.37.0 TERMS OF PAYMENT

The terms of payment for the supply work shall be as follows

i. No advance payment shall be made in this contract.
ii. No claim for interest shall be entertained by AEGCL
iii. The price is firm and no price variation shall be applicable.
iv. Final bill must contain the original site register.
v. Payment shall be released against receipt of materials in full and good condition at site. The Bidder / Firm will have to be submitted the following Net Banking details.
    a) Banker's Name & Branch
    b) Account No
    c) Banker's address
    d) Banker's IFSC Code

e) Banker's RTGS Code

1.38.0 CORRUPT OR FRAUDULENT PRACTICES

1.38.1 It is required that bidders/suppliers/contractors observe the highest standard of ethics during the procurement and execution of the contracts. In Pursuance of this Clause AEGCL;

(a) defines, for the purposes of this provision, the terms set forth below as follows:

(i) "corrupt practice" means behavior on the part of officials in the public or private sectors by which they improperly and unlawfully enrich themselves and/or those close to them, or induce others to do so, by misusing the position in which they are placed, and it includes the offering, giving, receiving or soliciting of anything of value to influence the action of any such official in the procurement process or in contract execution; and

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

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

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

1.39.0 PENALTY FOR DELAYED EXECUTION

In the event of delay in completing the work extending beyond the date of completion or beyond the extended date, if any, permitted by the Board, the contractor shall pay as agreed liquidated damage and not as a penalty a sum equal to 1% of the contract price under this contract for each week of delay or part thereof subject to a maximum of 10% of the contract price.

1.40.0 EXTENSION OF TIME

If the completion of the work is delayed due to reason beyond the control of the contractor, the contractor should without delay give notice to AEGCL within 7 (seven) days in writing of his claim for an extension of time. The AEGCL may extend the completion date as may be reasonable but without prejudice to other terms and conditions of the contract.

1.41.0 VARIATIONS, ADDITIONS, OMMISSIONS

1.41.1 The contractor shall not modify any of the terms and conditions except as directed in writing by AEGCL.

1.41.2 The AEGCL shall have the right during the contract to amend, alter, omit or otherwise vary any of the items by notice in writings. The contractor shall carry out such variations although the said variations shall not exceed 15% of the W.O/LOI value except with written consent of the purchaser. The amount of such variations shall be determined in accordance with rates specified in the contract and where such rates are not available this will be mutually agreed between the purchaser and the contractor.

1.42.0 LIABILITY FOR ACCIDENTS AND/OR DAMAGE

The contractor shall indemnify the company (AEGCL) against any loss , damage, and injury to any person or to any property and against any other liability or obligation and against all actions, suits, claims demands costs, charges and expenses arising in connection with such damage , injury, liability or obligation resulting from:-

(a) the negligence of the contractor and his workers, agents, subcontractors; and/or

(b) the lack of or inadequacy of safety devices on equipment supplied under this contract.

1.43.0 USE OF MATERIALS ARRANGED BY THE BOARD

If any materials supplied by AEGCL are found to be misused or wasted due to negligence by the contractor comes to the notice of the Board then the contractor shall be liable to pay compensation to the Board as may be decided by the Board.

1.44.0 SITE FACILITIES AND ACCOMODATION OF CONTRACTOR'S PERSONNEL

1.44.1 AEGCL will not provide any accommodation at the work site to the contractor and their field personnel. The same has to be arranged by the contractor on their own. However, AEGCL may provide space for storage of the materials but responsibility of the material and their safety shall be taken care of by the Contractor. In case of none availability of space under AEGCL the same should be arranged by the contractor outside AEGCL campus/work site at their own cost and responsibility.

1.44.2 AEGCL shall not be responsible for the safety of the workers at site either on account of the works executed by the Contractor or on account of the works executed by any other agency involved at that time.

1.44.3 AEGCL shall on no account be responsible for the expenses incurred by the Contractor during the progress of work at site, towards any incidental expenditure like medical amenities to the workers at site, security arrangements.

1.44.4 The quoted price shall be deemed to include charges for all site facilities for labour that are considered necessary for execution of the work. Subject to availability of land, AEGCL may provide free site for labour camp,construction of yard etc. close to site of work.

1.44.5 No assurance can be given regarding the availability of AEGCL's land given for use to the Bidder to natural calamities. AEGCL undertakes no responsibility or liability in this regard.

1.44.6 The bidder shall make his own arrangement for arranging power supply as may be required for work. AEGCL may, however assist in recommending his/their application to the Electricity Supply Utility for the power supply on payment basis as per norms of the Electricity Supply Utility.

1.44.7 No claim shall be entertained from the bidder for making his own arrangement for approach roads from outside PWD road to the site and bidder will bear entire expenses.

1.44.8 AEGCL on no account shall be responsible for storage of materials or loss or pilferage or theft either in respect of the material stored or material already billed and paid for by the AEGCL.

1.44.9 Any facilities available at site shall be utilized only with prior permission of AEGCL and it should not be taken as granted for availing such services.

1.45.0 DEFECT AFTER COMPLETION OF WORK

1.45.1 The contractor shall make good at his own cost and to the satisfaction of AEGCL all defects, or other faults which may appear during the defect liability period / warranty period.

1.45.2 In default, AEGCL may employ and pay other agency or persons to amend and make good such damages. Losses and expenses consequent thereon or incidental thereto shall be made good and borne by the contractor, failing which the same shall be recoverable from the payment due to the contractor and performance guarantee. In the event of amount due andperformance guarantee being insufficient, the balance amount will be recovered from the contractor from the amount due or retained for other works executed in AEGCL.

1.46.0 VARIATION AND DEVIATION OF QUANTITY

The Tendered rates shall hold good for any variations in the Tendered quantities for completion of work on account of any modification in the bill of quantities or design or specification.

1.47.0 DELETION OR WORK

AEGCL and its representative have the right to delete or decrease any item or quantity from schedule of quantity at its discretion if deemed necessary. No claim by the contractor will be admissible for this deletion or deduction of Item/quantity from schedule of quantity.

1.48.0 ELIGIBILITY OF CONTRACTOR'S EMPLOYEES

The Contractor shall employ in and about the Execution of the works only such persons as are skilled and experienced in their several trades. A list of such personal should be submitted in corresponding Appendix.

1.49.0 ENGINEER AT LIBERTY TO OBJECT

AEGCL's Site in-charge shall have right to remove any person provided by the Contractor who, in the opinion of the Site in-charge, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose presence on Site is otherwise considered by the Engineer to be undesirable, and such person shall not be again allowed upon the Works without consent of the Engineer. Any person so removed from the Works shall be replaced immediately without hampering the work

1.50.0 DAMAGE TO PERSON AND PROPERTY

1.50.1The Contractor shall be responsible for all injury to the work or to workmen, to persons, animals or things and for all damages to the structural and/or decorative part of property which may arise from the operations or neglect of contractor or its employees, against whether such injury or damage arise from carelessness, accident or any other cause whatsoever in any way connected with the carrying out of this Contract. The Contractor shall at his cost effect the insurance necessary and indemnify AEGCL entirely from all responsibility in this respect. The scope of insurance is to include loss or damage to the work and workmen due to carelessness, accident including fire, earthquake, floods, all medical expenses, compensation to be borne in the event of accident etc., damage or loss to the Contract itself till this is made over a complete state. Insurance is compulsory and must be affected from the very initial stage and should cover the entire contract period till handing over of complete works. The Contractor shall also be responsible for anything which may be excluded from damage to any property arising out of incidents, negligence or defective carrying out of this Contract.

1.50.2AEGCL shall be at liberty and is hereby empowered to deduct the amount of any damages, compensations, costs, charges and expenses arising or occurring from or in respect of any such claim or damages from any sums due or to become due to the Contractor.

1.51.0 STATUTORY AND SAFETY REQUIREMENT

1.51.1 Each and every safety measures for MAN and MACHINE will be the sole responsibility of the Contractor without any prejudice. Compensation claim if any will also be the responsibility of the contractor without any prejudice.

1.51.2 During the execution of the work, the contractor shall have to mark the site with banner warning/ indicating precautions.

1.51.3 The Contractor shall, throughout the execution and completion of the Works and the remedying of any defects therein:

a) Have full regard for the safety of all persons entitled to be upon the Site and keep the Site (So far as the same is under his control) and the Works in an orderly state appropriate to the avoidance of danger to such persons, and

b) Provided and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where

necessary or required by the Engineer or by any duly constituted authority for the protection of the Works or for the safety and convenience of the public or others, and Take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods.

1.52.0 TERMINATION OF CONTRACT

If the performance of the contract is not satisfactory and not corrected within 15 days of receiving notice, then employer shall be at liberty to terminate the contract and get the work executed through other means at the risk and cost of the Contractor.

1.53.0 PAYMENT ON TERMINATION

If the performance of the contract is not satisfactory and not corrected within 15 days of receiving notice, then employer shall be at liberty to terminate the contract and get the work executed through other means at the risk and cost of the Contractor.

1.54.0 FORCE MAJEURE

Force Majeure shall be considered as any circumstances beyond the reasonable control of the party claiming relief, including but not limited to strikes lockout, civil commotion, riot, insurrection, hostilities, war, fire, flood, earthquake, delay in delivery of equipments or part thereof by AEGCL, would entitle contractor to extension of time.

1.55.0 SETTLEMENT OF THE DISPUTE & ARBITRATION

Any dispute arising out of the contract will first be discussed and settled bilaterally between the Assam Electricity Grid Corporation Limited and firms/ contractors. In case, the dispute cannot be settled bilaterally, it will be referred to arbitration by an arbitrator to be appointed by the AEGCL, The contractor shall not stop the work during settlement of any arbitration case. All disputes arising out of the agreement so made shall be subjected to the jurisdiction of district court of Kamrup District.

Bidder's Signature & Seal

PURCHASER'S REQUIREMENTS

2.1.0 SCOPE OF WORK:

2.1.1 This section of the specification deals with the technical information & criteria for VARIOUS TERMINAL EQUIPMENT AND CONTROL & RELAY PANEL ACCESSORIES. The Contractor's proposal shall be based on the use of materials complying fully with the requirements specified herein.: The work involves design, engineering, manufacture, assembly, inspection, testing at manufacturer's works before dispatch, packing, supply, including insurance during transit, delivery at site of various equipment and materials including erection, testing and commissioning as specified in subsequent Clauses and Sections.

2.1.2 It is not the intent to specify completely herein all details of design and construction of the equipment and accessories. However, the equipment and accessories shall conform in all respects to high standards of engineering, design and workmanship and be capable of performing in continuous operation up to the bidder's guarantees in a manner acceptable to the Purchaser. The Purchaser will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material, which in his judgment is not in full accordance therewith.

2.1.3 The various items of supply are described very briefly in the schedule of Bid Form, Prices & Other Schedules and annexure. The various items as defined in these schedules shall be read in conjunction with the corresponding section in the technical specifications including amendments and, additions if any.

2.2.0 CONTRACTOR TO INFORM HIMSELF FULLY

2.2.1 The contractor should admit that he has examined the general condition of contract, specifications and schedule and has satisfied as to all the conditions and circumstances affecting the contract prices and fixed his price according to his own views on these matters and acknowledge that no additional allowances except as otherwise provided therein will be levied. The purchaser shall not be responsible for any misunderstanding or incorrect information obtained by the contractor other than information given to the contractor in writing by the purchaser.

2.3.0 STANDARDS

2.3.1 The equipment covered under this bidding document shall, unless otherwise stated be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to the regulations of local statutory authorities. In case of any conflict between the standards and this specification, this specification shall govern.

2.3.2 Equipment conforming to other international or authoritative Standards which ensure equivalent or better performance than that specified under Clause 3.6.0 above shall also be accepted. In that case relevant extracts of the same shall be forwarded with the bid.

2.4.0 ENGINEERING DATA

2.4.1 The furnishing of engineering data by the Contractor shall be in. accordance with the Bidding Document. The review of these data by the Employer will cover only general conformance of the data to the specifications and not a thorough review of all dimensions, quantities and details of the materials, or items indicated or the accuracy of the information submitted. This review by the Employer shall not be considered by the Contractor,as limiting any of his responsibilities and liabilities for mistakes and deviations from the requirements, specified under these specifications.

2.4.2 All engineering data submitted by the Contractor after review by the Employer shall or part of the contract document.

2.5.0 DRAWINGS AND DOCUMENTS FOR APPROVAL

2.5.1. All necessary drawings and documents required for completion of the project is to be submitted by the contractor for approval. The drawings provided with bid (if any) are for indicative purpose only and fresh drawings are to be prepared by the contractor as per actual site condition after survey. The drawings and documents are to be approved by AEGCL before procurement or commencement of work.

2.5.2 All drawings submitted by the Contractor including those submitted at the time of Bid shall be with sufficient detail to indicate the type, size, arrangement, dimensions, material description, Bill of Materials, weight of each component break-up for packing and shipment, fixing arrangement required, the dimensions required for installation and any other information specifically requested in these specifications.

2.5.3 Each drawing submitted by the Contractor shall be clearly marked with the name of the Employer, the specification title, the specification number and the name of the Project. All titles, noting, markings and writings on the drawing shall be in English. All the dimensions should be to the scale and in S.I. units.

2.5.4 **The drawings submitted for approval to the Employer shall be in quadruplicate**. One print of such drawings shall be returned to the Contractor by the Employer marked "approved/approved with corrections". The contractor shall there upon furnish the Employer additional prints as may be required along with one reproducible in original of the drawings after incorporating all corrections.

2.5.5 The Contractor shall perform the work strictly in accordance with these drawings and no deviation shall be permitted without the written approval of the Employer, if so required.

Bidder's Signature & Seal

2.5.6 All manufacturing, fabrication and erection work under the scope of Contractor prior to the approval of the drawings shall be at the Contractor's risk. The contractor may make any changes in the design which are necessary to conform to the provisions and intent of the contractor and such changes will again be subject to approval by the Employer.

