Standard Bidding Document

Procurement of 11KV Outgoing Panel 25 KA under IESCO Own Resources and 7th STG projects
(Goods)

National

Single Stage-Two Envelope

April 23, 2026

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INVITATION TO BIDS

PROCUREMENT OF GOODS

1. The **IESCO-PMU (Islamabad Electric Supply Company (IESCO))** has reserved Funds for the procurement planned for FY **2025-26**. The **IESCO-PMU (Islamabad Electric Supply Company (IESCO))** intends to apply part of the proceeds of this Fund to cover eligible payments under the contract for the "**Procurement of 11KV Outgoing Panel 25 KA under IESCO Own Resources and 7th STG projects**".

2. The **IESCO-PMU (Islamabad Electric Supply Company (IESCO))** invites E-bids from eligible Bidders for procurement of goods descibed in the bidding documents on**EPADS v2.0**.

3. **Single Stage-Two Envelope**will be used by adopting **Least Cost Based Selection (LCBS)**Technique for the subject procurement, in line with the Public Procurement Rules, 2004 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority from time to time.

4. All Bids must be accompanied by a Bid Security amounting described in Bid Security Section in Bidding Documentin the form of **Call at Deposit, Bank Guarantee, Demand Draft**. Where **Bid Security**is not required by the **Procuring Agency**, Bidders are required to furnish**Bid Security Declaration** as specified in Bidding Document.

5. E-Bidding documents, containing detailed terms & conditions, specifications and requirements etc. are available on **e-Pak Acquisition and Disposal System (EPADS)** at **https://vendors.epads.gov.pk/.**

6. Bidder(s) are required to get themselves registered on**EPADS v2.0** on or before **Monday, May 11, 2026 11:00 AM**. E-bids will be opened using **EPADS v2.0**on the same day at **Monday, May 11, 2026 11:30 AM**. Manual submission of Bids shall not be entertained. Those vendors who have not yet registered on the new version of**EPADS v2.0,** may register themselves on **https://vendors.epads.gov.pk/**. A tutorial to explain the registration process is available at **https://www.youtube.com/watch?v=MNW6T38v7tc**

7. In terms of Rules 48 of Public Procurement Rules, 2004 Grievance Redressal Committee (GRC) is notified for the subject procurement and notification copy is available on the procuring agency's website and on Authority's website at (**www.ppra.org.pk**).

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Instructions to Bidders

A. Introduction

1.Scope of Bids

1.1 The Procuring Agency (PA), as indicated in the **Bids Data Sheet (BDS)** invites Bids **through EPADS v2.0** for the provision of Goods for as specified in the BDS and **in Section V – Evaluation Criteria, Specifications & Schedule of Requirements**. The name, identification, and number of items/deliverables are provided in the **BDS**. The successful Bidders will be expected to provide the goods within the specified period and timeline(s) as stated in the **BDS**.

2. Source of Funds

2.1Source of funds is referred in Clause-1of Invitation for Bids.

3. Eligible Bidders

3.1 A Bidder may be natural person, company or firm or public or semi-public agency of Pakistan or any foreign country**,** or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture, consortium, or association. In the case of a joint venture, consortium, or association, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The joint venture, consortium, or association shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture, consortium, or association during the Bidding process, and in case of award of contract, during the execution of the contract.

3.2 Verifiable copy of the agreement that forms a joint venture, consortium or association shall be required to be submitted as part of the Bid.

3.3 The appointment of Lead Member in the joint venture, consortium, or association shall be confirmed by submission of a valid Power of Attorney to the Procuring Agency.

3.4 Any bid submitted by the joint venture, consortium or association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring Agency and in line with

any instructions issued by the Authority.

(The limit on the number of members of JV or Consortium or Association may be prescribed in BDS, in accordance with the guidelines issued by the PPRA).

3.5The invitation for Bids is open to all prospective suppliers, manufacturers, or authorized agents / dealers subject to any provisions of incorporation or licensing by the respective national incorporating agency or statutory body established for that particular trade or business. Procuring agencies shall specify the registration/licensing requirements for the foreign bidders keeping in view the requirement of that business.

3.6 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidder may be considered to have a conflict of interest with one or more parties in this Bidding process, if they:

1. are associated or have been associated in the past, directly or indirectly with a firm or any of its affiliates which have been engaged by the Procuring Agency to provide consulting services for the preparation of the design, specifications and other documents to be used for the procurement of the Goods to be purchased under this Invitation for Bids.

2. have controlling shareholders in common; or

3. receive or have received any direct or indirect subsidy from any of them; or

4. have the same legal representative for purposes of this Bid; or

5. have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the Bids of another Bidder, or influence the decisions of the Procuring Agency regarding this Bidding process; or

6. Submit more than one Bid in this Bidding process.

3.7 A Bidder may be ineligible if –

1. he is declared bankrupt or, in the case of company or firm, insolvent;

2. payments in favor of the Bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;

3. the Bidder is convicted, by a final judgment, of any offence involving professional conduct;

4. the Bidder is blacklisted locally or by international organizations and hence debarred due to involvement in corrupt and fraudulent practices, or performance failure or due to breach of Bid securing declaration.

3.8 As and when required, bidders shall provide to the Procuring Agency evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively.

3.9 Bidders shall submit Bids relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract amounting to more than ten (10) percent of the Bid price is envisaged.

4. Eligible Goods and Related Services

4.1 All goods and related services to be supplied under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such goods and services. For purpose of this Bid, ineligible countries are the countries declared ineligible by the Federal Government.

5. One Bid per Bidder

5.1 A bidder shall submit only one Bid, in the same bidding process, either individually as a Bidder or as a member in a joint venture or any similar arrangement.

5.2 The Bidder shall not engage a subcontractor for any portion of the contract if the value of such subcontracting exceeds thirty percent (30%) of the total contract amount.

6. Cost of Bidding

6.1 Any cost incurred by the bidder relating to the preparation and submission of its Bid shall be borne by the bidder, and the Procuring Agency shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

B. Bidding Documents

7. Contents of Bidding Document

7.1 The Goods required, Bidding procedures, and terms and conditions of the contract are prescribed in the Bidding Documents. In addition to the Invitation for Bids, the Bidding documents which should be read in conjunction with any addenda issued in accordance with **ITB 9.1** include:

Section I -Invitation to Bids

Section II Instructions to Bidders (ITB)

Section III Bid Data Sheet (BDS)

Section IV Evaluation Criteria, Specifications, Schedule of Requirements

Section V Bid Forms

Section VI General Conditions of Contract (GCC)

Section VII Special Conditions of Contract (SCC)

Section VIII Contract Forms

7.2 The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding documents. Failure to furnish all the information required in the Bidding documents through **EPADS v2.0** will be at the Bidder’s risk and may result in the rejection of his Bids.

8. Clarification of Bidding documents

8.1 A prospective Bidder requiring any clarification of the Bidding documents may notify the Procuring Agency through **EPADS v2.0.**

8.2 The Procuring Agency will within three (3) working days after receiving the request for clarification, respond to any request for clarification through **EPADS v2.0** provided that such request is received not later than three (03) days prior to the deadline for the submission of Bids as prescribed in **ITB 22**

8.3 Copies of the Procuring Agency's response will be forwarded to all identified Prospective Bidders through **EPADS v2.0**, including a description of the inquiry, but without identifying its source.

8.4 Should the Procuring Agency deem it necessary to amend the Bidding document as a result of a clarification, it shall do so following the procedure under **ITB 9.**

8.5 If indicated **in the BDS**, the Bidder's designated representative is invited at the Bidder's cost to attend a pre-Bid meeting at the place, date and time mentioned **in the BDS**. During this pre-Bid meeting, prospective Bidders may request clarification of the schedule of requirement, the Evaluation Criteria or any other aspects of the Bidding document.

8.6 Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be uploaded on **EPADS v2.0**. Any modification to the Bidding documents that may become necessary as a result of the pre-Bid meeting shall be made by the Procuring Agency exclusively through the use of an Addendum pursuant to **ITB 9**. Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.

9. Amendment of Bidding documents

9.1 Before the deadline for submission of Bids, the Procuring Agency for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder or Pre-Bid meeting may modify the Bidding documents by issuing addenda through **EPADS v2.0**.

9.2 The Procuring Agency shall promptly publish the addendum through **EPADS v2.0**.

9.3 Any addendum issued including the notice of any extension of the deadline shall also be communicated through EPADS v2.0 to all the bidders who have already submitted their bids. Such bidders shall have the right to withdraw their already submitted bid and re-submit the revised bid prior to the original or extended bid submission deadline.

9.4 To give prospective Bidders reasonable time in which to take an addendum/corrigendum into account in preparing their Bids, the Procuring Agency may, at its discretion, extend the deadline for the submission of Bids through **EPADS v2.0**:

Provided that the Procuring Agency shall extend the deadline for submission of Bids, if such an addendum is issued within last three (03) days of the Bids submission deadline.

C. Preparation of Bids

10. Language of Bid

10.1 The Bid prepared by the bidder, as well as all correspondence and documents relating to the Bids exchanged by the Bidder and the Procuring Agency shall be written in the English language unless otherwise specified in the BDS**.** Supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate translation of the relevant pages in the English language unless otherwise specified in the **BDS**, in which case, for purposes of interpretation of the Bidder, the translation shall govern.

11. Documents and samples Constituting the Bid

11.1 The Bid prepared by the Bidder shall constitute thedocuments required in the **BDS**.

Details of sample(s) where applicable and requested in the BDS.

1. Documentary evidence established in accordance with ITB that the Bidder is eligible and/or qualified for the subject bidding process;

2. Documentary evidence establish that the Bidder has been authorized by the manufacturer to deliver the goods into Pakistan, where required and where the supplier is not the manufacturer of those goods;

3. Documentary evidence establish that the goods and related services to be supplied by the Bidder are eligible goods and services, and conform to the Bidding Documents;

4. Bid security or Bid Securing Declaration furnished in accordance with **ITB 18.**

12. Documents Establishing Eligibility of the Goods and Conformity to Bidding documents

12.1 To establish the conformity of the bidder to the Bidding document, the Bidder shall furnish as part of its Bids the documentary evidence that Goods provided conform to the technical specifications and standards.

13. Documents Establishing Eligibility and Qualification of the Bidder

13.1 The Bidder shall furnish, as part of itsBid, all those documents establishing the Bidder’s eligibility to participate in the Bidding process and/or its qualification to perform the contract if its Bid is accepted.

14. Form of Bids

14.1 The Bidder shall fill the Form of Bid furnished in the Bidding documents.The Bids Form must be completed without any alterations to its format and no substitute shall be accepted.

15. Bids Prices

15.1 The Bids Prices quoted by the Bidder in the Form of Bid and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the Bidding documents.

15.2 All items in the Schedule of Requirement must be listed and priced separately in the Price Schedule(s). If a Price Schedule shows items listed but not priced and neither explicitly denied, their prices shall be construed to be included in the prices of other items.

15.3 Items not listed in the Price Schedule shall be assumed not to be included in the Bid, and provided that the Bid is still substantially responsive in their absence or due to their nominal nature, the corresponding average price of the respective item(s) of the remaining substantially responsive Bidder(s) shall be construed to be the price of those missing item(s)

15.4 The Bid price to be quoted in the Form of Bid in accordance with **ITB 14.1** shall be the total price of the Bid.

15.5 The Bidder shall indicate on the appropriate Price Schedule, the unit prices (where applicable) and total Bid price of the Goods it proposes to provide under the contract.