2.5.7 The approval of the documents and drawings by the Employer shall mean that the Employer is satisfied that:

a) The Contractor has completed the part of the Works covered by the subject document (i.e. confirmation of progress of work).

b) The Works appear to comply with requirements of Specifications.

2.5.8 In no case the approval by the Employer of any document does imply compliance with neither all technical requirements nor the absence of errors in such documents. If errors are discovered any time during the validity of the contract, then the Contractor shall be responsible of their consequences.

2.5.9 For equipment and items in the scope of supply:

a) General arrangement drawing with full dimensions.

b) Electrical schematic diagram, where applicable.

c) Wiring diagram, where applicable.

All Designs/Drawings/Calculations/Data submitted by the contractor, from time to time shall become the property of the Employer and Employer has the right to use or replicate such designs for future contracts / works without the permission of the Contractor. The Employer has all rights to use/ offer above designs/drawings/data sheets to any other authority without prior Permission of the Contractor.

2.6.0 FINAL DRAWINGS AND DOCUMENTS

2.6.1 The successful Contractor shall require to provide following drawings and documents for each bay constructed in printed form:

a) All approved drawings (AS BUILD) of equipment and works related to a particular bay in three (3) copies.

b) Instruction manuals of all equipment related to a particular bay in three (3) copies. These instruction manuals shall generally consist of-

i) Operation Manuals,

ii) Maintenance Manuals and

iii) Spare Parts Bulletins.

c) Copies of routine test reports (in triplicate) of relevant equipment.

d) Final Guaranteed and Other technical particulars of relevant equipment.

e) In addition to the above the Contractor shall provide five (5) sets of all the drawings and documents to Employer in printed form for his reference and record.

2.7.0 APPLICATION SYSTEM SOFTWARE

2.7.1. Contractor shall provide copies of licensed copies of application software / configuration & system software in the form of CD (in duplicate) for all IEDs, meters, SAS etc.

2.8.0 QUALITY ASSURANCE, INSPECTION & TESTING

2.8.1 To ensure that the supply and services under the scope of this Contract whether manufactured or performed within the Contractor's works or at his Sub Contractor's premises or at site or at any other place of work are in, accordance with the specifications, the Contractor shall adopt suitable quality assurance programme to control such activities at all points necessary. Such programme shall be outlined by the Contractor and shall be finally accepted by the Employer after discussions before the award of Contract. A quality assurance programme of the Contractor shall generally cover but not limited to the following:

a) His organization structure for the management and implementation of the proposed quality assurance programme

b) Documentation control System.

c) Qualification data for Contractors key personnel.

d) The procedure for purchases of materials, parts components and selection of sub-Contractors services including vendor analysis, source inspection, incoming raw material inspection, verification of material purchases etc.

e) System for shop manufacturing including process controls and fabrication and assembly controls.

f) Control of non-conforming items and system for corrective action.

g) Control of calibration and testing of measuring and testing equipment.

Bidder's Signature & Seal

h) Inspection and test procedure for manufacture.
i) System for indication and appraisal of inspection status.
j) System for quality audits.
k) System for authorizing release of manufactured product to the Employer.
l) System for maintenance of records.
m) System for handling storage and delivery and
n) A quality plan detailing out the specific quality control procedure adopted for controlling the quality characteristics relevant to each item of supply.

2.8.2 The Quality plan shall be mutually discussed and approved by the Employer after incorporating necessary corrections by the Contractor as may be required.

2.9.0 QUALITY ASSURANCE DOCUMENTS

2.9.1 The Contractor shall be required to submit all the Quality Assurance Documents as stipulated in the Quality Plan at the time of Employers inspection of equipment/material.

2.9.2 The Employer or his duly authorized representatives reserves the right to carry out Quality Audit and quality surveillance of the systems and procedures of the Contractors/his vendors Quality Management and Control Activities.

2.10.0 EMPLOYER'S SUPERVISION

2.10.1 To eliminate delays and avoid disputes and litigation it is agreed between the parties to the Contract that all matters and questions shall be resolved in accordance with the provisions of this document.

2.10.2 The manufacturing of the product shall be carried out in accordance with the specifications. The scope of the duties of the Employer, pursuant to the contract, will include but not be limited to the following:

a) Interpretation of all the terms and conditions of these Documents and Specifications.
b) Review and interpretation of all the Contractors drawings, engineering data etc.
c) Witness or authorize his representative to witness tests at the manufacturer's works or at site, or at any place where work is performed under the contract.
d) Inspect, accept or reject any equipment, material and work under the Contract, in accordance withthe Specifications.
e) Issue certificate of acceptance and/or progressive payment and final payment certificate.
f) Review and suggest modification and improvement in completion schedules from time to time, and
g) Supervise the Quality Assurance Programme implementation at all stages of the works.

2.11.0 INSPECTION AND INSPECTION CERTIFICATE

2.11.1 The Employer, his duly authorized representative and/or outside inspection agency acting on behalf of the Employer shall have, at all reasonable times, access to the premises and works of the Contractor and their sub-contractor(s)/sub-vendors and shall have the right, at the reasonable times, to inspect and examine the materials and workmanship of the product during its manufacture.

2.11.2 All routine and acceptance tests whether at the premises or works of, the Contractor or of any Sub Contractor, the Contractor except where otherwise specified shall carry out such tests free of charge. Items such as labour, materials, electricity, fuel, water, stores apparatus and instruments as may be reasonably demanded by theEmployer/inspector or his authorized representative to carry out effectively such tests in accordance with the Contract shall be provided by the Contractor free of charge.

2.11.3 If desired by the Employer, the Contractor shall also carry out type tests as per applicable Standards for which Employer shall bear the expenses except in cases where such tests have to be carried out in pursuance to **Clause 3.13.3**. The Contractor is required to quote unit rates of type test charges in a separate Schedule (if such schedule is provided in the Bidding Document) in pursuance to this Clause. However, these type test charges shall not be taken into account in comparing Price Bid.

2.11.4 The inspection by Employer and issue of Inspection Certificate thereon shall in no way limit the liabilities and responsibilities of the Contractor in respect of the agreed Quality Assurance Programme forming a part of the Contract.

2.12.0 TESTS

2.12.1 The type, acceptance and routine tests and tests during manufacture to be carried-out on the material and equipment shall mean as follows:

a) Type Tests shall mean those tests, which are to be carried out to prove the process of manufacture and general conformity of the material to this Specification. These tests shall be carried out on samples prior to commencement of commercial production against the order. The Bidder shall indicate his schedule for carrying out these tests.

b) Acceptance Tests shall mean those tests, which are to be carried out on samples taken from each lot offered for pre-dispatch inspection, for the purposes of acceptance of that lot.

c) Routine Tests shall mean those tests, which are to be carried out on the material to check requirements, which are likely to vary during production.

d) Tests during Manufacture shall mean those tests, which are to be carried out during the process of manufacture and end inspection by the Contractor to ensure the desired quality of the end product to be supplied by him.

e) The norms and procedure of sampling for these tests will be as per the Quality Assurance Programme to be mutually agreed to by the Contractor and the Employer.

2.12.1 The standards and norms to which these tests will be carried out are specified in subsequent Sections of this Specification. Where a particular test is a specific requirement of this Specification, the norms and procedure of the test shall be as specified or as mutually agreed to between the Contractor and the Employer in the Quality Assurance Programme.

2.12.2 For all type and acceptance tests, the acceptance values shall be the values specified in this Specification or guaranteed by the Bidder or applicable Standards, as applicable.

2.13.0 TYPE TEST REPORTS

2.13.1 Materials, which have never been tested for critical performance, shall not be accepted. In such cases, a promise or agreement by a bidder to have the equipment tested after award of a contract is not acceptable.

2.13.2 All Bids must be accompanied by the Type Test Certificates of materials offered (refer Clause 3.13.5 below). Such type test certificates shall be acceptable only if:

a) Tests are conducted in an independent testing laboratory with NABL accreditation, or

b) Tests are conducted in manufacturer's own laboratory.

In case of (a) the laboratory must have NABL accreditation; and

In case of (b) tests have been witnessed by technically qualified representatives of earlier clients or purchaser.

2.13.3 Test reports to be acceptable must be related directly to the equipment offered i.e. it is fully identical in design, rating and construction with the equipment for which the type test certificates have been submitted. Test reports for higher class (by capacity/voltage etc.) of equipment are acceptable with commitment to perform the type tests free of any charge on the particular equipment after the award of contract.

2.13.4 Type Test Reports older than ten (10) years on the date of Technical bid opening shall not be accepted.

2.14.0 GUARANTEED TECHNICAL PARTICULARS

2.14.1 The Guaranteed Technical Particulars of the various items shall be furnished by the Bidders with the Technical Bid in the prescribed Schedules of the bidding document. The Bidder shall also furnish any other information's as in their opinion is needed to give full description and details to judge the item(s) offered by them.

2.14.2 The data furnished in Guaranteed Technical Particulars should be the minimum or maximum value (as per the requirement of the specification) required. A Bidder may guarantee a value more stringent than the specification requirement. However, for testing purpose or from performance point of view, the material shall be considered performed successfully if it achieves the minimum/maximum value required as per the technical specification. No preference what so ever shall be given to the bidder offering better/more stringent values than those required as per specification except where stated otherwise.

2.15.0 MATERIALS HANDLING AND STORAGE

2.15.1 All the supplies under the Contract as well as Employer supplied items (if any) arriving at site shall be promptly received, unloaded and transported and stored in the stores by the Contractor.

2.15.2 Contractor shall be responsible for examining all the shipment and notify the Employer immediately of any damage, shortage, discrepancy etc. for the purpose of Employer's information only. The Contractor shall submit to the Employer every week a report detailing all the receipts during the week. However, the Contractor shall be solely responsible for any shortages or damages in transit, handling and/or in storage and erection at site. Any demurrage, and other such charges claimed by the transporters, railways etc., shall be to the account of the Contractor.

2.15.3 The Contractor shall maintain an accurate and exhaustive record-detailing out the list of all items received by him for the purpose of erection and keep such record open for the inspection of the Employer.

2.15.4 All items shall be handled very carefully to prevent any damage or loss. The materials stored shall be properly protected to prevent damage. The materials from the store shall be moved to the actual location at the appropriate time so as to avoid damage of such materials at Site.

2.15.5 All the materials stored in the open or dusty location must be covered with suitable weather-proof and flameproof covering material wherever applicable.

2.15.6 The Contractor shall be responsible for making suitable indoor storage facilities, to store all items/materials, which require indoor storage.

2.15.7 The Contractor shall have total responsibility for all equipment and materials in his custody, stored, loose, semi-assembled and/or erected by him at site. The contractor shall make suitable security arrangements including employment of security personnel to ensure the protection of all materials, equipment and works from theft, fire, pilferage and any other damages and loss.

2.17.0 SERVICE CONDITIONS

The materials supplied shall be suitable for operation under the following climatic and other conditions:

1. Peak ambient day temperature in still air: 45^0C
2. Minimum night temperatures: 0^0C
3. Ground temperatures: 40^0C
4. Reference ambient day temperature: 45^0C
5. Relative Humidity: i) Maximum - 100 % ii) Minimum - 10 %
6. Altitude: Below1000 M above MSL
7. Maximum wind pressure: As per IS: 802 latest code
8. Seismic Intensity: ZONE-V as per IS 1893.

2.18.0 COMMISSIONING SPARES

2.18.1 It will be the responsibility of the Contractor to provide all commissioning spares required for initial operation till the Employer declares the equipment as ready for commissioning. All commissioning spares shall be deemed to be included in the scope of the Contract at no extra cost to the Employer.

2.18.2 These spares shall be received and stored by the Contractor at least 1 month prior to the schedule date of commencement of commissioning of the respective equipment and utilized as and when required. The unutilized spares and replaced parts, if any, at the end of successful completion of performance and guarantee test shall be the property of the Contractor and he will be allowed to take these parts back at his own cost with the permission of Employer's Representative.

2.19.0 TECHNICAL PARTICULARS OF 33KV OUTDOORTYPE PORCELAIN CLAD VACUUM CIRCUIT BREAKER (PCVCB)

2.19.1 INTRODUCTION

The circuit breakers should be complete in all respects with insulators, bimetallic connectors, interrupting chamber, operating mechanism control cabinet, interlocks, auxiliary switches indicating devices, supporting structures, accessories, etc., described herein and briefly listed in the schedule of requirements. The scope of supply shall also include necessary special tools and plants required for erection as indicated, if any.

2.19.2 STANDARDS

The circuit breaker shall conform in all respects to the requirements of latest issue of IS/IEC specifications except for modifications specified herein. The equipment manufactured according to any other authoritative standards which ensure an equal or better quality than the provision of IS/IEC specifications shall also be acceptable. The salient point of difference between the proposed standard and provision of these specification shall be clearly brought out in the tender. A copy of English version of such specifications shall be enclosed with the tender.

The list of standards mentioned in this specification and to which the circuit conform is given below:

1.	IEC-62271-100	High Voltage A.C. Circuit Breakers
2.	IEC-60137	Bushing for alternating Voltages above 1000 volts
3.	IEC-60071	Insulation Co-ordination
4.	IEC-60694	Common clauses for high voltages switchgear and control gear standards
5.	IEC-60815	Specification for Creepage distances
6.	IS-13118	Specifications for high voltage alternating current circuit breakers
7.	IS-2099	High voltages porcelain bushings
8.	IS-4379	Identification of the contents of industrial gas cylinders
9.	IS-3072	Installation and maintenance of switchgear
10.	IEC-60267	Guide for testing of circuit breakers with respect to out of phase switching
11.	IS-802	Code of practice for use of structural steel in overhead transmission lines
12.	IEC-17A Study Group Dec.1981	Sealing of interrupters / breakers
13.	IS-1554	PVC insulated cables upto and including 1000 volts
14.	IS-5	Colors for ready mixed paints and channels

Bidder's Signature & Seal

15.	Ref.Standard IES	Internal Electro-Technical Commission Bureau Central Data Commission, Elecro Technique International, 1, Ruede Verembe, Geneva, Switzerland
16.	IS	Indian Standard Bureau of India Standard, Manak Bhawan 9, Bahadurshah Zafar Marg, New Delhi – 110 002, India

2.19.3 SERVICE CONDITIONS
CLIMATIC CONDITONS

The breakers and accessories to be supplied against this specification shall be suitable for satisfactory continuous operation as per section-I.