15.6 Prices quoted by the Bidder shall be fixed during the Bidder’s performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price will be treated as non-responsive and shall be rejected.

16. Bids Currencies

16.1Prices shall be quoted in Pakistani Rupees unless otherwise specified in the BDS in accordance with Rule 30(2) of the Public Procurement Rules, 2004.

17. Bids Validity Period

17.1 Bids shall remain valid for the period specified in the **BDS** after the Bid submission deadline prescribed by the Procuring Agency. A Bid valid for a shorter period shall be rejected by the Procuring Agency as non-responsive**.** The period of Bid validity will be determined from the complementary Bid securing instrument, i.e. the expiry period of Bid Security or Bids Securing Declaration as the case may be.

17.2 The procuring agency shall ordinarily be under an obligation to process and evaluate the bid and to issue letter of award within the stipulated bid validity period.

17.3Under exceptional circumstances, prior to the expiration of the initial Bid validity period, the Procuring Agency may request the Bidders' consent to an extension of the period of validity of their Bids only once through **EPADS v2.0**, for the period not more than the period of initial bid validity. The Bid Security provided under **ITB 18** shall also be suitably extended. A Bidder may refuse the request without forfeiting its Bid security or causing to be executed its Bid Securing Declaration. A Bidder agreeing to the request will not be required nor permitted to modify its Bid, but will be required to extend the validity of its Bid Security or Bid Securing Declaration for the period of the extension.

18. Bid Security or Bid Securing Declaration

18.1 The Bidder shall furnish as part of its Bid, a Bid Security in accordance withRule 25 of the Public Procurement Rules, 2004.

18.2 The original Bid Security shall be enclosed within the sealed envelope and to be submitted physically before closing time for submission of bids. Whereas, scanned copy of bid security shall be uploaded electronically through EPADS v2.0 before closing hours for submission of bids.

18.3 The Bidder who failed to submit the original Bids security before the submission deadline shall be disqualified straightaway.

18.4The Bid Security or Bid Securing Declaration is required to protect the Procuring Agency against the risk of Bidder's conduct which would warrant the security's forfeiture, pursuant to **ITB 18.7.**

18.5The Bid Security shall be denominated in the local currency, and it shall be a Bank Draft in the name of the Procuring Agency and valid for twenty-eight (28) days beyond the end of the validity of the Bid. This shall also apply if the period

for Bids/Bid Validity is extended. In either case, the form must include the complete name of the Bidder.

18.6The Bid Security shall be payable promptly upon written demand by the Procuring Agency in case any of the conditions listed in **ITB 18**are invoked.

18.7Unsuccessful Bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bids Validity prescribed by the Procuring Agency pursuant to **ITB 17**. The Procuring Agency shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security document, after whichever of the following that occurs earliest:

1. the expiry of the Bid Security;

2. the entry into force of a procurement contract and the provision of a Performance Guarantee, for the performance of the contract if such a guarantee, is required by the Bid documents;

3. the rejection by the Procuring Agency of all Bids;

4. the withdrawal of the Bids prior to the deadline for the submission of Bids, unless the Bids documents stipulate that no such withdrawal is permitted.

18.8 The successful Bidder's Bids Security will be discharged upon the Bidder signing the contract**,** or furnishing the Performance Guarantee.

18.9 The Bid Security may be forfeited or the Bid Securing Declaration executed:

1. if a Bidder:

2. withdraws its Bid during the period of Bid Validity as specified by the Procuring Agency, and referred by the Bidder on the Form of Bids except as provided for in **ITB 17.2**; or

3. does not accept the correction of errors**;** or

4. in the case of a successful Bidder, if the Bidder fails:

5. to sign the contract; or

6. to furnish Performance Guarantee**.**

19. Withdrawal, Substitution, and Modification of Bid

19.1 Before Bid submission deadline, any Bidder may withdraw, substitute, or modify its Bid after it has been submitted through EPADS v2.0. Bids requested to be withdrawn, shall be returned unopened to the Bidders through **EPADS v2.0**.

20. Format and Signing of Bid

20.1 The Bidder shall prepare and submit Bids with due diligence after carefully reading all the terms and condition **before bid submission deadline** through EPADS v2.0.

D. Submission of Bids

21.Submission of Bids through EPADS v2.0

21.1 The Technical and Financial Bids if required to submitted, shall be submitted on **EPADS v2.0**.

22. Deadline for Submission of Bids

22.1 Bids shall be received by the Procuring Agency through **EPADS v2.0** before bid submission deadline.

22.2 The Procuring Agency may, under exceptional circumstances, extend the deadline for the submission of Bids, after recording reasons in writing and in an equal opportunity manner.

In such case, all rights and obligations of the Procuring Agency and the Bidders that were previously governed by the original deadline shall thereafter be subject to the revised deadline.

E. Opening and Evaluation of Bids

23. Opening of Bids

23.1 The Bid Evaluation Committee of the Procuring Agency shall open all Bids through the EPADS v2.0, on the date and time specified in the Bid Data Sheet (BDS).

23.2 The Bid Evaluation Committee **shall generate minutes through EPADS v2.0 containing brief details of bid opening process.** The record of the Bid opening shall include, as a minimum: the name of the Bidder, the Bid price if applicable, and the presence or absence of a Bid Security or Bid Securing Declaration.

23.3 The procuring agency shall live broadcast the opening of bids on national media or on their website or digital channels, if the volume of procurement exceeds five hundred million rupees in case of goods and services and one thousand million rupees in case of works.

23.4 In case the date of opening of bid has been declared as public holiday or the procuring agency fail to open bid due to any EPADS v2.0 related issues, the submission and opening of bids shall be shifted to the next working day on the same time.

23.5In case of Single Stage One Envelope Procedure, the Bidders names, the Bid prices, the total amount of each Bid and, the presence or absence of Bid Security, Bid Securing Declaration and such other details as the Procuring Agency may consider appropriate, will be announced by the Bid Evaluation Committee.

24. Clarification of Bids

24.1 To assist in the examination, evaluation and comparison of Bids of the Bidders, the Procuring Agency may, ask any Bidder for a clarification of its Bid including breakdown of prices.

24.2 The request for clarification and the response shall be sought through EPADS v2.0 before **three days prior to the deadline for submission of bids.** No change in the prices or substance of the Bids shall be sought, offered, or permitted.

24.3 The alteration or modification in the BIDS which in any way affect the following parameters will be considered as a change in the substance of a Bids:

1. evaluation & qualification criteria;
2. required scope of work or specifications;
3. all securities requirements;
4. tax requirements;

5. terms and conditions of Bidding documents.

6. change in the ranking of the Bidder

24.4 From the time of Bids opening to the time of Contract award if any Bidder wishes to contact the Procuring Agency on any matter related to the Bids it should do so through **EPADS v2.0**.

25. Preliminary Examination of Bids

25.1 Prior to the detailed evaluation of Bids, the Procuring Agency will determine whether each Bid:

1. meets the eligibility criteria defined in **ITB 3**;

2. has been prepared as per the format and contents defined by the Procuring Agency in the Bidding documents;

3. is accompanied by the required securities; and

4. is substantially responsive to the requirements of the Bidding documents.

25.2 The Procuring Agency's determination of a Bid's responsiveness will be based on the contents of the Bid itself.

25.3A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one that: -

1. affects in any substantial way the scope, quality, or performance of the Goods;

2. limits in any substantial way, inconsistent with the Bidding documents, the Procuring Agency's rights or the Bidders obligations under the Contract; or

3. if rectified, would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

25.3 If a Bids is not substantially responsive, it will be rejected by the Procuring Agency and may not subsequently be evaluated for complete technical responsiveness.

26. Examination of Terms and Conditions; Technical Evaluation

26.1 The Procuring Agency shall examine the Bids to confirm that all terms and conditions specified in the **GCC** and the **SCC** have been accepted by the Bidder without any material deviation or reservation.

26.2 The Procuring Agency shall evaluate the technical aspects of the Bids submitted, to confirm that all requirements specified in Schedule of Requirements and Technical Specifications of the Bidding documents have been met without material deviation or reservation.

26.3 If after the examination of the terms and conditions and the technical evaluation, the Procuring Agency determines that the Bid is not substantially responsive in accordance with **ITB 25.2,** it shall reject the Bid.

27. Correction of Errors

27.1 Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -

1. if there is a discrepancy between unit prices and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected, unless in the opinion of the Procuring Agency there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected;

2. if there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected; and

3. where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

4. Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bids, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors.

27.2 The amount stated in the Bid will, be adjusted by the Procuring Agency in accordance with the above procedure for the correction of errors and, with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected amount, its Bid will then be rejected, and the Bid Security may be forfeited or the Bids Securing Declaration may be executed.

28. Conversion to Single Currency

28.1 To facilitate evaluation and comparison, the Procuring Agency will convert all Bids prices expressed in the amounts in various currencies in which the Bids prices are payable. For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding documents. The rate of exchange shall be the selling rate prevailing on the date of opening of financial bids specified in the bidding documents, in accordance with weighted average customer exchange rates list issued by the State Bank of Pakistan on that day.

29. Evaluation of Bids

29.1 The Bids, quotations, or proposals shall be evaluated by the respective evaluation committees as per evaluation criteria described in the Bidding Documents in accordance with Rule 29 and 30 of the Public Procurement Rules, 2004.

1. Least Cost Based Selection (LCBS)
After meeting the requirements of eligibility, qualification and substantial responsiveness, the bid in compliance with all the mandatory (technical) specifications/requirements and/or requisite quality threshold (if any), and having lowest evaluated cost (or financial proposal) shall be considered Successful Bid.

2. Quality and Cost Based Selection (QCBS)
In such combination, there shall be some specific weightage of both the technical features and financial aspects of the proposal. The financial marks shall be awarded on the basis of inverse proportion calculations. The successful bid shall be declared, on the basis of combined evaluation.

3. Quality Based Selection (QBS)
Atter meeting the requirements of eligibility, qualification and substantial responsiveness the bid in compliance with all the mandatory (technical) specifications/requirements and attaining highest marks in the Technical Evaluation considering all other qualitative and/or quantitative parameters (or point rated criteria) for technical proposal(s) such as working methodology, implementation plan, resource allocation, additional functionalities, risk management approach, knowledge transfer techniques, post implementation methodology etc. shall be treated as highest ranked bid. Later on, the financial proposal of highest ranked bidder shall be opened, however, in case of failure to proceed further with such a bidder, the procuring agency may resort to second

highest bidder and so on.

29.2 In case of tie of bids, the bidders shall be provided an opportunity to offer their best and final monetary offer through EPADS v2.0. However, in no case the rates shall be higher than the original financial bids.

30. Domestic Preference

30.1 The procuring agency shall evaluate and compare bids, allow for preference to domestic bidders, while competing with the international bidders in accordance with the policies of Federal Government.

The percentage of preference, to be accorded shall be clearly mentioned in the bidding documents under the bid evaluation criteria.

31. Determination of Successful Bid

31.1 Selection technique will be adopted for determining the Successful Bid in accordance with the criteria referred in the BDS or prescribed in the separate section titled as Evaluation Criteria.

31.2 In case where the Procuring Agency adopts the Cost Based Evaluation Technique and, the Bid with the lowest evaluated price from amongst those which are eligible, compliant and substantially responsive shall be the Successful Bid.