AUXILIARY POWER SUPPLY

Auxiliary electrical equipment shall be suitable for operation on the following supply system.

a)	Power Devices (like motors)	:	415 V, 3 phase 4 wire 50 hz, neutral grounded AC supply
b)	DC Alarm, Control and Protective Devices	:	110V DC, ungrounded 2 wire
c)	Lighting	:	240 V, single phase 50 Hz AC supply

Bidder's scope includes supply of interconnecting cables, terminal boxes, etc. The above supply voltage may vary as indicated below and all devices shall be suitable for continuous operation over the entire range of voltages

i)	AC Supply	Voltage + 10% -15% Frequency ± 5%
ii)	DC Supply	-15% to + 10%

2.19.4 GENERAL REQUIREMENT OF 36 KV OUTDOOR VACUUM CIRCUIT BREAKERS

3.19.4.1 The vacuum type circuit breaker shall have vacuum interrupters, designed to provide a long contact life at all currents upto rated making and breaking current during switching operation. The vacuum interrupters sealed for life shall be encapsulated by porcelain insulators for outdoor installation requirement of the circuit breakers. The offered breakers shall be suitable for outdoor operation under climatic conditions specified without any protection from sun, rain and dust storm.

3.19.4.2 The vacuum interrupters of each phase shall be housed in a separate porcelain insulator. The three identical poles shall be mounted on a common base frame and the contact system of three poles should be mechanically linked to provide three pole gang opening/closing for all type of faults.

3.19.4.3 The offered equipment shall be practically maintenance free over a long period. All mechanical parts and linkages shall be robust in construction and maintenance free, over at least 10,000 switching operations, except for lubrication of pins/articulated joints at interval of 5 years or 5000 operations. Similar parts shall be strictly interchangeable without special adjustment of individual fittings. Parts requiring maintenance shall be easily accessible, without requiring extensive dismantling of adjacent parts.

3.19.4.4 The operating mechanism will be self-maintained and of proper operation endurance not less than the Mechanical life of circuit breaking unit. It shall be spring operated type described hereinafter.

3.19.4.5 The circuit breaker shall be supplied complete with all auxiliary equipment, meant necessary for the safe operation, routine and periodic maintenance. All internal wiring including those of spare auxiliary contacts shall be complete and wired upto terminal blocks.

3.19.4.6 The breaker shall be totally re-strike free under all duty conditions. The details of any device incorporated to limit or control the rate of rise of re-striking voltage across the circuit breaker contacts shall be stated.

3.19.4.7 The breaker shall be reasonably quiet in operation and the noise level shall not exceed 140 decibels.

3.19.4.8 The breaker shall be suitable for three phase re-closing operation.

3.19.4.9 An operation counter, visible from the ground level even with the mechanism housing closed shall be provided.

2.19.5 FIXED AND MOVING CONTACT

The fixed and moving contacts of the breaker have to ensure permanent full contact during closing. All making and breaking contacts shall be hermetically sealed and free from atmospheric effects.

The main contacts should have low contact resistance.

2.19.6 RECOVERY VOLTAGE AND POWER FACTOR

The circuit breaker shall be capable of interrupting rated power with recovery voltage equal to the rated maximum line to line service voltage at rated frequency and at a power factor equal to or exceeding 0.15. In case of multiple break circuit breaker, devices/method adopted for ensuring uniform voltage distribution across all the breaks shall be indicated and actual voltage distribution recorded during interruption tests shall be furnished with the bid.

2.19.7 RESTRIKING RECOVERY

The complete data for the phase factor, amplitude factor, etc., for rate of rise of re-striking voltage shall be furnished in the tender.

2.19.8 LINE CHARGING INTERRUPTING CAPACITY

The circuit breaker shall be designed so as to be capable of interrupting line charging currents without undue rise in the voltage on the supply side without re-strike and without showing sign of undue strains.

The maximum permissible switching over voltage shall not exceed 2.5 p.u. The guaranteed over voltage, which will not be exceeded while interrupting the rated line charging current for which the breaker is designed to interrupt shall also be stated. The results of the tests conducted along with the copies of the oscillographs to prove ability of the breakers to interrupt the rated as well as lower values of the line charging current shall be furnished with the tender.

2.19.9 TRANSFORMER CHARGING CURRENT BREAKING CAPACITY

The breaker shall be capable of interrupting inductive currents, such as those occurring while switching off unloaded transformers, without giving rise to undue over voltage and without re-strikes. The maximum over voltage value, which will not be exceeded under such conditions shall be stated in the tender.

2.19.10 BREAKING CAPACITY FOR SHORTLINE FAULTS

The interrupting capacity of the breaker for short line faults shall be stated in the tender. The details of the test conducted for proving the capability of the breaker under a short line fault occurring from one phase to earth conditions shall also be stated in the tender. The rated characteristics for short line faults shall be in accordance with stipulation contained in clause 4.105 of IEC 62271-100.

2.19.11 AUTOMATIC RAPID RECLOSING

36 kV circuit breaker shall be suitable for 3 pole rapid re-closing.

2.19.12 OUT OF PHASE SWITCHING

The circuit breaker shall be capable of satisfactory operation even under conditions of phase opposition that may arise due to faulty synchronization. The maximum power that the breaker can satisfactorily interrupt under “Phase Opposition” shall be stated in the bid”.

2.19.13 TEMPERATURE RISE

The maximum temperature attained by any part of the equipment when in service at side and under continuous full load conditions and exposed to the direct rays of the sun shall not exceed the permissible limits fixed by IEC. When the standards specify the limits of temperature rise these shall not be exceeded when corrected for the difference between ambient temperature specified in the approved specification.

The limits of temperature rise shall also be corrected for altitude as per IEC and stated in the bid.

2.19.14 INSULATORS SUPPORTS AND HOUSING

The porcelain used shall be homogenous, free from cavities and other flaws. The insulators shall be designed to have ample insulation, mechanical strength and rigidity for satisfactory operation under conditions specified above.. The puncture strength of bushing shall be greater than the flash over value. The design of bushing shall be such that the complete bushing in a self-contained unit and no audible discharge shall be detected at a voltage upto a working voltage (Phase Voltage) plus 10%. The support insulator shall conform to IEC-60137.
Minimum clearance between phases, between live parts and grounded objects shall be as per IS-3072-1975 and should conform to Indian Electricity Rules-1956. The minimum creepage distance for severely polluted atmosphere shall be 25 mm/KV as per IEC-815-1985.

The details for atmospheric pollution of the sub-stations where these breakers are to be installed shall be as per Clause 2.14.0 of this specification. The air clearance of bushing should be such that if the bushings were tested at an altitude of less than 1000 meters, air clearance would withstand the application of higher voltages (IS-2099- 1973 para 6.1). In order to avoid breakdown at extremely low pressures the support insulators should not be covered by moisture and conducting dust. Insulators should therefore be extremely clean and should have antitracking properties. Sharp contours in conducting parts should be avoided for breakdown of insulation. The insulators shall be capable to withstand the seismic acceleration of 0.3 g in horizontal direction.

2.19.15 OPERATING MECHANISM GENERAL REQUIREMENTS

The operating mechanism shall be stored energy type and capable of giving specified duty of the breaker (sequence of opening and closing) as specified under O-0.3 sec-CO-3 min-CO. The breaker shall also pass the operational test which ascertains the capabilities of operating mechanism. The operating mechanism shall be capable to perform the following functions efficiently.

To provide means where the circuit breaker can be closed rapidly, at all currents from zero to rated making current capacity.
To hold the circuit breaker in closed position by toggles or latches till the tripping signal is received. To allow the circuit breaker to open without delay immediately on receiving tripping signal.
To perform auto re-closure duty cycle.
To perform the related functions such as indication, contacts, etc.

Operating mechanism should also be suitable for three phase auto re-close duty. The closing spring shall be automatically charged by motor immediately after closing operation. In case of failure of supply to the spring charging motor, the spring shall be chargeable by hand-crank.

TRIPPING/CLOSING COILS

The circuit breakers shall be provided with two trip coils and one closing coil per breaker. First trip coil shall be utilized for tripping the breaker on main protection fault detection. Whereas second trip coil shall be used to trip the breaker when first trip coil fails to trip the breaker and backup protection comes into operation and shall also be used to trip the breaker on command. Provision shall be given for trip circuit supervision both in pre close and post close condition of the breaker. All the breakers shall have provision for independent electrical operation of trip coils from local as well as remote through local/remote selector switch.

TRIP FREE FEATURES

When the breaker has been instructed to close by manual instructions using push button, the operating mechanism will start operating for closing operations. If in the mean time a fault has taken place, the relay provision shall be such that it should close the trip circuit simultaneously interrupting the live circuit of closing coil which has been instructed for close command.

The trip free mechanism shall permit the circuit breaker to be tripped by the protective relay even if it is under the process of closing. An anti-pumping device to prevent the circuit breaker from reclosing after an automatic opening shall be provided to avoid the breaker from pumping i.e., anti pumping relay should interrupt the closing coil circuit.

Controls

The circuit breaker shall be controlled by a control switch located in the control cabinet . The control arrangement shall be such as to disconnect the remote control circuits of the breaker, when it is under test. Local control devices, selector switch and position indicator shall be located in weather and vermin-proof cabinet with degree of protection not less than IP-55. The circuit breaker control scheme shall incorporate trip circuit supervision arrangement. Local/remote selector switch shall be provided for all breakers for selection of "Local" control/remote control.

Provision shall be made for local manual, electrical and spring controls. Necessary equipment's for local controls shall be housed in the circuit breaker cabinet of weather-proof construction. In addition to this, a hand closing device for facilitating maintenance shall also be provided.

Each circuit breaker shall have a mechanical open/closed and spring charge indicator in addition to facilities for provisions for semaphore indicators for breakers which are required for the mimic diagram in the control room. Lamps for indicating, `close/open' position of the breaker shall also be provided.

The contact pressure spring and tripping spring shall be chargeable during closing operation to ensure the breaker is ready to open. Mechanically ON/OFF indicator, spring charged indicator and operation counter shall be provided on the front of the control cubicle. For tripping, the spring provided shall ensure the trippings

Mechanical indicator, to show the 'open' and 'close' position of the breaker shall be provided in a position where it will be visible to a man standing on ground with mechanism housing open. An operation counter, visible from the ground even with the mechanism housing closed, shall be provided. Electrical tripping of the breaker shall be performed by shunt trip coils.

Closing coil shall operate correctly at all value of voltage between 85% and 110% of the rated voltage. Shunt trip coils shall operate correctly under all operating conditions of the circuit breaker upto the rated breaking capacity and at all values of supply voltage between 85% and 110% of rated voltage. The variation in A.C. supply voltage shall be –15%to +10% while variation in frequency shall be 3. Working parts of the mechanism shall be non- corrosive material. Bearings which require grease shall be equipped with pressure type fillings.

Bearing pins, bolts, nuts and other parts shall be adequately pinned or locked to prevent loosening or changing adjustment with repeated operation of the circuit breaker. It shall be possible to trip the circuit breaker even in the event of failure of power supply.

Operating mechanism and all accessories shall be enclosed in control cabinet. A common marshalling box for the three poles of the breaker shall be provided, along with supply of tubing, cables from individual pole operating boxes to the common marshalling box, local.

2.19.16 SPRING OPERATED MECHANISM

The motor compressed spring mechanism shall consists of a closing spring which is wound or compressed by an electric motor immediately after the breaker closes.

After the breaker has tripped, the tripping spring shall remain in the released position as long as the breaker is open, but the closing spring shall remain wound and ready for closing operation. The operating mechanism shall have all the necessary auxiliaries, apparatus for operation and supervision, like motor starter with thermal overload release, one closing coil, two trip coils, push button for local electrical operation, local/remote control selector switch, push button for direct mechanical tripping, auxiliary switches, anti puming contactors, operation counter, socket for inspection, lamp and heater with switch. Spring charging motor shall be standard single phase universal motor suitable for 220 volts supply.

Operating voltages for closing/tripping coils shall be 220/110/48/24 Volts DC or as per actual DC voltage available at existing substations which is to be verified by supplier after award of contract.

Operating voltages for heater elements shall be 220V AC 50 HZ. Other features of the spring operated mechanism shall be as follows.

a) The spring operating mechanism shall have adequate energy stored in the operating to close and latch the circuit breaker against the rated making current and also to provide the required energy for tripping mechanism in case the tripping energy is derived from the operating mechanism.
b) The mechanism shall be capable of performing the rated operating duty cycle of O-0.3Sec-CO-3 Min- CO...
c) The spring charging motor shall be AC or DC operated and shall not take more than 30 sec., to fully charge the closing spring made for automatic charging. Charging of spring by the motor should not interfere with the operation of the breakers.
d) The motor shall be adequately rated to carry out a minimum of one duty cycle. Also provision shall be made to protect the motor against overloads.
e) In case of failure of power supply to spring charging motor, the mechanism shall be capable of performing one open-close-open operation.
f) Mechanical interlocks shall be provided in the operating mechanism to prevent discharging of the closing springs when the breaker is already in closed position. Provision shall be made to prevent a closing operation to be carried out with the spring partially charged.
g) Facility shall be provided for manual charging of closing springs.