31.3 The Procuring Agency may adopt the Quality & Cost Based Selection Technique due to the following two reasons:

1. Where the Procuring Agency knows about the main features, usage and output of the products; however not clear about the complete features, technical specifications and functionalities of the goods to be procured and requires the bidders to submit their proposals defining those features, specifications and functionalities; or

2. Where the Procuring Agency, in addition to the mandatory requirements and mandatory technical specifications, requires parameters specified in EvaluationCriteria to be evaluated while determining the quality of the goods.

31.4 In such cases, the Procuring Agency may allocate certain weightage to these factors as a part of Evaluation Criteria, and may determine the ranking of the bidders on the basis of combined evaluation in accordance with provisions of Rule 2(1)(h) of the Public Procurement Rules, 2004.

32. Abnormally Low Financial Bids

32.1Where the Bid price is considered to be abnormally low, the Procuring Agency shall perform price analysis either during determination of Successful Bids or as a part of the post-qualification process.

32.2 The Procuring Agency may reject an Abnormally low financial bids.

32.3 In order to identify the Abnormally Low Bids (ALB) following approaches can be considered to minimize the scope of subjectivity:

1. Comparing the Bids price with the cost estimate;

2. Comparing the Bids price with the Bids offered by other Bidders submitting substantially responsive Bids; and

3. Comparing the Bids price with prices paid in similar contracts in the recent past either government- or development partner-funded.

32.4The Procuring Agency will determine to its satisfaction whether the Bidder that is selected as having submitted the successful bid is qualified to perform the contract satisfactorily.

32.5 The determination will take into account the Bidder's financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, as well as such other information as the Procuring Agency deems necessary and appropriate. Factors not included in these Bidding documents shall not be used in the evaluation of the Bidders' qualifications.

32.6 Procuring Agency may seek "Certificate for Independent Price Determination" from the Bidder and the results of reference checks may be used in determining an award of contract.

Explanation: The Certificate shall be furnished by the Bidder. The Bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc.

32.7An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's Bids, in which event the Procuring Agency will proceed to the next ranked Bidder to make a similar determination of that Bidder's capabilities to perform

satisfactorily.

F. Award of Contract

33. Criteria of Award

33.1The Procuring Agency will award the Contract to the Bidder whose Bids has been determined to be substantially responsive to the Bidding documents and who has been declared as Most Advantageous Bidder.

34. Negotiations

34.1 The procuring agency shall not engage in negotiations with respect to scope and price with the bidder except when the procuring agency conducts a procurement using direct **or negotiated** contracting or a request for proposals with evaluation based on quality alone.

34.2 The procuring agency may negotiate with the most advantageous bid with a view to streamline the work or task execution, at the time of contract finalization on methodology, work plan, staffing, finalizing payment arrangements, delivery arrangements, minor amendments to the special conditions of the contract.

35. Procuring Agency Right to reject all bids

35.1 The Procuring Agency reserves the right to reject all bids or proposals at any time prior to the issuance of the Letter of Award, without incurring any liability, in accordance with Rule 33 of the Public Procurement Rules, 2004.

36. Procuring Agency’s Right to Vary Quantities at the Time of Award

36.1 The Procuring Agency reserves the right at the time of contract award to increase or decrease the **quantity of** Goods originally specified in these Bidding documents provided this does not exceed **by** 15%, without any change in unit price or other terms and conditions of the Bids and Bidding documents.

37. Notification of Award

37.1 Prior to the award of contract, the procuring agency shall announce and publish the result of bid evaluation on **EPADS v2.0** in accordance with Rule 35

of the Public Procurement Rules, 2004.

37.2 The Bidder whose Bids has been accepted will be notified of the award by the Procuring Agency prior to expiration of the Bids/Bid Validity period. The Letter of Award will state the sum that the Procuring Agency will pay the successful Bidder in consideration for the delivery of Goods as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price).

37.3 The Letter of award will constitute the formation of the Contract, subject to the Bidder furnishing the Performance Guarantee and signing of the contract.

38. Signing of Contract

38.1 Promptly after issuance of Letter of award, Procuring Agency shall send the successful Bidder the draft Contract, incorporating all terms and conditions as agreed by the parties to the contract.

38.2 Immediately after the Redressal of grievance by the GRC (if any), mandatory standstill period in accordance with Rule 35 of the Public Procurement Rules, 2004and **after fulfillment of all condition's precedent** of the Contract Form, the successful Bidder and the Procuring Agency shall sign the Contract.

39. Corrupt & Fraudulent Practices

39.1 Procuring Agencies (including beneficiaries of Government funded projects and procurement) as well as Bidders/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts, and will avoid to engage in any corrupt and fraudulent practices.

F. Grievance Redressal & Complaint Review Mechanism

40. Constitution of Grievance Redressal

40.1 The Grievance Redressal Committee shall address the grievance, if any submitted by any party, including the bidder, in accordance with Rule 48 of the Public Procurement Rules, 2004 to be read with Redressal of Grievances Regulations, 2021.

40.2 In case if any party or the bidder is not satisfied with the decision of the GRC or if it fails to decide within ten days, the bidder or the party may file an appeal before the Appellate Committee of the Authority in accordance with Rule 48 of the Public Procurement Rules, 2004 to be read with Redressal of Grievances Regulations, 2021.

G. Mechanism of Blacklisting

41. Mechanism of Blacklisting

41.1 The Procuring Agency shall initiate blacklisting proceedings against any bidder, supplier, or contractor in accordance with the Mechanism for Blacklisting Regulations, 2024, read with Rule 19 of the Public Procurement Rules, 2004.

41.2 The blacklisted/debarred bidder may file the review petition before the Authority in accordance with Rule 19 of the Public Procurement Rules, 2004 to be read with Procedure of filing and disposal of Review Petitions Regulations, 2021.

Bid Data Sheet

Bids Data Sheet (BDS)

The following specific data for the procurement of Goods to be procured shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITB). Whenever there is a conflict, the provisions herein shall prevail over those in ITB.

BDS Clause Number	ITB Number	Amendments of, and Supplements to, Clauses in the Instruction to Bidders
A. Introduction		
1	1.1	Name of Procuring Agency:**IESCO-PMU (Islamabad Electric Supply Company (IESCO))** The subject of procurement is:**Procurement of 11KV Outgoing Panel 25 KA under IESCO Own Resources and 7th STG projects** Expected commencement date: **Thursday, July 30, 2026**
2.	2.1	Financial year for the operations of the Procuring Agency:**2025-26** Name and identification number of the Contract: **P16268**
3.	3.1	JV/Consortium or AssociationAllowed: **Yes** Number of JV/Consortium Members: **2** *see section of eligibility criteria.*
B. Bidding Documents		

4.	**8.1**	The Bidders may seek clarifications through **EPADS v2.0** : Clarification Date: Thursday, May 7, 2026
C. Preparation of Bids		
5.	**10.1**	The Language of all correspondences and documents related to the Bids shall be in: **English** List of documents required along with the bid: 1. 1. i.Joint venture Agreement if any on non-judicial stamp paper for particular tender ii. No Deviation certificates from Commercial terms and technical specification iii. Firms Engineers and professionals Information iv. Income tax returns for last three years v. Audited Financial Reports of last three years vi. Confirm and valid Bank Credit line (latest) (if any) required to establish cash flow or financial resources.
6.	**11.1**	**Items/Lots and threre relateddocuments:** *See section items and Lots*
7.	**12.1**	**Items / Lots Specifications:** *see section of items specifications.*
8.	**15.6**	The price shall be **Fixed**.
9.	**16.1**	Currency of the Bids shall be : **PKR**

10.	**17.1**	The Bids/Bid Validity period shall be: **90 Days**
11.	**18.1**	The amount of Bid Security shall be as defined in Bid Security Section for items and lots given in **BDS 6** The Bid Security shall be in the form of: **Call at Deposit, Bank Guarantee, Demand Draft**

D. Submission of Bids

12.	**20.1**	Bid shall be submitted online on EPADS v2.0 whereas hard copy of the bid security should be submitted to the following; **Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory** before bid submission deadline. Bids that are not submitted on EPADS v2.0 shall be disqualified. The deadline for Bids submission is: **Monday, May 11, 2026 11:00 AM**

E. Opening and Evaluation of Bids

13.	**23.1**	The Bids opening shall take place on **EPADS v2.0** . Day *: **Monday*** Date:***Monday, May 11, 2026*** Time *: **11:30 AM***

14.	**31.1**	Selection technique adopted will be: **Least Cost Based Selection (LCBS)** *see Evaluation Criteria*
F. Review of Procurement Decisions		
15.	**41.1**	Grievence against this procurement shall be submitted online on EPADS v2.0. Arbitrator shall be appointed by mutual consent of the both parties.

Eligibility Criteria

Bidder's Type	Required Registration
Sole Proprietorship	NADRA CITIZENSHIP (CNIC/NICOP)
Partnership Firm	FBR (NTN)
Company (Private Limited)	FBR (GSTN)
Company (Public Limited)	Punjab (PRA)
Company (Holding Company)	
Company (Limited by Guarantee)	
State Owned Enterprise (Private Limited)	
State Owned Enterprise (Public Limited)	

Eligibility Criteria	Document
The amount of performance security (or guarantee), as a percentage of the Contract Price, shall be Ten (10%) percent of the Contract Price in favor of chief engineer (Development) IESCO from Schedule Bank of Pakistan having rating A+ in shape of Bank Guarantee. Contractor will provide performance Guarantee at time of acceptance of Notification of Award	Yes
Bid Declaration Form not applicable	No

Bid security must be submitted in an acceptable form in the amount fixed in PKR valid for 28 days beyond bid validity period in favor of Chief Engineer (Development), IESCO, Islamabad	Yes

Evaluation Criteria

Eligibile bidder(s) with substantially responsive bid(s) offering**Least Cost Based Selection (LCBS)** shall be consider for the award of contract(s).

Least Cost Based Selection (LCBS)

Technical Marks	**100**
Passing Marks	**100**
Technical Evaluation Criteria	
Bidder/Joint Venture (JV) must have successfully completed at least two (02) contracts of similar complexity involving same or higher-rated material/equipment during the last five years. value of both contracts must not be less than 30% of Rs. 98 M (Quantitative)(Doc Required)	30
manufacturer shall demonstrate at least five years experience in designing and manufacturing of similar nature/complex involving same or higher rated equipment/material. Three years satisfactory operation performance of same or high rated equipment. (Quantitative)(Doc Required)	30
manufacturer will indicate its manufacturing / production capacity which shall be double the total sum of orders already in hand, expected orders in pipe line and this order (if placed on the bidder) (Quantitative)(Doc Required)	10
Bidder’s Net Worth for last three years calculated as Rs. 98 Million difference b/w total assets &total liabilities should be positive (Quantitative)(Doc Required)	10

Minimum average annual turnover of PKR calculated as total revenue of the Bidder over the last three Years shall be equal to: 200 M (Quantitative)(Doc Required)	10
Specify proposed sources of financing, working capital and lines of credit after deduction of current commitments available to meet the cash flow demands as indicated in below: 98 M (Quantitative)(Doc Required)	10

Items/Lots

Items Without Lots :

Item	UNSPSC	Delivery Schedule	Quantity	Bid Security	Manufacturer / Dealer Authorization	Warranty
Procurement of 11KV Outgoing Panel 25 KA	Electrical control panels for generators	**Address:** IESCO Regional Store New Wah **Schedule:** (60 Days for local and 60 days for Foreign) after signing of contract **Quantity:** 26	26	2303000	Manufacturer Authorization form	730 Days

Related Services of Goods:

No

Items/Lot Specification

Items Without Lots :

Item: Procurement of 11KV Outgoing Panel 25 KA

UNSPSC: Electrical control panels for generators

Specifications / Requirements:
P-44:2018 as per NTDC specification

Price Schedule

For Individual Items

#	Item Title	Quantity	Unit Price (PKR)	Total Price (PKR)	Delivery Location	Delivery Period / Year	Country of Origin
1							
2							

For Lots

#	Lot Title	Total Lot Price (PKR)	Country of Origin
1	[Lot 1 Title]		

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

General Conditions of Contract

A. General

1. Definitions

1.1 Unless the context otherwise requires, the following terms whenever used in this Contract shall have the same meaning and shall be interpreted as indicated

1. “Applicable Law” means the laws and any other instruments having the force of law in the Government’s Country, or in such other country as may be specified in the Special Conditions of the Contract (SC), as they may be issued and in force from time to time;

2. “Procuring Agency” means:-

2.1. any Ministry, Division, Department or any Office of the Government;

2.2. any authority, corporation, body or organization established by or under a Law or which is owned or controlled by the Government;.

3. “The Contract” means an agreement enforceable by law;

4. “The Contract Price” means the price payable to the Bidder under the Contract for the full and proper performance of its contractual obligations;

5. “Ancillary Services” means those services ancillary to the provision of Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, and other such obligations of the Bidder covered under the Contract;

6. “GCC” means the General Conditions of Contract contained in this section;

7. “SCC” means the Special Conditions of Contract by which the GCC may be amended or supplemented;

8. **“**Day” means calendar day unless indicated otherwise.

9. “Effective Date” means the date on which this Contract comes into force and effect.

10. The Bidder” means the individual or corporate body whose Bids to provide the Goods has been accepted by the Procuring Agency;

11. “The Project Site,” where applicable, means the place or placesnamedin BidsData Sheetand technical Specifications;

12. “Government” means the Government of Pakistan;

13. “Subcontractor” means any entity to which the Bidder subcontracts any part of the Goods.

14. "Service" means any object of procurement other than goods or works;

15. “Party” means the Procuring Agency or the Bidder, as the case may be, and “Parties” means both of them;

16. “Foreign Currency” means any currency other than the currency of the country of the Procuring Agency;

17. “Completion Date” means the date of completion of the contract by the Bidder as certified by the Procuring Agency;

18. “In Writing” means communicated in written form with proof of receipt;

19. “Local Currency” means the currency of Pakistan;

2. Application and Interpretation

2.1 These General Conditions shall apply to the extent that they are not superseded by provisions of other parts of the Contract.

2.2 In interpreting these Conditions of Contract headings and marginal notes are used for convenience only and shall not affect their interpretations unless specifically stated; references to singular include the plural and vice versa; and masculine include the feminine. Words have their ordinary meaning under the language of the Contract unless specifically defined.

3. Applicable Law

3.1 The contract shall be governed and interpreted in accordance with the laws of Pakistan, unless otherwise specified in SCC.

4. Governing Language

4.1 The Contract as well as all correspondence and documents relating to the Contract exchanged between the Bidder and the Procuring Agency, shall be written in the **English language** unless otherwise stated in the **SCC**. Supporting documents and printed literature that are part of the Contract may be in another language provided these are accompanied by an accurate translation of the relevant passages in English, in which case, for purposes of interpretation of the Contract, this translation shall govern.

5. Notices

5.1 Any notice, request, or consent made pursuant to this Contract shall be in writing and shall be deemed to have been made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent by registered mail, telex, telegram, or facsimile to such Party at the address specified in the **SCC**.

6. Delivery/Location

6.1 The Goods shall be delivered to such locations as the Procuring Agency may approve and as specified in SCC.

7. Authorized Representatives / Authority of Member in charge

7.1 Any action required or permitted to be taken, and any document required or permitted to be executed, under this Contract by the Procuring Agency or the Bidder may be taken or executed by the officials specified in the **SCC**.

B. Commencement, Completion, Modification, and Termination of Contract

8.Effectiveness of Contract

8.1 This Contract shall come into effect on the date the Contract is signed by both parties and such other later date as may be stated in the SCC.

9.Commencement of Services

9.1 The Bidder shall confirm availability of Key Experts and begin carrying out the Services not later than the number of days after the Effective Date specified in the SCC.

10. Program

10.1 Before commencement of the Services, the Bidder shall submit to the Procuring Agency for approval a Program showing the general methods, arrangements, order and timing for all activities. The Services shall be carried out in accordance with the approved Program as updated.

11. Starting Date/Expiration Date

11.1 The Bidder shall start carrying out the Services Five (05) days after the date the Contract becomes effective, or at such other date as may be specified in the **SCC.**

11.2 Unless terminated earlier pursuant to Clause **GCC 15** hereof, this Contract shall expire at the end of such time period after the Effective Date as specified in the SCC.

12. Entire Agreement

12.1 This Contract contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement, representation, promise or agreement not set forth herein.

13. Modification

13.1 Any modification or variation of the terms and conditions of this Contract, including any modification or variation of the scope of the Services, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any Bids for modification or variation made by the other Party.

13.2 In cases of any modifications or variations, the prior written consent of the Procuring Agency is required.

14. Force Majeure

14.1 Definition

For the purposes of this Contract, “Force Majeure” means an event which is beyond the reasonable control of a Party and which makes a Party’s performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances.

14.2 No Breach of Contract

The failure of a Party to fulfill any of its obligations under the contract shall not be considered to be a breach of, or default under, this Contract in so far as such inability arises from an event of Force Majeure, provided that the Party affected by such an event (a) has taken all reasonable precautions, due care and reasonable alternative measures in order to carry out the terms and conditions of this Contract, and (b) has informed the other Party as soon as possible about the occurrence of such an event.

14.3 Extension of Time

Any period within which a Party shall, pursuant to this Contract, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

14.4 Payments

During the period of their inability to perform the Services as a result of an event of Force Majeure, the Bidder shall be entitled to continue to be paid under the terms of this Contract, as well as to be reimbursed for additional costs reasonably and necessarily incurred by them during such period for the purposes of the Services and in reactivating the Service after the end of such period.

15. Termination

15.1 By the Procuring Agency

The Procuring Agency may terminate this Contract in case of the occurrence of any of the events specified in paragraphs (a) through (e) of this Clause. In such an occurrence the Procuring Agency shall give at least thirty (30) calendar days' written notice of termination to the Bidder in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e);

1. If the Bidder fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension;

2. If the Bidder becomes (or, if the Bidder consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary;

3. If the Bidder fails to comply with any final decision reached as a result of arbitration proceedings;

4. If, as the result of Force Majeure, the Bidder is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days;

5. If the Procuring Agency, in its sole discretion and for any reason whatsoever, decides to terminate this Contract;

15.2 By the Bidder

The Bidder may terminate this Contract, by not less than thirty (30) calendar days' written notice to the Procuring Agency, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.

1. If the Procuring Agency fails to pay any money due to the Bidder pursuant to this Contract and not subject to dispute within forty-five (45) calendar days after receiving written notice from the Bidder that such payment is overdue.

2. If, as the result of Force Majeure, the Bidder is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days.

3. If the Procuring Agency fails to comply with any final decision reached as a result of arbitration.

4. If the Procuring Agency is in material breach of its obligations pursuant to this Contract and has not remedied the same within forty-five (45) days (or such longer period as the Bidder may have subsequently approved in writing) following the receipt by the Procuring Agency of the Bidder's notice specifying such breach.

C. Obligations of the Bidder

16. General

16.1 Standard of Performance

1. The Bidder shall deliver the product and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Bidder shall always act, in respect of any matter relating to this Contract or to the Services, as a faithful adviser to the Procuring Agency, and shall at all times support and safeguard the Procuring Agency's legitimate interests in any dealings with the third parties.

16.2 Law Applicable to Goods

The Bidder shall deliver the goods in accordance with the Contract and in accordance with the Law of Pakistan and shall take all practicable steps to ensure that any of its Experts and Sub-Bidders, comply with the Applicable Law.

17. Conflict of Interests

17.1 Bidder Not to Benefit from Commissions and Discounts.

The remuneration of the Bidder shall constitute the Bidder's sole remuneration in connection with this Contract or the Services, and the Bidder shall not accept for their own benefit any trade commission, discount, or similar payment in connection with activities pursuant to this Contract or to the Services or in the discharge of their obligations under the Contract, and the Bidder shall use their best efforts to ensure that the Personnel, any Subcontractors, and agents of either of them similarly shall not receive any such additional remuneration.

17.2 Bidder and Affiliates Not to be Otherwise Interested in Project

The Bidder agree that, during the term of this Contract and after its termination, the Bidder and its affiliates, as well as any Subcontractor and any of its affiliates, shall be disqualified from providing Goods for any project resulting from or closely related to the Services.

17.3 Prohibition of Conflicting Activities

Neither the Bidder nor its Subcontractors nor the Personnel shall engage, either directly or indirectly, in any of the following activities:

1. during the term of this Contract, any business or professional activities in the Government's country which would conflict with the activities assigned to them under this Contract;

2. during the term of this Contract, neither the Bidder nor their Subcontractors shall hire public employees in active duty or on any type of leave, to perform any activity under this Contract;

18. Confidentiality

18.1 Except with the prior written consent of the Procuring Agency, the Bidder and the Experts shall not at any time communicate to any person or entity any confidential information acquired in the course of the contract.

19. Insurance to be Taken Out by the Bidder

19.1 The Bidder(a) shall take out and maintain, and shall cause any Subcontractors to take out and maintain, at its (or the Subcontractors', as the case may be) own cost but on terms and conditions approved by the Procuring Agency, insurance against the risks, loss or damage, and for the coverage, as shall be specified in the SCC; and (b) at the Procuring Agency's request, shall provide evidence to the Procuring Agency showing that such insurance has been taken out and maintained and that the current premiums have been paid.

20. Bidder's Actions Requiring Procuring Agency's Prior Approval

20.1 The Bidder shall obtain the Procuring Agency's prior approval in writing before taking any of the following actions:

(a) appointing such members of the Personnel not provided by the Bidder;

(b) changing the Program of activities; and

(c) any other action that may be specified in the SCC.

21. Reporting Obligations

21.1 The Bidder shall submit to the Procuring Agency the reports and documents in the numbers, and within the periods as prescribed by the Procuring Agency.

22. Liquidated Damages

22.1 If the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Procuring Agency shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in **SCC** of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the performance security (or guarantee) specified in **SCC**. Once the said maximum is reached, the Procuring Agency may consider termination of the Contract pursuant to **GCC Clause 15.**

22.2 Correction for Over-payment

If the Intended Completion Date is extended after liquidated damages have been paid, the Procuring Agency shall correct any overpayment of liquidated damages by the Bidder by adjusting the next payment certificate. The Bidder shall be paid interest on the overpayment, calculated from the date of payment to the date of repayment, at the rates specified in SCC.

22.3 Lack of performance penalty

If the Bidder has not corrected a Defect within the time specified in the Procuring Agency's notice, a penalty for Lack of performance will be paid by the Bidder. The amount to be paid will be calculated as a percentage of the cost of having the Defect corrected, assessed as specified in the SCC.