2.19.17 CONTROL CABINET

The switchgear operating mechanism, the control equipment such switch for closing and tripping the breakers, various control relays, antipuming device, a set of terminal blocks for wiring connections, MCB's for disconnecting the control auxiliary power supplies including relays, etc., shall be enclosed in a cabinet to be mounted on a suitable structure at a convenient working height at the end of the breaker in the outdoor switchyard. The supporting structure and the enclosure shall be capable of withstanding the typical tropical climatic conditions, change of ambient temperature, severe dust-storms, very high relative humidity those are prevailing at the site of location of switchgear.

2.19.18 ENCLOSURE

The enclosure shall be made out of stretched level steel plates not less than 3 mm thick and of light section structural steel. It should be weather proof as well as vermin proof.

The enclosure shall provide protection against dust and foreign objects. Each cabinet section shall have full width and full-length hinged doors mounted on the front that swing fully open. The doors shall be provided with latches to securely hold it with the cabinet. Doors shall be of sturdy construction, with resilient material covering, fully perimeterically contacting the cabinet frame to provide dust protection and prevent metal to metal contact except at the latch points. Filtered ventilation shall be provided along with the rigid supports for control and other equipment, measuring instruments, mounting cabinet members and equipment shall not restrict easy access to terminal blocks for terminating and testing external connection or to equipment for maintenance.

All screws and bolts used for assembling and mounting wire and cable termination, supports, devices and other equipment shall be provided with lock washers or other locking devices. All metal parts shall be clean and free of weld splatter, rust and mill scale prior to application of double coat of zinc chromate primer which should be followed by an under coat to serve as base and binder for the finishing coat. The shade of exterior and interior shall be as per GTR. The mounting structure shall be galvanized and shall be as per IS-802-II-1978.

HEATERS

Suitable heaters shall be mounted in the cabinet to prevent condensation. Heaters shall be controlled by thermostat and shall be provided with ON/OFF switches and fuses. Heaters shall be suitable for 240 V AC supply voltage.

LIGHTING

At least one 13-watt CFL fixture and lamp working on 240 V 50 c/s AC supply shall be provided in each switchgear control cubicle section and shall be located suitably to provide adequate interior lighting of the cubicle. A single-pole 6 Amp. lighting switch shall be

provided for each cubicle alongwth 5/15 amp.

The lighting and convenient outlet circuits shall be completely wired in conduit and terminated on cubicle terminal blocks.

WIRING AND CABLING

Unless otherwise specified control wire shall be stranded tinned copper switchboard wire with 1.1 kV PVC insulation conforming to the requirements of IS-1554.
All the control circuit and secondary wiring shall be wired completely and brought out to terminal block ready for external connections in the control cabinet. The cross-section of control wire shall not be less than 2.5 mm2 copper (14 SWG).
All spare auxiliary contacts of the circuit breaker shall be supplied wired upto terminal block. Each terminal in terminal block shall be suitable for at least 2 x 2.5 mm2 copper conductor.
All wiring termination on terminal blocks shall be made through lugs.

All wires shall be identified with non-metallic sleeve or tube type markers at each terminations.
Terminal blocks shall be made up of moulded non-inflammable plastic material with blocks and barriers moulded integrally have white marking strips for circuit identification and moulded plastic covers. Disconnecting type terminal blocks will be provided.

GROUNDING

A ground bus of copper bar not less than 6 mm by 25 mm shall be provided for grounding the cabnet.

2.19.19 ACCESSORIES

a. Each circuit breaker assembly shall be supplied with the following accessories.
b. Line and earthing terminals and terminal connectors.
c. Control housing with:
   One auxiliary switch with adequate number of auxiliary contacts, but not less than 20 nos. (10 NO + 10 NC) for each breaker. These shall be over and above the No. of contacts used for closing, tripping and re-closing and interlocking circuit of the circuit breaker. All auxiliary contacts shall be capable of use as "Normally closed" or "Normally open" contacts. Special auxiliary contacts required for the re-closing circuit if any, shall also be provided. There shall be provision, to add more auxiliary contacts at a later date, if required.
d. Operation counter
e. Position indicator (Close/Open)
f. Necessary cable glands
g. Fuses
h. Manual trip device and local test push buttons
i. Terminal blocks and wiring for all control equipment and
j. Adequate number of heaters for continuous operation to prevent moisture condensation in the housing of operating mechanism
k. Selector switch for local/remote control.

2.19.20 SUPPORTING STRUCTURE

The circuit breakers shall be supplied complete with necessary galvanized steel supporting structures, foundation and fixing bolts, etc., the galvanizing shall be as per IS. The mounting of the breaker shall be such as to ensure the safety of the operating staff and should conform to Indian Electricity Rules, 1956. Minimum ground clearance of live part from ground level shall be 3700 mm from finished ground level.

The bidder shall submit detailed design calculations and detailed design calculations and detailed drawings in respect of supporting structures suitable for the equipment offered.

All material for making connections between the circuit breaker and its control shall also be included in the scope of supply. Facility to earth the circuit breaker structure at two points shall be provided.

2.19.21 SURFACE FINISH

All interiors and exteriors of tanks, control cubicles and other metal parts shall be thoroughly cleaned to remove all rust, scales, corrosion, greases or other adhering foreign matter. All steel surfaces in contact with insulation oil, as far as accessible, shall be painted with not less than two coats of heat resistant, oil insoluble, insulating paint.

All metal surfaces exposed to atmosphere shall be given two primer coats of zinc chromate and two coats of epoxy paint with epoxy base thinner. All metal parts not accessible for painting shall be made of corrosion resisting material. All machine finished or bright surfaces shall be coated with a suitable preventive compound and suitably wrapped otherwise protected. All paints shall be carefully selected to withstand tropical heat and extremes of weather within the limits specified. The paint shall not scale off or wrinkle or be removed by abrasion due to normal handling.

All ferrous hardware, exposed to atmosphere, shall be hot dip galvanized.

2.19.22 GALVANISING

All ferrous parts including all sizes of nuts, bolts, plain and spring washers, support channels, structures, shall be hot dip galvanized conforming to latest version of IS:2629 or any other equivalent authoritative standard.

2.19.23 CABLE TERMINATION

Suitable cable glands for terminating the multicore cable, shall be provided wherever required.

2.19.24 TERMINAL CONNECTIONS AND EARTH TERMINALS

Each circuit breaker connected with incoming and outgoing feeders shall be provided with solderless clamp type connectors suitable for ACSR conductor.

Each circuit breaker pole and control cabinet shall be provided with appropriate number of grounding terminals and clamps for receiving ground connections.

Each circuit breaker pole and control cabinet shall be provided with appropriate number of grounding terminals and clamps for receiving ground connections.

2.19.25 INTERLOCKS

Necessary interlocks to prevent closing or opening of the breaker under low pressure of the contact spring and devices for initiating alarm shall be provided. The detailed interlocking scheme based upon single line diagram as applicable for the substation shall be provided by the contractor

Requirement of interlock shall be as given below:

Isolator should not be operated unless the associated breaker is in open position.
The circuit breaker shall close only after all isolators associated with it have been in closed position.

In case of double bus bar arrangement following additional requirement for interlocking shall be provided.

One bus bar selector isolator of any bay excepting the bus coupler bay shall close only when, The circuit breaker of corresponding bay is open and locked.
The other bus isolator of that bay is open.

When one bus isolator of any bay excepting the bus coupler bay is closed. The other shall close only when the bus coupler circuit breaker and both the bus isolators are closed.
Bus isolator of bus coupler bay shall operate only when the bus coupler breaker is open.
The bypass isolator of feeder shall close when the feeder circuit breaker and its adjoining isolators are closed.

2.19.26 EARTHING SYSTEM

All switchgear enclosures should be bolted metal to metal and should carry the full earth return current. Connection between phases at the earthing points shall be dimensioned for carrying full earth return current i.e., actual service current not rated current.

2.19.27 VACUUM INTERRUPTER ASSEMBLY

Each pole of the circuit breaker shall be provided with vacuum interrupter, one for each phase, hermetically sealed for life and encapsulated by ceramic insulators. The interrupter shall be provided with steel chromium are chamber to prevent vaporized contact material being deposited on the insulating body. A further shield giving protection to the metal bellows shall also follow the travel of the moving contacts to seal the interrupter against the surroundings atmosphere.

It shall have high and consistent dielectric strength of vacuum unaffected by environment and switching operations. Bronzed joints should ensure retention of vacuum for life time. It shall have low and stable contact resistance due to absence of oxidation effects and shall ensure low power loss. The arcing voltage shall be low and minimum contact erosion.

2.19.28 GUARANTEED TECHNCIAL PARTICULARS

Guaranteed and technical particulars as called for in Section-II shall be furnished along with the tender. Particulars which are subject to guarantee shall be clearly marked.

2.19.29 TESTS

TYPE TESTS

Each circuit breaker shall comply with requirements of type tests prescribed in IEC publication No. 62271-100 Short time and peak withstand current test .
Short circuit breaking capacity and making capacity.
Capacitive current switching test : Cable charging current breaking test(Ur less than or equal to 52 kV). Dielectric test i.e., power frequency withstand and impulse withstand test
Temperature rise test.

Mechanical Endurance Test at ambient temperature. Measurement of resistance of the main circuit.

ROUTINE TESTS

Routine Tests as per IEC- 62271-100 shall be carried out on each breaker in presence of purchaser's representative at the manufacturer's expenses at his works except, where agreed to otherwise. All test reports should be submitted and should be got approved from the purchaser before despatch of the equipment.

SITE TESTS ON CONTROL AND AUXILIARY CIRCUIT

The following tests shall be conducted at site. Voltage tests on control and auxiliary circuit. Measurements of resistance of the main circuit. Mechanical Operation Tests.

2.19.30 NAME PLATE

Equipment should be provided with name plate giving full details of manufacture, capacities and other details as specified in the relevant ISS or other specification stipulated.

2.19.31 TECHNICAL PARAMETERS OF 36 KV CIRCUIT BREAKERS

SL. NO.	DESCRIPTION		VALUES
1)	Rate voltage (KV rms)	:	36 KV
2)	Rated frequency (Hz)	:	50
3)	System neutral earthing	:	Solidly grounded system
4)	Type of arc quenching medium	:	Vacuum
5)	Rated normal current at site conditions (Amps)	:	2000 Amps
6)	Number of poles	:	3
7)	Installation	:	Outdoor type
8)	Temperature rise	:	As per IEC 56 (Table-4) Page-19
9)	Rated short circuit	:	
	a) Interrupting capacity at 36 KV	:	31.5 KA
	b) The percentage DC components	:	As per IEC-62271-100
	c) Duration of short circuit	:	3 Sec.
10)	Rated short circuit making	:	82 KA
11)	First pole to clear factor	:	1.5
12)	Rated short time current	:	25 KA
13)	Rated duration of short circuit	:	3 Seconds
14)	Total break time for any current upto the rated breaking current with limiting condition of operating and quenching media pressure (ms)	:	< 80 ms
15)	Closing time (ms)	:	< 150 ms
16)	Mounting	:	Hot dip galvanized lattices steel support structured bolted type
17)	Phase to phase spacing in the switch yard i.e, interpole spacing for breaker (min) in mm	:	470±10
18)	Required ground clearance from the lowest line terminal if both the terminals are not in same horizontal plane (mm)	:	3700
19)	Height of concrete plinth (mm)	:	150
20)	Minimum height of the lowest part of the support insulator from ground liner (mm)	:	3194
21)	Minimum creepage distance of support insulator (mm)	:	1116 mm (31 mm/kV)
22)	Minimum corona extinction voltage (kv rms)	:	92
23)	Standard value of rated transient recovery voltage for terminal fault	:	As per IEC-56
24)	Standard value of rated line Characteristics for short line faults	:	
25)	RRRV	:	KV/ms=0.214
26)	Surge Peak Factor		K=1.6 A
27)	Impedance	:	450 Ohm
28)	Rated operating duty cycle	:	O-0.3 Second - CO-3 Minutes-CO

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	b) Auto reclosing	:	Suitable for three phase Auto reclosing duty
29)	Rated insulation level under heavy pollution condition 1.2/50 micro second lightening Impulse withstand voltage (KV peak) to earth	:	170 KV
30)	Power frequency withstand voltage KV (rms) to earth (KV rms)	:	70 KV
31)	Rated characteristic for out of Phase breaking	:	
	a) Out of phase breaking capacity	:	25% of rated breaking capacity
	b) Standard values of transient recovery	:	As per IEC-56
	c) Operating mechanism	:	Spring operated, Anti pumping and Trip free mechanism
	d) Power available for operating mechanism	:	Three phase 415 Volts 50 C/S or single phase 50 C/S 240 volts
	a) Rated supply voltage of closing and operating devices and auxiliary circuits	:	220 VDC/110 VDC 240 Volts AC 50 C/S single phase 415 volts 50 Hz three phase
	b) Permissible voltage variation	:	In case of DC Power supply voltage variation shall be between 85% to 110% of normal voltage. In case of AC power supply voltage variation shall be of the normal voltage as per IS-15% to +10%.
	c) Permissible frequency	:	□ 3% from normal 50 Hz as per IS 2026 part-I 1977 para 4.4
	d) Combined variation of frequency and voltage	:	□ 10%
32)	Auxiliary contacts (number & rating)	:	12 NO and 12 NC on each pole having continuous current rating of 10 Amps. DC breaking rating capacity shall be 2 Amps with circuit time constant less than 20 ms at 220/30 volts DC
33)	Number of trip coils	:	Two trip coils and 1 close coil with anti-pumping arrangement
34)	Rated terminal load	:	100 kg. Static. The breaker shall be designed to withstand the rated terminal load, wind, load, earthquake load and short circuit forces
35)	Noise level of the equipment	:	Not exceeding 140 db
36)	ladder	:	Necessary platform with ladder shall be provided for local operation/maintenance to ease out accessible reach
37)	Galvanisation Thickness of Supporting structure	:	125 microns

2.19.32 DRAWINGS AND INSTRUCTION MANUALS

Following drawings for each item are to be supplied as part of the contract.

a) General outline drawings, showing dimensions, front and side elevations and plan of the circuit breaker and its local control panel.
b) Outline drawing of bushings showing dimensions and number of sheds and creepage distance.
c) Assembly and sub-assembly drawings with numbered parts.
d) Sectional views showing the general constructional features, operating mechanism and are extinguishing chamber, etc.
e) Dimension and assembly of important auxiliaries.
f) Detailed drawings of operating mechanism. And inter-phase mechanism.
g) Test certificates.
h) Detailed drawings of mounting structure.
i) Spare parts and catalogue
j) Wiring diagram showing the local and remote control scheme of breaker including alarms indication devices instruments relay and timer wiring.

k) Write up on working of control schematic of breaker.

l) Foundation plan including weights of various components and impact loadings for working foundation design. Three copies for each pkg. of the above drawings and instruction manuals covering instructions for installations, operation and maintenance shall be supplied by the contractor(s) without any extra cost.

2.20.0 TECHNICAL SPECIFICATION OF OUTDOOR CURRENT TRANSFORMERS

2.20.1 SCOPE OF CONTRACT

This Section of the Specification covers general requirements for design, engineering, manufacture, assembly and testing at manufacturer's works of 33 kV outdoor Current and Potential Transformers.

2.20.2 STANDARDS

The equipment covered by this specification shall, unless otherwise stated be designed, constructed and tested in accordance with the latest revisions of relevant Indian Standards and shall conform to the regulations of local statutory authorities.

In case of any conflict between the Standards and this specification, this specification shall govern. The current transformer shall comply also with the latest issue of the following Indian standard.

1) IS: 2705(Part-I) Current transformers: General requirement.
2) IS: 2705(Part-II) Current transformers : Measuring Current transformers
3) IS: 2705(Part-III) Current transformers : Protective Current transformers
4) IS: 2705(Part-IV) Current transformers: Protective Current transformers for special purpose application.

2.20.3 GENERAL REQUIREMENTS

a) The cores of the instrument transformers shall be of high grade, non-aging CRC steel of low hysteresis loss and high permeability.

b) Instrument transformers shall be of Live Tank design.

c) The instrument transformers shall be truly hermetically sealed to completely prevent the oil inside the tank coming into contact with the outside temperature. To take care of oil volume variation the tenderer are requested to quote the current transformers with stainless steel diaphragm (bellow).

d) The instrument transformers shall be completely filled with oil.

e) A complete leak proof secondary terminal arrangement shall be provided with each instrument transformers, secondary terminal shall be brought into weather, dust and vermin proof terminal box. Secondary terminal boxes shall be provided with facilities for easy earthing, shorting, insulating and testing of secondary circuits. The terminal boxes shall be suitable for connection of control cable gland.

f) All instrument transformers shall be of single phase unit.

g) The instrument transformers shall be so designed to withstand the effects of temperature, wind load, short circuit conditions and other adverse conditions.

h) All similar parts, particularly removable ones, shall be interchangeable with one another.

i) All cable ferrules, lugs, tags, etc. required for identification and cabling shall be supplied complete for speedy erection and commissioning as per approved schematics.

j) The instrument transformers shall be designed to ensure that condensation of moisture is controlled by proper selection of organic insulating materials having low moisture absorbing characteristics.

k) All steel work shall be degreased, pickled and phosphated and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint.

2.20.4 INSULATING OIL

The quantity of insulating oil for instrument transformers and complete specification of oil shall be stated in the tender. The insulating oil shall conform to the requirement of latest edition of IS: 335

2.20.5 COMMON MARSHALLING BOXES

a) The outdoor type common marshalling boxes shall conform to the latest edition of IS 5039 and other general requirements specified hereunder.

b) The common marshalling boxes shall be suitable for mounting on the steel mounting structures of the instrument transformers.

c) One common marshalling box shall be supplied with each set of instrument transformers. The marshalling box shall be made of sheet steel and weather proof. The thickness of sheet steel used shall be not less than 3.0 mm. It is intended to bring all the secondary terminals to the common marshalling.

d) The enclosures of the common marshalling boxes shall provide a degree of protection of not less than IP 55 (As per IS 2147).

e) The common marshalling boxes shall be provided with double hinged front doors with pad locking arrangement. All doors and removable covers and plates shall be sealed all around with neoprene gaskets or similar arrangement.

f) Each marshalling box shall be fitted with terminal blocks made out of moulded non-inflammable plastic materials and having adequate number of terminals with binding screws washers etc. Secondary terminals of the instrument transformers shall be connected to the respective common marshalling boxes. All out going terminals of each instrument transformer shall terminate on the terminal blocks of the common marshalling boxes. The terminal blocks shall be arranged to provide maximum accessibility to all conductor terminals.

g) Each terminal shall be suitably marked with identification numbers. Not more than two wires shall be connected to any one terminal. At least 20% spare terminals shall be provided over and above the required number.

h) All terminal strips shall be of isolating type terminals and they will be of minimum 10 A continuous current rating.

i) All cable entries shall be from bottom. Suitable removable gland plate shall be provided on the box for this purpose. Necessary number of cable glands shall be supplied fitted on to this gland plate. Cable glands shall be screw on type and made of brass.

j) Each common marshalling box shall be provided with two numbers of earthing terminals of galvanised bolt and nut type.

k) All steel, inside and outside work shall be degreased, pickled and phosphate and then applied with two coats of Zinc Chromate primer and two coats of finishing synthetic enamel paint. The colour of finishing paint shall be as follows: -

   i) Inside: Glossy White

   ii) Outside: Light Grey (Shade No. 697 of IS: 5)

2.20.6 BUSHINGS AND INSULATORS

Bushings and Insulators shall be of Porcelain, Solid core type. Porcelain used for the manufacture of bushings and insulators shall be homogeneous, free from defects, cavities and other flaws or imperfections that might affect the mechanical or dielectric quality and shall be thoroughly vitrified, tough and impervious to moisture.

Glazing of the porcelain shall be of uniform brown colour, free from blisters, burns and other similar defects. Bushings shall be designed to have sufficient mechanical strength and rigidity for the conditions under which they will be used. All bushings of identical ratings shall be interchangeable.

Puncture strength of bushings shall be greater than the dry flashover value. When operating at normal voltage, there shall be no electric discharge between the conductors and bushing which would cause corrosion or injury to conductors, insulators or supports by the formation of substances produced by chemical action. No radio interference shall be caused by the bushings when operating at the normal rated voltage.

The design of bushing shall be such that the complete bushing is a self-contained unit and no audible discharge shall be detected at a voltage up to a working voltage (Phase Voltage) plus 10%. The minimum creepage distance for severely polluted atmosphere shall be 25 mm/KV.

Sharp contours in conducting parts should be avoided for breakdown of insulation. The insulators shall be capable to withstand the seismic acceleration of 0.5 g in horizontal direction and 0.6g in vertical direction.

Bushings shall satisfactorily withstand the insulation level specified in data sheet.

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2.20.7 MOUNTING STRUCTURES

All the equipment covered under this specification shall be suitable for mounting on steel structures. Supply of mounting structures is also in the scope of this tender.

Each equipment shall be furnished complete with base plates, clamps, and washers etc. and other hardware ready for mounting on existing steel structures.

2.20.8 SAFETY EARTHING

The non-current carrying metallic parts and equipment shall be connected to station earthing grid. For these two terminals suitable for 40mm X 10mm GI strip shall be provided on each equipment.

2.20.9 TERMINAL CONNECTORS

The equipment shall be supplied with required number of terminal connectors of approved type suitable for ACSR. The type of terminal connector, size of connector, material, and type of installation shall be approved by the Purchaser, as per installation requirement while approving the equipment drawings.

2.20.10 NAME PLATES

All equipment shall have non-corrosive name plates fix at a suitable position indelibly mark with full particular there on in accordance with the standard adapted.

2.20.11 TESTS

Routine/Acceptance Tests (all units)

All routine tests shall be carried out in accordance with relevant Standards. All routine/acceptance tests shall be witnessed by the Purchaser/his authorised representative.

Type Tests: The bidder shall furnish type test certificates and results for the all tests as per relevant Standards along with the bid for current and potential transformers of identical design.

Type test certificates so furnished shall not be older than 5 (five) years as on date of Bid opening.

2.20.12 TECHNICAL DATA SHEET FOR CURRENT TRANSFORMERS

For 33 kV CTs the instrument security factor at all ratios shall be less than five (5) for metering core. If any auxiliary CTs/reactor are used in the current transformers then all parameters specified shall have to be met treating auxiliary CTs as an integral part of the current transformer. The auxiliary CTs/reactor shall preferably be inbuilt construction of the CTs. In case these are to be mounted separately these shall be mounted in the central marshalling box suitably wired up to the terminal blocks.

2.20.13 TYPE AND RATING:

All instrument transformer shall be outdoor type, single phase, oil immersed, self-cooled suitable for mounting on steel structure. The instrument transformer shall have the following ratings and particulars.

Item	Ratings and Particulars
Nominal system voltage	33 kV
Highest system voltage, kV	36
Rated frequency ,HZ	50
System earthing	Solidly earth
Insulation level	
(a) Impulse withstand voltage: kVp	170
(b) One minute p.f. Withstand voltage, kV (r.m.s.)	70
(F) Short time current for one second, kA	20
(G) Minimum creepage distance, mm	As per IS
(H) Temperature rise	
Feeder/ BYPASS/ Bus Coupler CT	
(i) No. of Cores	2
(ii) Transformation Ratio	As per schedule of requirement
(iii) Rated Output	
Core-1	30 VA
(b) Core-2	15 VA
(c) Core-3	N.A
(iv) Accuracy Class	
(a) Core-1	0.2S

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(b) Core-2	5P
(c) Core-3	N.A
(v) Accuracy Limit Factor	
(a) Core-1	-
(b) Core-2	20
(c) Core-3	-
(vi) Instrument security factor	
(a) Core-1	<5
(b) Core-2	-
(c) Core-3	-
(vii) Minimum Knee point voltage, Volts	
(a) Core-1	-
(b) Core-2	-
(c) Core-3	-
(viii) Maximum secondary resistance, ohm	
(a) Core-1	-
(b) Core-2	-
(c) Core-3	N.A
(ix) Maximum exciting current, at Vk/4 mA	
(a) Core-1	-
(b) Core-2	-
(c) Core-3 (at Vk/4)	N.A

Note:
It is intended to use different ratios of the same CT at the same time for various protections and metering cores. The CTS should therefore be suitable for the above purpose by secondary tapings only. The ratio change by secondary taps is acceptable as long as the required CT specifications are achieved at all ratios.

The knee point voltage specified above shall be at higher ratio/ taps.

2.21.0 TECHNICAL PARTICULARS OF 33KV ISOLATOR

Sl. No.	**Type:**	**33kV**
I	**II**	**III**
1	Mainswitch	Horizontal
2	Service	Outdoor
3	Applicable standard	IS :9921 /IEC-2271-102
4	No. of Phases	3 phase
5	Design Ambient temperature	50°C
6	Type of operation	Mechanically ganged
7	Rated voltage (kV)	In kV
	(a) Nominal	33
	(b) Maximum	36
8	Rated current (Amps)	1250
9	Short time current for 3sec.(kA)	31.5
10	Rated frequency	50 HZ +5%
11	System earthing	Effectively earthed
12	Temperature rise	As per relevant IS/IEC standards
13	Lightning Impulse withstand voltage (kVp)	
	(a) Across Isolating distance	195
	(b) To earth	170
14	1-minute power frequency withstand voltage kV (r.m.s.)	
	(a) Across Isolating distance	80
	(b) To earth	70
15	Operating mechanism	
	(a) Isolator	Motorized & Manual
	(b) Earth Switch	Manual
16	Auxiliary voltage	
	(a) Control & Interlock	As per site 110V

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	(b) Motor voltage	3 Phase 415V AC 50Hz
	(c) Heater, lamp & socket	Single phase 240 V 50HZ
17	Safe duration of overload	
	(a) 150% of rated current	300 seconds.
	(b) 120% of rated current	Continuous.
18	Minimum creepage distance of insulator (mm)	25mm/kV
19	Operating time	Less than 12 secs
20	Insulator Data	
	a) Bending Strength (kgf)	600
	Type:	**33 kV**
	b) Height (mm)	508
	c) Bottom PCD (mm)	76
	d) No. of holes & hole dia.	4xM12
	e) Top PCD	76
	f) No. of holes & hole dia.	4xM12
	g) Minimum creepage distance (mm) (The protected creepage distance shall not be less than 50% of total)	1116
21	Working clearance (live part to plinth) (in mm)	3700
22	Phase Spacing (mm.)	1500
23	Minimum clearances (mm.)	
	a) Phase to Phase	450
	b) Phase to earth	460
	c) Sectional clearance	3000
24	Mechanical endurance class	M2

2.21.2 STANDARDS

Disconnecting switches covered by this specification shall conform to latest edition IEC-129/IEC 62271-102 I.S.1813 and IS: 9921, IS-325 and unless specifically stated otherwise in this specification.