23. Performance Guarantee

23.1 Within Seven (07) days from the issuance of acceptance letter from the Procuring Agency, the successful Bidder shall furnish the Performance Guarantee in shape of ------- at the discretion of the PA in the amount **specified in SCC.** In case the amount of Bids security is equal or greater than

23.2 The proceeds of the Performance Guarantee shall be payable to the Procuring agency as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract.

23.3 The Performance Guarantee shall be denominated in the currency of the Contract, or in a freely convertible currency acceptable to the Procuring agency and shall be in the acceptable form as specified in SCC.

23.4The Performance Guarantee will be discharged by the Procuring agency and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless otherwise **specified in SCC.**

24. Fraud and Corruption

24.1 The Procuring Agency requires the Supplier to disclose any commissions or fees that may have been paid or are to be paid to agents or any other party with respect to the Bidding process or execution of the Contract. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee.

25. Sustainable Procurement

25.1 The Bidder shall conform to the sustainable procurement contractual provisions, if and as specified in the SCC.

D. Bidder's Personnel

26. Description of Personnel

26.1 The titles, agreed job descriptions, minimum qualifications, and estimated periods of engagement in the carrying out of the Services of the Bidder's Key Personnel. The Key Personnel listed by title as well as by name are hereby approved by the Procuring Agency.

27. Removal and/or Replacement of Personnel

27.1 Except as the Procuring Agency may otherwise agree, no changes shall be made in the Key Personnel. If, for any reason beyond the reasonable control of the Bidder, it becomes necessary to replace any of the Key Personnel, the Bidder shall provide as a replacement a person of equivalent or better qualifications.

27.2 If the Procuring Agency finds that any of the Personnel have (i) committed serious misconduct or have been charged with having committed a criminal action, or (ii) have reasonable cause to be dissatisfied with the performance of any of the Personnel, then the Bidder shall, at the Procuring Agency's written request specifying the grounds thereof, provide as a replacement a person with qualifications and experience acceptable to the Procuring Agency.

27.3 The Bidder shall have no claim for additional costs arising out of or incidental to any removal and/or replacement of Personnel.

E. Obligations of the Procuring Agency

28. Assistance and Exemptions

28.1 The Procuring Agency shall use its best efforts to ensure that the Government shall provide the Bidder such assistance and exemptions as specified in the SCC.

29. Change in the Applicable Law

29.1 If, after the date of this Contract, there is any change in the Applicable Law with respect to taxes and duties which increases or decreases the cost of the related Services rendered by the Bidder, then the remuneration and reimbursable expenses otherwise payable to the Bidder under this Contract shall be increased or decreased accordingly by agreement between the Parties, and corresponding adjustments shall be made to the amounts referred in the SCC.

30. Services and Facilities

30.1 The Procuring Agency shall make available to the Bidder and the Experts, for the purposes of the Services and free of any charge, the services, facilities and property described , at the times and in the manner specified in the SCC or terms of reference.

30.2 In case that such services, facilities and property shall not be made available to the Bidder, the Parties shall agree on (i) any time extension that it may be appropriate to grant to the Bidder for the performance of the Services, (ii) the manner in which the Bidder shall procure any such services, facilities and property from other sources, and (iii) the additional payments, if any, to be made to the Bidder as a result thereof.

F. Payments to the Bidder

31. Contract Price

31.1 The price payable shall be in Pakistani Rupees unless otherwise specified in the SCC. Prices charged by the Supplier for Goods delivered under the Contract shall not vary from the prices quoted by the Supplier in its Bid.

32. Terms and Conditions of Payment

32.1 Payments will be made to the Bidder according to the payment schedule stated in the SCC and as per actual invoice submitted by the Bidder.

32.2 Unless otherwise stated in the SCC, the advance payment shall be made against the provision by the Bidder of a bank guarantee for the same amount, and shall be valid for the period stated in the SCC. Any other payment shall be made after the conditions listed in the SCC for such payment have been met, and the Bidder have submitted an invoice to the Procuring Agency specifying the amount due.

33. Currency of Payment

33.1 Any payment under this Contract shall be made in the currency(ies) specified in the SCC.

G. Quality Control

34. Identifying Defects

34.1 The principle and modalities of Inspection of the Goods by the Procuring Agency shall be as indicated in the SCC. The Procuring Agency shall check the Bidder's performance and notify him of any Defects that are found. Such checking shall not affect the Bidder's responsibilities. The Procuring Agency may instruct the Bidder to search for a Defect and to uncover and test any service that the Procuring Agency considers may have a Defect. Defect Liability Period is as defined in the SCC.

35. Correction of Defects, and

Lack of Performance Penalty

35.1 The Procuring Agency shall give notice to the Bidder of any Defects before the end of the Contract. The Defects liability period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice a Defect is given, the Bidder shall correct the notified Defect within the length of time specified by the Procuring Agency's notice.

35.3 If the Bidder has not corrected a Defect within the time specified in the Procuring Agency's notice, the Procuring Agency will assess the cost of having the Defect corrected, the Bidder will pay this amount, and a Penalty for Lack of Performance.

36. Taxes and Duties

36.1 A Supplier shall be entirely responsible for all taxes, duties, fees, etc., incurred until delivery of the contracted Goods to the Procuring Agency.

H.Settlement of Disputes

37. Alternate Dispute Resolution

37.1 The disputes between the parties to the contract may be settled in accordance with Public Procurement Rules, 2004.

37.2 The procuring agency shall refer the matter to the Chief Justice Islamabad High Court or Managing Director PPRA or the Secretary Ministry of Law & Justice for appointment of Arbitrator.

37.3 The fee for the Arbitrator shall be specified in Pak Rupees as determined by the appointing authority which shall be borne and shared equally by the contracting parties.

Special Conditions of Contract

SECTION VIII. SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the Conditions of Contract. The corresponding clause number of the GCC is indicated in parentheses.

Number of GC Clause	**Amendments of, and Supplements to, Clauses in the General Conditions of Contract**
GCC 1	**Definitions** **The Procuring Agency is:**IESCO-PMU (Islamabad Electric Supply Company (IESCO)),DirectorHead Office, Street # 40, Sector G-7/4., Islamabad Capital Territory **The Supplier is:** **The title of the subject procurement is: Procurement of 11KV Outgoing Panel 25 KA under IESCO Own Resources and 7th STG projects**
GCC 3	**Applicable/Governing Law:** The Contract shall be interpreted in accordance with the laws of Islamic Republic of Pakistan
GCC 4	**Language:** The language of the Contract, all correspondence and communications to be given, and all other documentation to be prepared and supplied under the Contract shall be in **English.**

GCC 5	**Notices:** **The addresses for the notices are:** Procuring Agency: IESCO-PMU (Islamabad Electric Supply Company (IESCO)),Director Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory +92-319-599-2205 iescopmu@iesco.com.pk Contractor/ Bidder: [Name, address and telephone number]. The Contractor/ Bidder's Representative(s) [Name, address, telephone number and e-mail address]
GCC 7.1	**The Authorized Representatives are:** **For the Procuring Agency:** IESCO-PMU (Islamabad Electric Supply Company (IESCO)),Director Head Office, Street # 40, Sector G-7/4., Islamabad Capital Territory +92-319-599-2205 iescopmu@iesco.com.pk **For the Bidder:** **Name: ……** **Designation: ……..** **Address: ……..**
GCC 8	**Effectiveness of the contract**
GCC 9	**Commencement of Contract:**
GCC 11.2	**Expiration of Contract:**

GCC 15	**Termination** In the event of termination of the contract due to any reason as already defined in the General Conditions of Contract, the Bidder shall be responsible for providing to the Authority the Goods till the time of alternate arrangements.
GCC 17	**Conflict of Interest:** The Procuring Agency reserves the right to determine on a case-by-case basis whether the Bidder should be disqualified from providing goods or services due to a conflict of a nature described in Clause GCC 17**.**
GCC 22	**Liquidated Damages** If the Bidder fails to provide services as required under the contract or in case of any data loss/data breach or any incident compromising the data security or other such failures related to any services, the Bidder shall pay to the Procuring Agency as Liquidated Damages at a rate of **0.07%** to **10.00%** of the Contract value, in accordance with the extent of performance failure & the cost of investigating such incidents as judged by the Authority.
GCC 23	**Performance Guarantee:** The amount of performance guarantee shall be **10.00%** of the contract price in acceptable form of **Bank Guarantee**
GCC 32	**Payment terms:** Payment will be made to the Bidder against the procured Goods and services according to the actual invoice or running bills submitted by the Bidder against the services provided within the time given in the conditions of the contract.
GCC 33	**Currency of Payment:** All the payment to be released to the contractor/Bidder shall be in Pakistani Rupees.

GCC 34 **Identifying Defects:**

The Authority reserves the right at any time to inspect the premises of the provider to inspect the goods and monitor the goods being provided.

Inspections & Tests Requirements

Quality and quantity inspection shall be carried out prior to shipment of Goods by the manufacturer(s) at the supplier's own expense and responsibility in terms of the items specified in the specifications. The supplier shall submit the inspection certificate issued by him which should be attached with the certificate(s) of the manufacturer(s) to the Procuring Agency in order to ensure that the goods are manufactured in compliance with the contract.

Factory Acceptance Tests (FAT) shall be carried out at the premises of Manufacturer jointly witnessed with IESCO Engineers.The Contractor shall keep the Engineer informed of the progress of manufacture and notify the Engineer approximately six (6) weeks in advance, in writing as to when the Goods or any part thereof will be ready for inspection and for shipping to wharf at the port of entry/disembarkation.

Following the receipt of such notice, the Engineer shall nominate to arrange pre-shipment inspection of the Goods or any part thereof including the packing at the Contractor's premises and will issue a pre-shipment Inspection Report or waiver to pre-shipment inspection. The Goods or any part thereof shall be shipped or delivered only upon issuance of pre-shipment inspection report.The Goods/material shall be subject to the type, sample and routine tests as described in the Specifications.

The contractor shall provide free of charge all such assistance, instruments, machines, labor and materials as are normally required for carrying out such tests. In case a part or whole of the equipment being supplied at the project by the contractor is from within the country (Pakistan) or outside country, the cost of performing as well as witnessing any test by the Inspectors during pre-shipment local inspection shall be borne by the contractor if such tests are clearly intended by or provided

for in the specifications or as agreed between IESCO and the contractor. Two (2) number authorized Engineers from IESCO will carry out inspection of the material at manufacturer's works. A notice of at least six (6) weeks advance, in writing shall have to be given to the IESCO by the Supplier when the stores against the order are ready for Inspection. Manufacturer will provide facilities for tests as per tender specifications free of cost.

All reasonable facilities as provided in the specifications or followed by Trade & Industry in general shall have to be offered to the Inspecting officers, by the Supplier at their expense for carrying out Testing and Inspection. If Goods are being manufactured on other premises, the Contractor shall obtain permission of the Engineer/IESCO to carry out such inspection, examinations and testing at those premises.

For such purpose, the Supplier shall provide free access at all times during manufacture, assembly and testing to the premises in which the work is being carried out. The contractor will cover all the expenses in context of witnessing of the tests by the Inspectors including 1st class traveling (by air or by road depending on the distance from Islamabad Pakistan to the place or places of inspections), boarding & lodging in any A class accommodation, local transportation and daily allowance

As per prevailing rules per inspector to meet other expenses.Abroad Testing witnessing

GCC 37	**Following is the guidance for Dispute Resolution**

1. If any dispute of any kind whatsoever shall arise between the Authority and the Bidder in connection with or arising out of the Contract, including without prejudice to the generality of foregoing, any question regarding its existence, validity, termination and the execution of the Contract – whether during developing phase or after their completion and whether before or after the termination, abandonment or breach of the Contract – the parties shall seek to resolve any such dispute or difference by mutual diligent negotiations in good faith within 14 (fourteen) days following a notice sent by one Party to the other Party in this regard**.**

2. At future of negotiation the dispute shall be resolved through mediation and mediator shall be appointed with the mutual consent of the both parties**.**

3. At the event of failure of mediation to resolve the dispute relating to this contract such dispute shall finally be resolved through binding Arbitration by sole arbitrator in accordance with Arbitration Act 1940. The arbitrator shall be appointed by mutual consent of the both parties**.** The Arbitration shall take place in Islamabad, Pakistan and proceedings will be conducted in English language.

4. The cost of the mediation and arbitration shall be shared by the parties in equal proportion however the both parties shall bear their own costs and lawyer's fees regarding their own participation in the mediation and arbitration. However, the Arbitrator may make an award of costs upon the conclusion of the arbitration making any party to the dispute liable to pay the costs of another party to the dispute**.**

5. Arbitration proceedings as mentioned in the above clause regarding resolution of disputes may be commenced prior to, during or after completion of the contract.

Notwithstanding any reference to the arbitration herein, the parties shall continue to perform their respective obligations under the Contract unless they otherwise agree that the Authority shall pay the Bidder any monies due to the Bidder.

Rules of procedure for arbitration proceedings:

Any dispute between the Authority and a Bidder who is a national of the Islamic Republic of Pakistan arising in connection with the present Contract shall be referred to adjudication or arbitration in accordance with the laws of the Islamic Republic of Pakistan including Arbitration Act 1940, however above provision shall prevail in referring the case to the Arbitrator.

Place of Arbitration and Award:

The arbitration shall be conducted in English language and place of arbitration shall be at Islamabad. The award of the arbitrator shall be final and shall be binding on the parties.

Bid Securing Declaration

Form 9: Bid Securing Declaration

Date: *[insert date (as day, month and year)]*

Bid No.:***P16268***

To: **IESCO-PMU (Islamabad Electric Supply Company (IESCO)),DirectorHead Office, Street # 40, Sector G-7/4., Islamabad Capital Territory**

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid Securing Declaration.

We accept that we will be blacklisted and henceforth cross debarred for participating in respective category of public procurement proceedings for a period of (not more than) six months, if fail to abide with a bid securing declaration, however without indulging in corrupt and fraudulent practices, if we are in breach of our obligation(s) under the Bid conditions, because we:

1. have withdrawn or modified our Bid during the period of Bid Validity specified in the Form of Bid;

2. Disagreement to arithmetical correction made to the Bid price; or

3. having been notified of the acceptance of our Bid by the Procuring Agency during the period of Bid Validity, (i) failure to sign the contract if required by Procuring Agency to do so or (ii) fail or refuse to furnish the Performance Security or to comply with any other condition precedent to signing the contract specified in the Bidding Documents.

We understand this Bid Securing Declaration shall expire if we are not the successful

Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight (28) days after the expiration of our Bid.

Contract Form

SECTION IX: CONTRACT FORMS

THIS AGREEMENT made the _____ day of _____ 20_____ between**IESCO-PMU (Islamabad Electric Supply Company (IESCO)),DirectorHead Office, Street # 40, Sector G-7/4., Islamabad Capital Territory**

(hereinafter called "the Procuring Agency") of the one part and *[name of Bidder]* of *[city and country of Bidder]* (hereinafter called "the Bidder") of the other part:

WHEREAS the Procuring Agency invited Bids for provision of goods, viz., **Procurement of 11KV Outgoing Panel 25 KA under IESCO Own Resources and 7th STG projects (*P16268*)** and has accepted a Bids by the Bidder for the provision of Goods in the sum of *[contract price in words and figures]* (hereinafter called "the Contract Price").

NOW THIS CONTRACT WITNESSETH AS FOLLOWS:

1. In this Contract words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.

2. The following documents shall be deemed to form and be read and construed as part of this Contract, In the event of any ambiguity or conflict between the Contract Documents listed below, the order of precedence shall be the order in which the Contract Documents are listed below:-

1. This form of Contract;
2. the Form of Bids and the Price Schedule submitted by the Bidder;
3. the Schedule of Requirements;
4. the Technical Specifications;
5. the Special Conditions of Contract;
6. the General Conditions of the Contract;
7. the Procuring Agency's Letter of Acceptance; and
8. [*add here: any other documents*]

3. In consideration of the payments to be made by the Procuring Agency to the Bidder as hereinafter mentioned, the Bidder hereby covenants with the Procuring Agency to provide the Goods related services and to remedy defects therein in conformity in all respects with the provisions of the Contract.

4. The Procuring Agency hereby covenants to pay the Bidder in consideration of the provision of Goods and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the contract at the times and in the manner prescribed by the contract.

IN WITNESS whereof the parties hereto have caused this Contract to be executed in accordance with their respective laws the day and year first above written.

Signed, sealed, delivered by _____the _____ (for the Procuring Agency)

Witness to the signatures of the Procuring Agency:

……

Signed, sealed, delivered by _____the _____ (for the Procuring Agency)

Witness to the signatures of the Bidder: ……

Integrity Pact

Integrity Pact

DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC. PAYABLE BYTHE SUPPLIERS OF GOODS, SERVICES & WORKS IN CONTRACTS WORTHRS.10.00 MILLION OR MORE

Contract Number: Contract Value: Contract Title:

Dated:

[Name of Supplier] hereby declares that it has not obtained or induced the procurement of any contract, right, interest, privilege or other obligation or benefit from Government of Pakistan or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoP) through any corrupt business practice.

Without limiting the generality of the foregoing [Name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fee etc. paid or payable to anyone and not given or agreed to give and shall not give or agree to give to anyone within or outside Pakistan either directly or indirectly through any natural or juridical person, including its affiliate, agent, associate, broker, consultant, director, promoter, shareholder, sponsor or subsidiary, any commission, gratification, bribe, finder's fee or kickback, whether described as consultations fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

[Name of Supplier] certifies that it has made and will make full disclosure of all agreements and arrangements with all persons in respect of or related to the transaction with GoP and has not taken any action or will not take any action to circumvent the above declaration, representative or warranty.

[Name of Supplier] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact or taking any action likely to defeat the purpose of this declaration, representation and warranty. It agrees that any contract, right interest, privilege or other obligation or benefit obtained or procured as aforesaid shall, without prejudice to any other right and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

Notwithstanding any rights and remedies exercised by GoP in this regard, [Name of Supplier] agrees to indemnify GoP for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to GoP in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee or kickback given by [Name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

Performance Guarantee Form

Performance Guarantee Form

To: **IESCO-PMU (Islamabad Electric Supply Company (IESCO)),DirectorHead Office, Street # 40, Sector G-7/4., Islamabad Capital Territory**

WHEREAS *[name of Bidder]* (hereinafter called "the Bidder") has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* for provision of Goods*(*hereinafter called "the Contract").

AND WHEREAS it has been stipulated by you in the said Contract that the Bidder shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Bidder's performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Bidders guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Bidder, up to a total of *[amount of the guarantee in words and figures]*, and we undertake to pay you, upon your first written demand declaring the Bidder to be in default under the Contract and without cavil or argument, any sum or sums within the limits of *[amount of guarantee]* as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the: *[insert date]*

Signature and seal of the Guarantors

_____

[name of bank or financial institution]

_____

[address]

_____

[date}

Annexure

manufacturer experience annex

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **manufacturer experience annex** (page number: 68)

Production capacity annex

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Production capacity annex** (page number: 69)

Bidder information form

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Bidder information form** (page number: 70)

Bidder JV form

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Bidder JV form** (page number: 71)

Deviation from contractual provision

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Deviation from contractual provision** (page number: 72)

Deviation technical provision

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Deviation technical provision** (page number: 73)

Qualification information

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Qualification information** (page number: 74)

Manufacturer authorization

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Manufacturer authorization** (page number: 77)

Manufacturer information form

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Manufacturer information form** (page number: 78)

Production capacity of manufacturer

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Production capacity of manufacturer** (page number: 79)

Letter of bid technical

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Letter of bid technical** (page number: 80)

Correction of defect in warranty period

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Correction of defect in warranty period** (page number: 82)

IESCO blacklisting policy

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **IESCO blacklisting policy** (page number: 83)

P-44:2018 Specification

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **P-44:2018 Specification** (page number: 112)

Procurement Forms

Past Experience and Completed Contracts

Bidder/Joint Venture (JV) shall demonstrate successfully completion of at **least two (02) No. contracts having similar complexityinvolving same or higher-rated material/equipment** during the **last five (05) years**. The aggregate **value of both Contract Agreement(s) / Purchase Order (s)** shall be equal to **amount specified as under**. However, value of none of both contracts shall be less than 30% as mentioned below.

NCB-275= Rs. 98 Million

To substantiate compliance with this requirement, the Bidder/JV shall submit **copies of relevant Purchase Orders / Contract Agreements along with Completion Certificates/GRN/Delivery Challan etc** issued by the concerned client.

The manufacturer shall demonstrate at least five (05) years' experience in designing and manufacturing of similar nature/complex involving same or higher rated equipment/material. Three (03) years satisfactory operation performance of same or high rated equipment /material. For the ease of evaluation,related form are enclosed in annexure and the same will be considered during evaluation

See Form Under Additional Forms and Documents: **Past Experience and Completed Contracts** (page number: 226)

Historical Contract Non-Performance, and Pending Litigation and Litigation History

History of Non-performing Contracts

Non-performance of a contract a did not occur as a result of contractor default since 1st January 2025.

a *Non-performance, as decided by the Purchaser, shall include all contracts where (a) nonperformance was not challenged by the contractor, including through referral to the dispute resolution mechanism under the respective contract, and (b) contracts that were so challenged but fully settled against the contractor. Nonperformance shall not include contracts where Purchasers decision was overruled by the dispute resolution mechanism. Nonperformance must be based on all information on fully settled disputes or litigation,i.e. dispute or litigation that has been resolved in accordance with the dispute resolution mechanism under the respective contract and where all appeal instances available to the Bidder have been exhausted.*

b*This requirement also applies to contracts executed by the Bidder as Joint Venture partner.*

pending litigation

All pending litigation, arbitration, Greivance Redressal committee (GRC) and Appellate GRC or other material events impacting the net worth and/or liquidity of the bidder, if any, shall be treated as resolved against the Bidder and so shall in total not represent more than 25% (twenty five percent) of the Bidder's last year net worth calculated as the difference between total assets and total liabilities.

See Form Under Additional Forms and Documents: **Historical Contract Non-Performance, and Pending Litigation and Litigation History** (page number: 227)

Current Contracts and Their Progress

See Form Under Additional Forms and Documents: **Current Contracts and Their Progress** (page number: 229)

Financial Capacity and Net Worth Evaluation Form

Financial Capability of Bidder

Submission of audited financial statements for the last three years to demonstrate the current soundness of the Bidder’s financial position.Bidder’s Net Worth for the last three years calculated as below: NCB-275=Rs. 98Million .The difference between total assets and total liabilities should be positive

Specify proposed sources of financing, working capital, lines of credit, and other financial means after deduction of current commitments, available to meet the cash flow demands as indicated in below:NCB-275=Rs.98 Million.