2.21.3 TYPE

a) The 33KV Isolators (SI or DI) shall be outdoor type with three phase double break center rotating manual as well as motor operated type with local and remote operation. They shall have crank and reduction gear mechanism.

b) All Isolators offered shall be suitable for horizontal upright mounting on steel structures. Each pole unit of the multiple Isolators shall be of identical construction and mechanically linked for gang operation.

c) Each pole of the Isolator shall be provided with two sets of contacts to be operated in series and the moving contact blades shall rotate in horizontal plane.

d) The design shall be such that the operating mechanism with the linkages shall be suitable for mounting on any of the outer pole ends without much difficulty and with minimum shifting of parts.

e) Moving contacts of all isolators shall rotate through 90 deg. from their “fully closed position” to “fully open position so that the break is distinct and clearly visible from ground level.

f) The Isolators offered by the Bidder shall be designed for Normal rating current of 1250A for 33kV Isolator

g) It should suitable for continuous service at the system voltages specified herein. The Isolators shall be suitable to carry the rated current continuously and full short circuit current of 31.5 KA for 33 KV respectively for 3 second at site condition without any appreciable rise in temperature. These shall also be suitable for operation at 110% rated (normal) voltage. The Isolators shall be suitable for Isolating low capacitive / inductive currents of 0.7amp at 0.15 power factor. The isolators shall be so constructed that they don’t open under the influence of short circuit conditions.

h) The Isolators and earthing switches are required to be used on electrically exposed installation and this should be taken into account while fixing the clearance between phases and between phase and earth.

2.21.4 MAIN CONTACTS

a) All Isolators shall have heavy duty, self-aligning and high-pressure line type contacts made of high conductivity, corrosion resistant, hard-drawn electrolytic copper strips of proper thickness and contact area. Fixed contact should consist of loops of above copper strips suitable for 1250Amps ratings for 33KV Isolators respectively. The hard dawn electrolytic copper strips should be silver plated 25micron thickness and fixed contacts should be backed by powerful phosphor bronze/stainless steel springs of suitable numbers. The main contacts should be preferably of tulip type design. However, the thickness and contact area of the contact should conform to the drawing approved during type test. Moving contact with moving arm should be of hard- drawn electrolytic copper of proper thickness and contact area.

b) These fixed and moving contacts shall be able to carry the rated current continuously and the maximum fault current of 31.5 KA for 33KV respectively for 3 seconds without any appreciable rise in temperature. The Isolator blades shall retain their form and straightness under all conditions of operation including all mechanical stress arising out of operation as well as under rated short circuit condition.

c) Fixed guides shall be provided so that even when the blades are out of alignment by one inch (maximum), closing of the switches, proper seating of the blades in between contacts and adequate pressure to give enough contact surface is ensured. Wherever possible, the blades shall be counter balanced by weights and springs. The contact shall be self-cleaning by the

wiping action created by the movements of the blades. The surface of the contacts shall be tendered smooth and silver plated (25 micron).

d) The Isolator shall be self-cleaning type so that when isolators remain closed for long periods in a heavily polluted atmosphere, binding does not occur. No undue wear or scuffing shall be evident during the mechanical endurance tests, contacts and springs shall be designed so that adjustment of contact pressure shall not be necessary throughout the life of the isolator. Each contact or part of contacts shall be independently sprung so that full pressure is maintained on all contact at all times.

2.21.5 ARCING HORN AND GRADING HORN

Suitable arcing horn made of tinned electrolytic copper which are required for guiding contacts shall be provided on the fixed and moving contacts of all Isolators. The contacts shall be of 'make before and break after" type.

2.21.6 ELECTRICAL INTERLOCK / MECHANICAL INTERLOCK

The disconnecting switches whenever required shall be with an approved type electrical interlock for interlocking with the associated circuit breakers and earth switch. Electrical interlock assembly should be more right in construction and properly mounted to ensure reliable operation. The design should be such that the electrical circuit for the interlocking mechanism will only remain energised during operation of the switches.
Mechanical interlock is also required.

2.21.7 AUXILIARY SWITCHES

a) All isolators and earthing switches shall be provided with 110/220V DC auxiliary switches for their remote position indication on the control board and for electrical locking with other equipment. The auxiliary switch shall be provided with a minimum of 12 normally open and 12 normally closed (for isolator) and 10 normally open and 10 normally closed for earth switch. Separate auxiliary switches shall be provided for isolating and earth switches. 6 additional NO and NC contact to be provided as spare in each case.

b) The auxiliary switches and auxiliary circuits shall have a continuous current carrying capacity of at least 10 Amps. Auxiliary switches shall not be used as limit switches. Details of make, rating and type of limit switch shall be furnished in the offer.

2.21.8 OPERATING MACHANISM

a) The operating mechanism shall be simple and shall ensure quick and effective 1000 operation. The design shall be such as to enable one man to operate it with nominal effort. The operating mechanism box shall be made out of aluminum extruded (Aluminum alloy) sections of minimum 3.15 mm thickness. The operating mechanism shall be strong rigid and not subject to rebound.

b) The Isolator blades shall be in positive continuous control throughout the entire cycles of operation. The operating rods and pipes shall be rigid enough to maintain positive control under most adverse conditions and to withstand all torsional and bending stresses arising from operation. Operation of the switches at any speed should not result in improper functioning, in displacement of parts / machines after final adjustment has been made. All holes in cranks, linkages etc. having moving pins shall be drilled and fitted accurately so as to prevent slackness and lost motion.

c) Provision shall be made for padlocking the operating mechanism of disconnecting and earth switches in both open and closed positions.

d) Bearings shall be ball and roller type shall be protected from weather and dust by means of cover and grease retainers. Bearings pressures shall be kept low to ensure long life and care of operation.

e) Each power operated isolator shall be motor driven as well as manually operated and shall be complete with local / remote selector switch and open / close push buttons. The function of all control facilitates operating isolators.

f) Provision shall be made in the control cabinet to disconnect power supply to prevent local / remote power operation. Limit switches for open and close positions of re-isolations and earth switches.

g) All the terminal blocks to be used in the operating mechanism should of stud type of Poly-amide/Mealmine material of make like Elmex (OAT-6 for non-disconnecting type & OAT –6T for disconnecting type) / connectwell (Equivalent).

2.21.9 DESIGN, MATERIALS AND WORKMANSHIP

a) The live parts shall be designed to eliminate sharp points, edges and similar corona producing surfaces. Where this is impracticable, adequate shields to be provided. All ferrous metal parts shall be hot dip galvanized, as per IS 2629.All metal parts shall be of such materials or treated in such a way so as to avoid rust, corrosion and deterioration due to continued exposure to atmosphere and rain. All current carrying parts shall be made from high conductivity electrolytic copper / aluminium.

b) Bolts, screws and pins shall be provided with standard locking device viz. Locknuts, spring washers, keys etc. and when used with current carrying parts, they shall be made of copper silicon or other high conductivity and wear resistant alloys.

c) The switches should not need lubrication of any parts except at very long interval of five year minimum.

2.21.10 PROTECTIVE COATINGS

All ferrous parts including bolts, nuts and washers of the switches assembly shall be galvanized to withstand at least six one minute dips in copper sulphate solution of requisite strength (Prece tests) except the threaded portions which should withstand four dips (Galvanizing thickness 86 micron (610 gm/cc).

2.21.11 INSULATORS

Support insulators for all type of isolators shall be of solid core type. The insulator shall be made of homogeneous and vitreous porcelain of high mechanical and dielectric strength. It shall have sufficient mechanical strength to sustain electrical and mechanical loading on account of wind load, short circuit forces etc. Glazing of the porcelains shall be of uniform dark brown color with a smooth surface arranged to shed away raise water. The porcelain shall be free from laminations and other flaws or imperfections that might affect the mechanical or dielectric quality. It shall be thoroughly vitrified, tough and impervious to

moisture. The porcelain and metal ports shall be assembled in such a manner and with such material that any thermal differential expansion between the metal and porcelain parts throughout the range of temperature specified in this specification shall not loosen the parts or create under internal stresses which may affect the mechanical or electrical strength or rigidity. The assembly shall not have excessive concentration of electrical stresses in any section or across leakage surfaces. The cement used shall not give rise to chemical reaction with metal fittings. The insulator shall be suitable for water washing by rain or artificial means in service condition. Profile of the insulator shall also conform to IEC-815. Insulator shall have a minimum cantilever strength of 600 Kgs for (33KV). Caps to be provided on top of the insulator shall be of high-grade cast iron or malleable steel casting. It shall be machine faced and hot dip galvanized. The cap shall have four numbers of tapped holes spaced on a pitch circle diameter of 127mm. The holes shall be suitable for bolts with threads having anti corrosive protection. The effective depth of threads shall not be less than the nominal diameter of the bolt. The cap shall be so designed that it shall be free from visible corona and shall have radio interference level within 500 micro volts. Casing shall be free from blow holes cracks and such other defects.

2.21.12 CONTROL CABINET:

The control cabinet of the operating mechanism shall be made out of minimum 3.15mm thick aluminium alloy sheet. Hinged door shall be provided with pad locking arrangement. Sloping rain hood shall be provided to cover all sides. 15 mm thick neoprene or better type of gaskets shall be provided to ensure degree of protections of at least IP 55 as per IS 2147/IS-3947. The cabinet shall be suitable for mounting on support structure with adjustment for vertical, horizontal and longitudinal alignment. Details of these arrangements shall be furnished alongwith the offer.

2.21.13 MOTOR:

Motors rated 1 KW and above shall be suitable for operation on 3 phase, 415 V, 50 HZ supply. Motors of lower rating shall be single phase type suitable for 240V, 50HZ system. It shall be totally enclosed type if mounted outside the control cabinet. The motor shall withstand without damage stalled torque for at least 3 times the time lag of the tripping device. The motor shall, in all other respects, conform to the requirement of I.S. 325.

2.21.14 GEAR:

The dis-connector / isolator may be required to operate occasionally, with considerably long idle intervals. Special care shall be taken for selection of material for gear and lubrication of gears to meet this requirement. The gear shall be made out of aluminium bronze or any other better material lubricated for life with graphite or better-quality non-drawing and non-hardening type grease. Wherever necessary automatic relieving mechanism shall be provided suitable relay, Device shall be provided to prevent over loading of the motor. Single phase preventer (for 3 phase meter) shall be provided to operate on open circuiting of any phase and shall trip off the motor. Complete details of the devices shall be furnished in the offer.

2.21.15 SPACE HEATERS:

Space heaters suitable for 1 phase 240V AC supply shall be provided for each motor operated operating mechanism to prevent condensation and shall be operated by MCB.

2.21.16 TERMINAL BLOCK AND WIRINGS

Each operating mechanism shall be provided with 1100V grade stud type terminal block. All auxiliary switches, interlocks and other terminals shall be wired upto terminal block. The terminal block shall have at least 20% extra terminals. All wiring shall be carried out with 1.1KV grade insulated 2.5 sq.mm. copper wires.

2.21.17 INTERIOR ILLUMINATION:

A holder suitable for a 240 V lamp shall be provided in each of the motor operated mechanism of three poles & shall be door operated type.

2.21.18 CONTROL AND AUXILIARY SUPPLY:

A 3-phase switch with MCB for phases and link for neutral, shall be provided for power supply and a 2 pole MCB shall be provided for control supply.

2.21.19 POSITION INDICATOR:

A position indicator to show the isolator is in ON or OFF position to be provided.

2.21.20 NAME PLATE:

Isolator, earthing switches and their operating devices shall be provided with name plate. The name plate shall be weatherproof and corrosion proof. It shall be mounted in such a position that it shall be visible in the position of normal service and installation. It shall carry the following information duly engraved or punched on it.

A. Isolator Base

Name: AEGCL
Name of manufacturer –
Order No. –
Type Designation –
Manufacturers serial No. –

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Rated voltage –
Rated normal current –
Rated short time current (rms) and duration –
Rated short time peak current (KAP)-
Weight-

B. Earthing Switch

Name: AEGCL
Name of manufacturer –
Order No. –
Type Designation –
Manufacturers serial No. –
Rated voltage –
Rated normal current –
Rated short time current (rms) and duration-
Rated short time peak current (KAP)-
Weight-

C. Operating Device

Name – AEGCL
Name of manufacturer –
Order No.
Type Designation –
Reduction gear ratio –
AC motor

i) Rated auxiliary voltage
ii) Starting current
iii) Designation of AC motor as per IS 4722/325
iv) Starting torque at 80% of supply voltage
v) Over travel in degrees after cutting off supply
Total operating time in seconds
i) Close operation – Electrical
ii) Open operation – electrical
iii) Open operation – manual

2.21.21 PAINTING GALVANIZING AND CLIMATE PROOFING:

a) At interiors and exteriors of enclosures, cabinets and other metal parts (other than made up of aluminium) shall be thoroughly cleaned to remove all rust, scales, corrosion, grease and other adhering foreign matter and the surfaces treated by phosphating (e.g. seven tank phosphating sequence). After such preparation of surfaces, two coats of zinc oxide primer shall be given by suitable stoving and air drying before final painting. Colour of the final paints shall be of shade no. 697 of IS:5. The finally painted cubicle shall present aesthetically pleasing appearance free from any dent or uneven surface.
b) Paint inside the metallic housing shall be of anti-condensation type and the paint on outside surfaces shall be suitable for outdoor installation.
c) All components shall be given adequate treatment of climate proofing as per IS:3202 so as to withstand corrosive and severe service conditions.
d) All metal parts not suitable for painting such as structural steel, pipes, rods,levers, linkages, nuts and bolts used in other than current path etc. shall be hot dip galvanized as per IS –2629. Galvanization test will be carried out during routine test.
e) Complete details of painting, galvanizing and climate proofing of the equipment shall be furnished in the offer.