See Form Under Additional Forms and Documents: **Financial Capacity and Net Worth Evaluation Form** (page number: 230)

Average Annual Turnover

Minimum average annual turnover of PKR calculated as total revenue of the Bidder over the last three Years shall be equal to: NCB-275= 200Million.

See Form Under Additional Forms and Documents: **Average Annual Turnover** (page number: 232)

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

Additional Forms and Documents

Manufacturing Experience

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
1. The manufacturer shall demonstrate at least five (05) years' experience in designing and manufacturing of similar nature/complex involving same or higher rated equipment/material. *2.* Three (03) years satisfactory operation performance of same or high rated equipment /material.	Must meet requirement	Not applicable	Not applicable	Manufacturer must meet	Manufacturer will provide the detailed supply record of similar or higher rated equipment. Satisfactory performance of similar equipment for three years.

Production Capacity

Criteria	Compliance Requirements				Documents
Requirement	Single Entity	Joint Venture			Submission Requirements
		All Partners Combined	Each Partner	One Partner	
In order to ensure the smooth and timely execution of order, the manufacturer will indicate its manufacturing / production capacity which shall be double the total sum of orders already in hand, expected orders in pipe line and this order (if placed on the bidder). The manufacturer shall provide the information with the bid to establish its capacity / capability to execute the order for which necessary documentary evidence may be attached related for the above mentioned requirements. In this context the manufacturer is required to fill in the relevant forms given in **Forms** of this tender document and submit the same with the bid. The purchaser may visit the site of supplier at any time during evaluation at the cost of supplier.	Must meet requirement	Not applicable	Not applicable	Manufacturer must meet	Forms

*A *Bidder or Manufacturer shall provide evidence of production output.*

Bidder Information Form

Date of Bid Submission: _____
Request for Bid No.: *NCB* _____

Page_____of_____pages

1. Bidder's Name: _____
2. In case of JV, legal name of each member: _____
3. Bidder's actual or intended country of registration: _____
4. Bidder's year of registration: _____ _____
5. Bidder's Address in country of registration: _____
6. Bidder's Authorized Representative Information Name: _____ CNIC No._____ Address: _____ _____ Telephone/Fax numbers: _____ Email Address: _____
7. Attached are copies of original documents of [please check the box(es) of the attached original documents] ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above. ☐ In case of JV, letter of intent to form JV or JV agreement, in accordance with ITB 3.4. ☐ Establishing that the Bidder is not under the supervision of the Procuring Agency 8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Bidder's JV Members Information Form

Date of Bid Submission: _____
Request for Bid No.: *NCB* _____

Page____of _____pages

1. Bidder's Name: _____
2. Bidder's JV Member's name: _____
3. Bidder's JV Member's country of registration: _____
4. Bidder's JV Member's year of registration: _____
5. Bidder's JV Member's legal address in country of registration: _____ _____
6. Bidder's JV Member's authorized representative information Name: _____ Address: _____ _____ Telephone/Fax numbers: _____ Email Address: _____
7. Attached are copies of original documents of [please check the box(es) of the attached original documents] ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4. 8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Deviation from Contractual/Commercial Provision

It is presumed that bidder shall not take any deviation. However, if he intends to take deviation to specified contractual/commercial conditions, those must be listed in the space provided below.

Sr #	Section No	Clause No	Deviation	Clarifications

Sign & Stamped by bidders

Deviation from Technical Provision

It is presumed that bidder shall not take any deviation. However, if he intends to take deviation to specified terms, those must be listed in the space provided below**:**

Sr #	Section No.	Clause No	Deviation	Clarifications

Sign & Stamped by bidders

Form of Qualification Information

1. Individual Bidders or Individual Members of Joint Ventures

1.1 Constitution or legal status of Bidder:

(Attach copy)

Place of registration: _____

Principal place of business: _____

Power of attorney of signatory of Bid: _____

1.2 Total annual volume of Services performed in _____ years, in the internationally traded currency specified in the Bid Data Sheet: _____

1.3 Services performed as prime Supplier on the provision of Services of a similar nature and volume over the last _____ years. The values should be indicated in the same currency used for Item 1.2 above. Also list details of work under way or committed, including expected completion date.

Project name and country	Name of Procuring Agency (PA) and contact person	Type of Services provided and year of completion

1.4 Major items of Supplier's Equipment proposed for carrying out the Services. List all information requested below. Refer also to ITB 13.3(c).

Item of equipment	Description, make, and age (years)	Condition (new, good, poor) and number available	Owned, leased (from whom?), or to be purchased (from whom?)
(a) (b)			

1.5 Qualifications and experience of key personnel proposed for administration and execution of the Contract. Attach biographical data. Refer also to ITB 13.4(d).

Position	Name	Years of experience (general)	Years of experience in proposed position
(a) (b)			

1.6 Proposed sub-contracts and firms involved. Refer to GCC 24.

Sections of the Services	Value of Sub-contract	Sub-contractor (Name and address)	Experience in providing similar Services
(a) (b)			

1.7 Financial reports for the last *(insert period)* years: balance sheets, profit and loss statements, auditors' reports, etc. List below and attach copies.

1.8 Evidence of access to financial resources to meet the qualification requirements: cash in hand, lines of credit, etc. List below and attach copies of support documents mentioning that We certify/confirm that we comply with eligibility requirements as per ITB 3 of the bidding documents.

1.9 Name, address, and telephone, telex, and facsimile numbers of banks that may provide references if contacted by the Procuring Agency.

1.10 Information regarding any litigation, current or within the last *(insert period)* years, in which the Bidder is or has been involved.

Other party(ies)	Cause of dispute	Details of litigation award	Amount involved
(a) (b)			

1.11 Information regarding Occupation Health and Safety Policy and Safety

Records of the Bidder.

1.12 Statement of compliance with the requirements of ITB 3.4.

1.13 Proposed Program (service work method and schedule). Descriptions, drawings, and charts, as necessary, to comply with the requirements of the bidding documents.

2. Joint Ventures

2.1 The information listed in 1.11 - 1.12 above shall be provided for each member of the joint venture.

2.2 The information in 1.13 above shall be provided for the joint venture.

2.3 Attach the power of attorney of the signatory (ies) of the Bid authorizing signature of the Bid on behalf of the joint venture.

2.4 Attach the Contract among all members of the joint venture (and which is legally binding on all members), which shows that

(a) all members shall be jointly and severally liable for the execution of the Contract in accordance with the Contract terms;
(b) one of the members will be nominated as being in-charge, authorized to incur liabilities, and receive instructions for and on behalf of any and all members of the joint venture; and
(c) the execution of the entire Contract, including payment, shall be done exclusively with the member in charge.

3. Additional Requirements

3.1 Bidders should provide any additional information required in the Bid Data Sheet and to fulfill the requirements of ITB 12.1, if applicable.

We, the undersigned declare that

(a) The information contained in and attached to this form is true and accurate as of the date of bid submission

Or [delete1 statement which does not apply]

(b) The originally submitted pre-qualification information remains essentially correct as of date of submission

Authorized Signature:_____

Name and Title of Signatory: _____

Name of Bidder: _____

Address: _____

Manufacturer's Authorization

No._____ **Dated**_____

Date of Bid Submission: ____/____/*2025*
Request for Bid No.: NCB _____

To:

_____

_____

WHEREAS

We _____,who are official manufacturers of _____, having factories at _____, do hereby authorize *M/s*_____ 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.

We hereby extend our full guarantee and warranty in accordance clause-18 of General Conditions of Contract, with respect to the Goods offered by the above firm.

Signed:_____

Name: _____

Title: _____

Date signed _____ day of _____Month, _____ Year

Manufacturer's Information Form

Date of Bid Submission: _____
Request for Bid No.: *NCB* _____

1. Manufacturer's Name:
3. Manufacturer Country of Registration: _____
4. Manufacturer year of Registration: _____
5. Manufacturer's legal address of Head Office and Production sites in Country of Registration: _____
6. Manufacturer's Authorized Representative Information Name: _____ Address: _____ _____ Telephone/Mob/Fax numbers: _____ Email Address: _____
1 Attached are copies of original documents of [please check the box(es) of the attached original documents] from concern chamber of commerce manufacturing country or Pakistani Embassy in manufacturing country ☐ Articles of Incorporation (or equivalent documents of Constitution or Association), and/or registration documents of the legal entity named above, in accordance with ITB 4.4. 2. Included are the organizational chart, a list of Board of Directors, and the Beneficial Ownership.

Production Capacity of Manufacturer

Sr #		Factory Capacity in unit as mentioned in Price schedule
A	Total Factory Production Capacity (No. or Sets or other unit)/Year	
B	Order in Hand (No. or Sets or other unit)	
C	Expected order during execution of this contract if awarded (No. or Sets or other unit)	
D	Quantity of this order	
E	Remaining Capacity of Factory (No. or Sets or other unit) E= (A-B-C-D)	
A ≥ 2xE		

Signed & Stamped by Manufacture

Letter of Bid – Technical Proposal

No._____ **Dated**_____

Date of Bid submission: _____
Request for Bid No.: (NCB) _____
Description of Bid: _____

To:

We, the undersigned Bidder, hereby submit our Bid, in two parts, namely:

(a) the Technical Proposal, and
(b) the Financial Proposal.

In submitting our Bid we make the following declarations:

(a) **No reservations:** We have examined and have no reservations to the bidding document, including addenda as well as blacklisting mechanism issued in accordance with Instructions to Bidders (ITB 9);

(b) **Eligibility**: We meet the eligibility requirements and have no conflict of interest in accordance with ITB 3;

(c) **Bid/Proposal-Securing Declaration**: We have not been suspended nor declared ineligible by the Procuring Agency based on execution of a Bid Securing Declaration or Proposal Securing Declaration in the Procuring Agency's country in accordance with ITB 4;

(d) **Conformity:** We offer to supply in conformity with the bidding document and in accordance with the Delivery Schedules specified in the Schedule of Requirements the following Goods: [*insert a brief description of the Goods and Related Services*----------
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---];

(e) **Bid Validity Period**: Our Bid shall be valid for the period ---------- specified in BDS 17.1 (as amended, if applicable) from the date fixed for the Bid submission deadline specified in BDS 23.1 (as amended, if applicable), and it shall remain binding upon us, and may be accepted at any time before the expiration of that period;

(f) **Performance Security**: If our Bid is accepted, we commit to obtain a performance security in accordance with the bidding document;

(g) **One Bid per Bidder**: We are not submitting any other Bid(s) as an individual Bidder, and we are not participating in any other bid(s) as a Joint Venture member or as a subcontractor, and meet the requirements, other than Alternative Bids submitted in accordance with ITB 19;

(h) **Suspension and Debarment**: We, along with any of our

subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Procuring Agency. Further, we are not ineligible under Pakistan laws;

(j) **State-owned enterprise or institution**: (check appropriate box)

i. We are not a state-owned enterprise or institution ☐

ii. We are a state-owned enterprise or institution but meet the requirements of this tender. ☐

(k) **Binding Contract**: We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;

(l) **Not Bound to Accept**: We understand that you are not bound to accept the Most Advantageous Bid or any other Bid that you may receive; and

(m) **Fraud and Corruption**: We hereby certify that we have taken steps to ensure that no person acting for us, or on our behalf, engages in any type of Fraud and Corruption.