2.21.22 TESTS:

Type Tests:

Isolators offered, shall be fully type tested as per the relevant standards. The Bidder shall furnish Three sets of the following valid type test reports for their different type of offered Isolators along with the offer. The Purchaser reserves the right to demand repetition of some or all the type tests in the presence of purchaser's representative. For this purpose, the Bidder may quote unit rates for carrying out each type test and this will be taken during bid price evaluation, if required.

a) Short time withstand & peak withstand current test for Isolator & Earth Switch.
b) Power frequency (Dry & Wet),
c) Lightening Impulse dry withstand Test
d) Mechanical Endurance Test
e) Temperature rise test
d) IP-55 test

During type tests the isolator shall be mounted on its own support structure or equivalent support structure and installed with its own operating mechanism to make the type tests representative. Drawing of equivalent support structure and mounting arrangements shall be furnished for Purchaser's approval before conducting the type tests.

The type tests shall be conducted on the isolator along with approved insulators and terminal connectors. Mechanical endurance test shall be conducted on the main switch of one isolator of each type.

In addition to that, the bidder has to submit Type Test Report on 33 kV (2x22 kV) Post Insulators as per relevant IS/IEC and technical specification of the bid.

Acceptance and Routine Test:

All acceptance and routine test as stipulated in the relevant standards shall be carried out by the supplier in presence of Purchaser's representative.

Tests Such as

1. Mechanical operation test (routine test) shall be conducted on isolator (main switch and earth switch) at the supplier's works as well as purchaser's substation site.
2. Temperature rise test,
3. Galvanized test

Immediately after finalization of the programme of type / acceptance, routine testing the supplier shall give sufficient advance intimation (clear 20 days advance intimation), along with shop routine test certificates, valid calibration reports from Govt. approved test house for the equipments, instruments to be used during testing for scrutiny by the purchaser to enable him to depute his representative for witnessing the tests. If there will be any discrepancies in the shop routine test certificates and calibration reports furnished by the firm then after settlement of the discrepancies only, purchaser's representative will be deputed for witnessing the tests. Special tests proposed to be conducted (if decided to conduct) as type test on isolators, are given at Annexure- II. These special type test charges shall be quoted along with all other type tests as per relevant IEC standard and these charges shall be included in the total bid price.

Test certificates of various items including but not limited to the following shall be furnished at the time of routine tests.

a) Chemical analysis of copper along with a copy of excise certificate indicating genuine source of procurement of electrolytic grade copper.
b) Bearings
c) Fasteners
d) Universal / swivel joint coupling
e) Insulators
f) Motor
g) Gears
h) Auxillary switch
i) Limit switch
j) Timer
k) Overload / single phase preventer relay
l) Interlocking devices
m) Terminal block
n) Any other item

2.21.23 INSPECTION:

i) The Purchaser shall have access at all times to the works and all other places of manufacture, where the disconnectors, earth switches and associated equipment are being manufactured and the supplier shall provide all facilities for unrestricted inspection of the works raw materials manufacture of all the accessories and for conducting necessary tests as detailed herein.
ii) The supplier shall keep the purchaser informed in advance of the time of starting of the progress of manufacture of equipment in its various stages so that arrangements could be made for inspection.
iii) No material shall be dispatched from its point of manufacture unless the material has been satisfactorily inspected and tested.
iv) The acceptance of any quantity of the equipment shall in no way relieve the supplier of his responsibility for meeting all the requirements of this specification and shall not prevent subsequent rejection if such equipment is later found to be defective.
v)No structure or any member thereof, which failed under the tests and inspection shall be supplied.

2.21.24 QUALITY ASSURANCE PLAN:

The Bidder shall invariably furnish following information along with his offer, failing which his offer shall be liable for rejection.

(i) Names of sub suppliers for raw materials, list of standards according to which the raw materials are tested, list of tests normally carried out on raw materials in presence of Supplier's representative, copies of test certificate
(ii) Information and copies of test certificates as in (i) and(ii) above in respect of bought out accessories.
(iii) List of manufacturing facilities available
(iv) Level of automation achieved and lists of areas where manual processing still exists.
(v) List of areas in manufacturing process, where stage inspections are normally carried out for quality control and details of such tests and inspections.
(vi) List of testing equipments with calibration certificates from Govt. approved test house available with supplier for final testing equipment and test plant limitation if any, vis-à-vis the type, special acceptance and routine test specified in the relevant standards. These limitations shall be very clearly brought out in the specified test requirements.

The supplier shall within 15 days of placement of order, submit following information to the purchaser.

i) List of raw material as well as bought out accessories and the names of sub-suppliers selected from the lists furnished along with offer.
ii) Type test certificates of the raw material and both bought out accessories.

iii) Quality Assurance Plan (QAP) withhold points for purchaser's inspection.

The supplier shall submit the routine test certificates of bought out accessories and raw material viz. Copper, aluminum conductors, lubricating material, gear material etc. at the time of routine testing of the fully assembled isolator.

2.21.25 DOCUMENTATION:

All drawings shall conform to relevant international standards organization (ISO). All drawings shall be in ink and suitable for micro filming. All dimensions and data shall be in S.I. Units.

List of Drawings and Documents

The Bidder shall furnish four sets of following drawings / documents along with his offer.

a) General outline and assembly drawings of the dis-connector operating mechanism, structure, insulator and terminal connector.
b) Sectional views and descriptive details of items such as moving blades, contacts, arms contact pressure, contact support bearing housing of bearings, balancing of heights, phase coupling pipes, base plate, operating shaft, guides, swivel joint operating mechanism and its components etc.
c) Loading diagram
d) Drawings with structure for the purpose of type tests.
e) Name plate.
f) Schematic drawing.
g) Type test reports.
h) Test reports, literature, pamphlets of the bought-out items and raw material.

The supplier shall within 2 weeks of placement of order submit four sets of final versions of all the above said drawings for Purchaser's approval. The purchaser shall communicate his comments / approval on the drawings to the supplier. The supplier shall, if necessary, modify the drawings and resubmit four copies of the modified drawings for Purchaser's approval within 1 (one) week from the date of comments. After receipt of approval the supplier shall within three weeks submit 15 prints and two good quality re-producibles of the approved drawings for purchaser's use.

Six sets of the type test report, duly approved by the Purchaser shall be submitted by the supplier for distribution, before commencement of supply Adequate copies of acceptance and routine test certificates, duly approved by the Purchaser shall accompany the dispatched consignment.

The manufacturing of the equipment shall be strictly in accordance with the approved drawings and no deviation shall be permitted without the written approval of the purchaser. All manufacturing and fabrication work in connection with the equipment prior to the approval of the drawing shall be at the supplier risk.

2.21.26 INSTRUCTION MANUALS:

Fifteen copies of the erection, operation and maintenance manuals in English to be supplied for each type of disconnector one month prior to dispatch of the equipment. The manual shall be bound volumes and shall contain all drawings and information required for erection, operation and maintenance of the disconnector including but not limited to the following particulars.

(a) Marked erection prints identifying the component parts of the disconnector as shipped with assembly drawings.
(b) Detailed dimensions and description of all auxiliaries.
(c) Detailed views of the insulator stacks, metallics, operating mechanism, structure, interlocks, spare parts etc.

2.21.27 PACKING AND FORWARDING:

The equipment shall be packed in crates suitable for vertical / horizontal transport, as the case may be and suitable to withstand handling during transport and outdoor storage during transit. The supplier shall be responsible for any damage to the equipment during transit, due to improper and inadequate packing. The easily damageable material shall be carefully packed and marked with the appropriate caution symbols.

Wherever necessary, proper arrangement for lifting, such as lifting hooks etc. shall be provided. Any material found short inside the packing cases shall be supplied by supplier without any extra cost.

Each consignment shall be accompanied by a detailed packing list containing the following information:

(a) Name of the consignee.
(b) Details of consignment.
(c) Destination.
(d) Total weight of consignment.
(e) Handling and unpacking instructions.
(f) Bill of material indicating contents of each package.

The supplier shall ensure that the bill of material is approved by the purchaser before dispatch.

2.22.0 TECHNICAL PARTICULARS OF 33KV SURGE ARRESTER

2.22.1 SCOPE

This Section covers the specifications for design, manufacture, shop & factory testing before dispatch of 33 kV 10 kA, Station class heavy duty, gapless metal (zinc) oxide Surge Arrestors complete with fittings & accessories.

2.22.2 STANDARDS

The design, manufacture and performance of Surge Arrestors shall comply with IS: 3070 Part-3 unless otherwise specifically specified in this Specification

2.22.3 GENERAL REQUIREMENT

2.22.3.1 The surge arrestor shall draw negligible current at operating voltage and at the same time offer least resistance during the flow of surge current.

2.22.3.2 The surge arrestor shall consist of non-linear resistor elements placed in series and housed in electrical grade porcelain housing/silicon polymeric of specified creepage distance.

2.22.3.3 The assembly shall be hermetically sealed with suitable rubber gaskets with effective sealing system arrangement to prevent ingress of moisture.

2.22.3.4 The surge arrestor shall be provided with line and earth terminals of suitable size. The ground side terminal of surge arrestor shall be connected with 25x6 mm galvanized strip, one end connected to the surge arrestor and second end to a separate ground electrode. The bidder shall also recommend the procedure which shall be followed in providing the earthing/system to the Surge Arrestor.

2.22.3.5 The surge arrestor shall not operate under power frequency and temporary over voltage conditions but under surge conditions, the surge arrestor shall change over to the conducting mode.

2.22.3.6 The surge arrestor shall be suitable for circuit breaker performing 0-0.3sec.-CO-3min-CO- duty in the system.

2.22.3.7 Surge arrestors shall have a suitable pressure relief system to avoid damage to the porcelain/ silicon polymeric housing and providing path for flow of rated fault currents in the event of arrestor failure.

2.22.3.8 The reference current of the arrestor shall be high enough to eliminate the influence of grading and stray capacitance on the measured reference voltage.

2.22.3.9 The Surge Arrestor shall be thermally stable and the bidder shall furnish a copy of thermal stability test with the bid.

2.22.3.10 The arrestor shall be capable of handling terminal energy for high surges, external pollution and transient over voltage and have low losses at operating voltages.

2.22.4 ARRESTOR HOUSING

2.22.4.1 The arrestor housing shall be made up of porcelain/***silicon polymeric*** housing and shall be homogenous, free from laminations, cavities and other flaws of imperfections that might affect the mechanical and dielectric quality. The housing shall be of uniform brown colour, free from blisters, burrs and other similar defects.

2.22.4.2 Arrestors shall be complete with insulating bases, fasteners for stacking units together, surge counters with leakage current meters and terminal connectors.

2.22.4.3 The **housing shall be so coordinated that external flashover shall not occur due to application of** any impulse or switching surge voltage up to the maximum design value for arrestor. The arrestors shall not fail due to contamination. The arrester housings shall be designed for pressure relief class as given in Technical Parameters of the specification.

2.22.4.4 Sealed housings shall exhibit no measurable leakage.

2.22.5 FITTINGS & ACCESSORIES

2.22.5.1 The surge arrestor shall be complete with insulating bases, fasteners for stacking units together, surge counters with leakage current meters and terminal connectors.

2.22.5.2 The terminals shall be non-magnetic, corrosion proof, robust and of adequate size and shall be so located that incoming and outgoing connections are made with minimum possible bends. The top metal cap and base of surge arrestor shall be galvanized. The line terminal shall have a built-in clamping device which can be adjusted for both horizontal and vertical takeoff.

2.22.5.3 Grading corona control rings, if necessary, shall be provided on each complete arrestor pole for proper stress distribution.

2.22.6 SURGE MONITOR

2.22.6.1 A self-contained discharge counter suitably enclosed for outdoor use and requiring no auxiliary or battery supply for operation shall be provided for each single pole unit. Leakage current meter with suitable scale range to measure leakage current of surge arrestor shall also be supplied within the same enclosure. The number of operations performed by the arrestor shall be recorded by a suitable cyclometric counter and surge monitor shall be provided with an inspection window. There shall be a provision for putting ammeter to record the current/alarm contacts in the control room if the leakage current exceeds the permitted value. Similar provision shall be considered for surge counter also.

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2.22.6.2 Surge monitor shall be mounted on the support structure at a suitable height so that the reading can be taken from ground level through the inspection window and length of connecting leads up to grounding point and bends are minimum.

2.22.7 TESTS

2.22.7.1 Test on Surge Arrestors

The Surge Arrestors offered shall be type tested and shall be subjected to routine and acceptance tests in accordance with IS: 3070 (Part-3). In addition, the suitability of the Surge Arrestors shall also be established for the following:

Residual voltage test Reference
voltage test Leakage current at M.C.O.V
P.D. test Sealing test
Thermal stability test
Aging and Energy capability test Watt
loss test

Each metal oxide block shall be tested for guaranteed specific energy capability in addition to routine/acceptance test as per IEC/IS.

2.22.7.2 The surge arrestor housing shall also be type tested and shall be subjected to routine and acceptance tests in accordance with IS: 2071.

2.22.7.3 Galvanization Test

All Ferrous parts exposed to atmospheric condition shall have passed the type tests and be subjected to routine and acceptance tests in accordance with IS: 2633 & IS 6745.

2.22.8 NAME PLATE

The name plate attached to the arrestor shall carry the following information: Rated Voltage
Continuous Operation Voltage Normal
discharge current Pressure relief rated
current Manufacturers Trade Mark
Name of Sub-station
Year of Manufacturer Name of the
manufacture
Purchase Order Number along with date

2.22.9 TECHNICAL DATA SHEET FOR SURGE ARRESTOR

	Particulars	**Voltage class**
		33 kV
1	Rated voltage of arrester, kV	30
2	Rated frequency, Hz	50 Hz
3	Nominal discharge current of arrester, kA	10
4	Maximum residual voltage at nominal discharge current, kV (peak)	108
5	Maximum steep current impulse residual voltage at kV (kVP)	120
6	One minute power frequency withstand voltage of arrester insulation, kV (rms)	70
7	1.2 / 50 □ second impulse withstand voltage of arrester insulation, kV (peak)	170
9	Line discharge class	2
10	**Insulator Housing**	
	Power frequency withstand test voltage(wet) (kV rms)	70

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	Lightning impulse withstand tests voltage (KVp)	170
	Pressure Relief Class	40
	Creepage distance not less than (mm)	31mm/kV

2.23.0 RELAYS

GENERAL

All relays shall conform to the requirements of IS 3231/IEC 60255/ IEC 61000 or other relevant Standards.

All protective relays shall be numerical type and communication protocol shall be IEC 61850. Further, test levels of EMI as indicated IEC 61850 shall be applicable to these relays.

Two sets of relevant software for relay configuration & setting, maintenance etc to be supplied to each station. The numeric relay and software shall be upgradable.

Relays shall be suitable for flush mounting with connectors from rear.

All draw out cases or plug in type modular cases will have proper testing facilities. The testing facilities provided on the relays shall be specifically stated in the bid. Necessary test plug shall be in the CONTRACTOR's scope of supply and shall be supplied loose. Unless otherwise specified all auxiliary relays and timers shall be supplied either in non-draw out cases or plug in type modular cases.

All A.C. relays shall be suitable for operation at 50 Hz. A.C. Voltage operated relays shall be suitable for110 volts VT secondary. DC auxiliary relays and timers shall be designed for 110 volts/ 220 volts DC and shall operate satisfactorily between 70% and 110% of rated voltage.

All Protective relays, auxiliary relays and timers except the lockout relays and interlocking relays shall be provided with self-reset type contacts. All protective relays, trip relays and timers shall be provided with electrically reset positive action operation indicators provided with proper inscription. Similar separate operating indicators (auxiliary relays) shall also be provided in the trip circuits of protections located outside the board such as Buchholz relays, temperature protection etc.

No control relays that shall trip the circuit breaker when the relays are de-energized shall be employed in the circuits.

All relays shall withstand a test voltage of 2.5 kV, 50 Hz r.m.s. voltage for one second.

All protective relays and alarm relays shall be provided with two extra isolated pair of contacts wired terminals exclusively for Employer's use.

GENERAL SPECIFICATION OF NUMERICAL RELAYS

All **Numerical Relays** should have following **minimum features**.

- Relays shall be communicable on **IEC61850** protocol without any protocol converter. Certificate from KEMA confirming interoperability, ***Goose messaging & publishing as per IEC61850*** standard shall be submitted along with the tender.
- Relays shall have one no. front RJ45 or USB port for Local Relay Parameterization and♣ **Two nos. rear FO port**/ Rear RS485 for connectivity to SAS over IEC61850 protocol
- The relay shall have self-communication port monitoring feature and failure shall generate♣alarm. Relays shall have redundant power supply card i.e. in case of failure of one source fail, the redundant shall pick up instantly. Power supply card failure shall generate necessary alarm to local SCADA.
- The relay shall have sufficient battery back up to keep the internal clock running for atleast 2 years in absence of auxiliary supply
- Should have minimum 16 configurable LEDs
- Should have sufficient Binary Inputs and Binary Outputs as per scheme requirement including 30% BI & BO spare.

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- All BI/BOs shall be site configurable
- Shall have front minimum 4 lines LCD display with Alpha numeric key pad♣
- Numerical relays are to be provided with built in Event / Disturbance / Fault Recorder features. The bidder shall bring out in the bid that the Numerical relays providing different protection features / application in a single unit if any one of the application/features goes out of service the other feature/application (s) will remain un-effected.
    - The relays shall be site configurable (Including logic development)
- Configured features♣ & set values shall be in non-volatile memory Must have real time clock for time stamping of events/ disturbances with time♣ synchronization inputs (GPRS etc.), Time synchronization through SNTP & IRIG-B compatible.
- The relays should have self-diagnostic features identifying area of fault or failure of a♣particular component or card.
- Shall have in built Circuit Breaker Failure protection based on undercurrent detection♣and/or circuit breaker auxiliary contact status. Provision shall be given to initiate the breaker fail logic using a digital input from external protection devices.

Hardware based measurement shall not be acceptable.

The relay should have high immunity to electrical and electromagnetic interference. The same

relay shall be provided with both 1A CT inputs and shall be site selectable.

It shall be possible to energize the relay from either AC or DC auxiliary supply. ***Auxiliary dc supply shall*** be ***suitable for both 110 and 220 Volt and shall be site selectable***.

Be capable of performing basic instrumentation functions and displaying various instantaneous parameters like Voltage, current, active power, reactive power, phase sequence etc. in primary values. Additionally, all sequence current and voltage values shall be displayed on-line. Also, the direction of power flow shall be displayed.

Extensive disturbance recording facility shall be available for at least up to 10 seconds to capture maximum possible information. Necessary software shall be provided for retrieving and analyzing the records.

Facility for developing customized logic schemes inside the relay based on Boolean logic gates and timers should be available. Facility for renaming the menu texts as required by operating staff at site should be provided.

Must have additional feature of local breaker back up protection

- The relay shall have built in Circuit Breaker Supervision Functions
- The relay shall be able to detect any discrepancy found between NO¬ & NC contacts of breaker
- The relay shall monitor number of breaker trip operations
- The relay shall also monitor the breaker operating time The

relays shall have the following tools for fault diagnostics-

- Fault record – The relay shall have the facility to store fault records with information on cause of trip, date, time, trip values of electrical parameters. Event record – The relay shall have the facility to store time stamped event records with 1ms resolution.
- Disturbance records – The relay shall have capacity to store disturbance records of at least 10 sec. duration and sampling rate per cycle shall be more than 100.
- It shall be possible to preserve stored information in the event of an auxiliary supply failure with the help of a battery backup.
- The relay settings shall be provided with password protection.
- It shall be possible to change the relay setting from the front panel using the key pads/ Work¬ station of SAS and Laptop.

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The relay shall have comprehensive self-diagnostic feature. This feature shall continuously monitor the healthiness of all the hardware and software elements of the relay. Any failure detected shall be annunciated through an output watchdog contact. The fault diagnosis information shall be displayed on the LCD. These records shall also be retrieved / retrievable from local as well as remote terminal through the communication port.

The Numerical Relays shall be provided with 2 sets of common support software compatible with, Windows 7 which will allow easy settings of relays in addition to uploading of event, fault, disturbance records, and measurements. The relay settings shall also be change from local or remote using the same software.

The manufacturer shall have to provide up-graded support software if any within 10 years span.

TRIP CIRCUIT SUPERVISION RELAY

The relay shall be capable of monitoring the healthiness of each 'phase' trip-coil and associated circuit of circuit breaker during 'ON' and 'OFF' conditions.
The relay shall have adequate contacts for providing connection to alarm and event logger.
The relay shall have time delay on drop-off of not less than 200 milli seconds and be provided with operation indications for each phase.

MASTER TRIP RELAY

High Speed Tripping Relay shall be instantaneous (operating time not to exceed 10 milli-seconds) The relays shall reset within 20 milli seconds

The relay shall be re-settable/configurable from local SCADA. The relays shall be D.C. operated
The relays shall have adequate contacts to meet the requirement of scheme, other functions like auto-reclose relay, LBB relay as well as cater to associated equipment like event logger, Disturbance recorder, fault Locator, etc
The relays shall be provided with operation indicators for each element/coil.

OTHER TRIP RELAYS

For transformer protection other trip relays for Buchholz, winding & oil temperature high, PRD etc. shall be provided as per requirement.
These High-Speed Tripping Relays shall be instantaneous (operating time not to exceed 10 milli-seconds The relays shall have adequate contacts to meet the requirement of scheme

DC SUPPLY SUPERVISION RELAY

The relay shall be capable of monitoring the failure of D.C. supply to which, it is connected. It shall have adequate potential free contacts to meet the scheme requirement.
The relay shall have a 'time delay on drop-off' of not less than 100 milli seconds and The relays shall be provided with operation indicator/flag.

SECTION – 3

BID SUBMISSION SHEET, BID FORMS AND SCHEDULES

1. Bid Submission Sheet

(To be submitted in Bidder's Letterhead)

Name of contract:

To,

The Deputy General Manager,
Bongaigaon T&T Circle, AEGCL
Dhaligaon, Chirang-783385

Sir:

We have examined the General Conditions of Contract, Technical Specification, Schedules, and Addenda Nos __(if any). We have understood and checked these documents and have not found any errors in them. We accordingly offer to execute and complete the said Works and remedy any defects fit for purpose in conformity with these documents and the enclosed Proposal (Price Offer)

We accept your suggestions for the appointment of the Dispute Adjudication Board, as set out in the Bidding Document.

We agree to abide by this Bid until _____and it shall remain binding upon us and may be accepted at any time before that date.

If our bid is accepted, we will provide the specified performance security, commence the Works as soon as reasonably possible after receiving the notice to commence, and complete the Works in accordance with the above-named documents within the time stated in the Bidding Document.

Unless and until a formal Agreement is prepared and executed this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

We understand that you are not bound to accept the lowest or any bid you may receive.

Commissions or gratuities, if any, paid or to be paid by us to agents relating to this Bid, and to contract execution if we are awarded the contract, are listed below:

Yours faithfully

Signature _____ in the capacity of _____ duly authorized to sign bids for and on behalf of

_____

Address

_____

_____

Bidder's Signature & Seal

2. Form-BG

Form of Bid Security (Bank Guarantee)

WHEREAS, _____ *[Name of Bidder]* (hereinafter called "the Bidder") has submitted his bid dated _____ *[Date]* for the construction of _____ *[Name of Contract]* (hereinafter called "the Bid").

KNOW ALL MEN by these presents that We _____ *[Name of Bank]* of _____ *[Name of Country]* having our registered office at _____ (hereinafter called "the Bank) are bound unto _____ *[Name of Employer]* (hereinafter called "the Employer") in the sum of _____for which payment will and truly to be made to the said Employer the Bank binds himself, his successors and assigns by these presents.
SEALED with the Common Seal of the said Bank this day of_____20___.

THE CONDITIONS of this obligation are:

(1) If the bidder withdraws his Bid during the period of bid validity specified in the Form of Bid:
Or

(2) If the Bidder refuses to accept the correction of errors in his Bid;

Or

(3) if the Bidder, having been notified of the acceptance of his Bid by the Employer during the period of Bid validity;

(a) fails or refuses to execute the Form of Contract Agreement in accordance with the Instructions to Bidders, if required; or

(b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders;

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

This Guarantee will remain in force up to and including the date 180 days after the deadline for submission of bids as such deadline is stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

DATE _____ SIGNATURE OF THE BANK _____

WITNESS _____ SEAL _____

(Signature, Name, and Address)

3. Form-MA

Form of Manufacturer's Authorization

(To be submitted in Manufacturer's Letterhead)

Bid No.:

To,

The Deputy General Manager,
Bongaigaon T&T Circle, AEGCL,
Dhaligaon, Chirang-783385

WE *[insert: **name of Manufacturer]*** who are established and reputable manufacturers of *[insert: **name and/or description of the Goods]*** having production facilities at *[insert: **address of factory]*** do hereby authorize *[insert:*

name & address of Bidder] (hereinafter, the "Bidder") to submit a bid the purpose of which is to provide the following goods, manufactured by us, and to subsequently negotiate and sign the Contract:

1. ----------

2. ----------

We hereby extend our full guarantee and warranty in accordance with ***Clause 1.35.0***, for the above specified Goods supporting the Supply of specified Goods and fulfilling the Related Services by the Bidder against this Bidding Documents, and duly authorize said Bidder to act on our behalf in fulfilling these guarantee and warranty obligations. We also hereby declare that, we will furnish the Performance Guarantee in accordance with ***Clause 1.36.0.***

Further, we also hereby declare that we and, *[insert: **name of the Bidder]*** have entered into a formal relationship in which, during the duration of the Contract (**including related services and warranty / defects liability**) we, the Manufacturer or Producer, will make our technical and engineering staff fully available to the technical and engineering staff of the successful Bidder to assist that Bidder, on a reasonable and best effort basis, in the performance of all its obligations to the Purchaser under the Contract.

For and on behalf of the Manufacturer

Common Seal and Signature of
the authorised person: Name:

Designation:

NOTE:

This MA should be signed by a person having either of the following-

1) Valid Power of attorney
2) Authorised by Managing Director
3) Member of Board of Directors

Bidder's Signature & Seal

4. Guarantee Declaration

We declare that the ratings, specifications and performance figures of the various plants and equipments /material furnished by us in the Bid are guaranteed. We further declare that in the event of any deficiencies in meeting the guarantees in respect of the characteristics mentioned in Guaranteed Technical Particulars, of Technical Bid as established after conducting the factory test, you may at your discretion, reject or accept the equipment/material after assessing the liquidated damages as specified in relevant clause of Bid Document.

Date: (Signature).....

Place: (Printed Name).....

(Designation).....

(Common Seal).....

Bidder's Signature & Seal

5. Profile of the Bidder

Sl. No.	Particulars	To be filled by Bidder
a)	Name of the Bidder	
b)	Registration with Memorandum of Association	
c)	PAN	
d)	GST Registration number	
e)	Labour Licence registration	
f)	Electrical Licence registration	
g)	Employees Provident Fund	
h)	Employees State Insurance Certificate (If Available)	
i)	Income Tax Clearance Certificate	
j)	Bank Solvency Certificate	
k)	Date of Establishment/ Incorporation	
l)	Postal Address	
	House No.	
	Lane	
	Street	
	Town/Village	
	Post Office	
	P.S.	
	District	
	Pin code	
m)	Telephone Number	
	Mobile No.	
	E-Mail Address	
	Website	
n)	Name(s) of the Owners/Directors/Partners	
o)	Name of the Banker with Address andTelephone Number	
p)	Contact Person Details *(Furnish here name of that person with whom AEGCL may get in touch for more information orclarifications)*	Name: Designation: Mobile No.: Email ID:
q)	Manufacturer's Authorisation, if any	

Bidder's Signature & Seal