(n) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions, gratuities, or fees with respect to the bidding process or execution of the Contract:

Name of Recipient	Address	Reason	Amount

Complete Name of the Bidder: *_____

Name of the person duly authorized as per PoA to sign the Bid on behalf of the Bidder: ** _____

Title of the person signing the Bid: _____

Signature of the person named above: _____

Date signed _____ **day of** _____ Month _____ Year_____

*: In the case of the Bid submitted by a Joint Venture specify the name of the Joint Venture as Bidder.
**: Person signing the Bid shall have the power of attorney given by the Bidder. The power of attorney shall be attached with the Bid Schedules.

Correction of defects in the warranty period

The period for taking remedial action for failure of correction of defects in the warranty period is: **Thirty (30) Days from the date defect notified to the supplier at his cost and expense.**

MECHANISM
FOR BLACKLISTING OF CONTRACTORS / CONSULTANTS / MANUFACTURERS

Approved by IESCO Board of Directors (BoD) in its 178th Meeting held on 23rd August 2019.

ISLAMABAD ELECTRIC SUPPLY COMPANY (IESCO)

28th October, 2019

DISCLAIMER

If any clause of this policy afterwards develops contradiction with PPRA Rules, then PPRA Rules will supersede the relevant clause of IESCO Mechanism for Blacklisting of Contractors / Consultants / Manufacturers.

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PREFACE

This mechanism of blacklisting has been drafted in the light of Rule-19 “Blacklisting of suppliers and contractors” of the Public Procurement Rules, 2004 “PPRA Rules”. This Mechanism has been developed to mitigate the possibilities of corrupt practices and ensure the transparent and corruption free public procurement in the organization. The blacklisting policies of various procurement agencies have also been consulted. The policy was placed on IESCO website for more than 03 months & all the stake holders were invited to furnish their comments so that no one may have any objection after its implementation. This mechanism consists of 09 chapters containing Grounds for Blacklisting, Procedure for Suspension and Blacklisting, Formulation of “IESCO Standing Committee for Blacklisting”, Review against Decision of the Procuring Agency, Period of Debarment, Process to deal with Complaints & Guidelines for Evaluation of Performances of Contractors. The procedure has been developed for both of the procurement stages including competitive bidding stage and contract implementation stage. A disclaimer Clause has also been added so that Authority’s instructions could prevail. This document shall be considered an integral part of IESCO Bidding Documents / Tender Documents/ RFPs as well as contract agreements / purchase orders etc. The bidders shall have to submit an undertaking along with their bid that they have read all the contents of this blacklisting mechanism and they accept all the provisions of this document.

DEFINITIONS

In addition to definitions mentioned in bidding document, following definitions are also applicable:

(i) **Authority:** The Public Procurement Regulatory Authority.

(ii) **Appeal**: Right of firm/individual to bring its / his grievance against the issuance of Blacklisting Order at the appropriate legal forum.

(iii) **Appellate Authority**: The department, office or government unit exercising general and/or administrative supervision/control over the blacklisting agency. Department level agencies shall exercise appellate authority over offices, agencies, under their jurisdiction. *Provided, further,* that blacklisting decisions of government agencies that are not subject to general and/or administrative supervision/control of any department, office or government unit shall be final and executor.

(iv) **Award**: A written notice from the procuring entity accepting a bid or proposal.

(v) **Blacklisting:** An administrative penalty disqualifying a person or an entity from participating in any government procurement for a given period.

(vi) **Blacklisting Mechanism:** A mechanism adopted by IESCO as a procuring agency/entity for Blacklisting supplier(s), manufacturer(s), distributor(s), contractor(s) or Experts/consultants/consulting firm(s) etc.

(vii) **Blacklisted Person/Entity**. A person/entity that was disqualified by an agency and/or is included in the PPRA/ADB/World Bank/Donor Agencies' (working with Government of Pakistan) Consolidated Blacklisting Report/sanctioning list.

(viii) **Contractor** includes-suppliers, contractors and consultants

(ix) **Consolidated Blacklisting Repor**t: The report prepared by the NTDC/WAPDA/DISCOs/PPRA/ADB/World Bank/Donor Agency working with Government of Pakistan containing the list of supplier(s), manufacturer(s), distributor(s), contractor(s) or Experts/ consultants/ consulting firm(s) blacklisted by procuring entities/agencies.

(x) **Debarment:** state of being legally excluded from participating in all types of procurement proceedings of the procuring department for a given period.

(xi) **Delist**. Removal of a person/entity from the Consolidated Blacklisting Report.

(xii) **Procuring Agency:** Any department, attached department or any office of the Islamabad Electric Supply Company;

(xiii) **Suspension.** Administrative action taken for infractions committed by a contractor during the competitive bidding stage, whereby such contractor is prohibited from further participation in the bidding process of an agency.

(xiv) **Termination of Contract**- Extinction of contract by reason or resolution or rescission under applicable rules/regulations/laws arising from the default of the firms/individuals.

Chapter No.1

1.1 Introduction

Blacklisting is one of the effective tools used in the struggle against the corruption in connection with public procurement. The main objectives of any procurement process are transparency, economy, fairness and efficiency so that public money is spent on welfare of the public. Hence, blacklisting is an instrument, which may lead to the decrease of the potential corruption risks and also inculcate protection of public means and increase of effectiveness of allocation of the limited resources.

Rule-19 "Blacklisting of suppliers and contractors" of the Public Procurement Rules, 2004 (hereinafter "**PPRA Rules**") stipulates that;

> *"The procuring agencies shall specify a mechanism and manner to permanently or temporarily bar, from participating in their respective procurement proceedings, suppliers and contractors who either consistently fail to provide satisfactory performances or are found to be indulging in corrupt or fraudulent practices. Such barring action shall be duly publicized and communicated to the Authority:*
> *Provided that any supplier or contractor who is to be blacklisted shall be accorded adequate opportunity of being heard."*

In the light of the above said Clause, Blacklisting Mechanism (hereinafter **the Mechanism**) has been specified for all procurements made by IESCO. This policy shall govern the blacklisting of manufacturers, suppliers, distributors, contractors, consultants and consulting firms ("contractors" for brevity) involved in government procurement for offenses or violations committed during competitive bidding and contract implementation

Any capitalized terms and abbreviations used in this mechanism which are not defined herein shall have the meanings given to them in Public Procurement Regulatory Authority Ordinance, 2002 (hereinafter "**PPRA Ordinance**") and PPRA Rules amended upto date.

1.2 Extent of Application

i. The Mechanism shall be applicable and remain in force, along with any amendments thereto, within IESCO until any clear instructions or guidelines are imparted by the Government through PPRA, PEC, or any other competent forum.

ii. The Mechanism shall also be applicable on the pre-qualified firms.

iii. The Mechanism shall be applicable for suppliers / bidders / contractors / local agents / representatives / consultants / firms / individuals / distributors / Manufacturers / organization transacting business with IESCO.

iv. Wherever any provision of this mechanism shall be in conflict with provisions of any applicable guidelines of donor agencies, or any other applicable Statute / Law or Rule enforced at the time in Pakistan, the provisions of the Statute / Law or rule shall prevail.

v. After Approval of this mechanism by the competent Authority, it shall be considered an integral part of bidding document/tender document/RFP as well contract agreement/Purchase Order, unless otherwise specified PPRA rule-5. The bidder will submit an Undertaking along-with their bid that they have read and accept the provisions of this Mechanism. Non-submission of an Undertaking may result in rejection of their bid. The said Undertaking will subsequently become part of the Contract Agreement as well.

1.3 Basic Principles of Blacklisting Mechanism

Following are the important basic principles of Blacklisting Mechanism::

i. To lay down effective mechanism for disciplining deviant Contractors against whom, misconduct has been established;

ii. An opportunity will be provided to any contractor alleged to have committed an act of misconduct, to defend himself;

iii. The formal hearing be conducted by a Committee/Committees.

iv. The presenter has the sole responsibility for deciding the terms of suspension.

v. Blacklisting is a temporary action and not permanent measure.

vi. The period of blacklisting / suspension would invariably depend upon the seriousness / nature of offence committed by the erring contractor.

vii. Blacklisting Mechanism is applicable for all type of national or international contractors, manufacturers, consultants, pre-qualified contractors /manufacturers, local agents, distributors and suppliers.

CHAPTER NO. 2

GROUNDS FOR BLACKLISTING

2.1 General Grounds

The following shall comprise the broad multilateral grounds for blacklisting:

i. **Corrupt Practice**" the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of a public official in the procurement process or in contract execution;

ii. "**Fraudulent Practice**" a misrepresentation or omission of facts in order to influence a procurement process or the execution of a contract

iii. "**Collusive Practice**" a scheme of arrangement between two or more bidders, with or without the knowledge of the Purchaser, designed to establish bid price at artificial, non-competitive levels, and

iv. "**Coercive Practice**" harming or threatening to directly or indirectly, persons or their property to influence their participation in the procurement process or affect the execution of a contract.

In addition to above, blacklisting of firms/individuals may be resorted to when the charges are of serious nature, which include but are not limited to the following:

2.2 Grounds at Competitive Bidding Stage

The procuring Agency shall impose on bidder(s)/JV/Entities/Consulting firm(s) or prospective bidders the penalty of suspension or blacklist them for a specific period for the offense from participating in the public bidding process, without prejudice to the imposition of additional administrative sanctions as the internal rules of the agency may provide and/or further criminal prosecution, as provided by applicable laws, for the following violations:

i. Indulging in Corrupt, Fraudulent as well as Collusive & Coercive Practices.
ii. Submission of eligibility requirements containing false information or falsified or spurious documents
iii. Submission of false/forged/unauthentic Bid Security/Pay Order/CDR or infringement of documents to get undue monetary or any other benefit.

iv. Submission of Bids that contain false information or falsified documents, or the concealment of such information in the Bids or making frivolous complaints and allegations in order to influence the outcome of eligibility screening or any other stage of the public bidding.

v. Unauthorized use of one's name, or using the name of another for purpose of public bidding.

vi. Withdrawal of a bid after submission, or refusal to accept an award, or enter into contract with the government without justifiable cause, after he had been adjudged as having submitted the Lowest Calculated Responsive Bid or Highest Rated/ranked Responsive Bid.

vii. Refusal or failure to submit the required performance security within the prescribed time limit.

viii. Any documented unsolicited attempt by a bidder to unduly influence the outcome of the bidding in his favor.

ix. All other acts that tend to defeat the purpose of the competitive bidding, such as but not limited to: an eligible contractor not buying bid documents from procuring agency or not complying with the requirements during bid evaluation, and contractors habitually withdraw from bidding for at least three (3) times within a year.

x. Bidder(s) (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the procuring agencies of the benefit(s) of free and open competition and any request for, or solicitation of anything of value by any public official in the course of the exercise of his duty;

xi. Involved in litigation or needless petitioning to influence or obstruct the procurement process either on his own behalf or at the behest of any other vested interest.

xii. Breach of confidentiality of evaluation process as mentioned in Appendix-I based on illegal access or in any way to get undue benefit or to provide benefit or to frustrate the bidding/evaluation process. This will also include attempts to sabotage the bidding process directly or indirectly.

xiii. Any effort by the bidder to influence the procuring agency in the examination, evaluation, ranking of Proposals, and recommendation for award of Agreement.

In addition to the penalty of suspension, the bid security posted by the concerned bidder or prospective bidder shall also be forfeited.

2.3 Grounds at Contract Implementation Stage

Without prejudice to the imposition of additional administrative sanctions as the internal rules of the procuring agency may provide and/or further criminal prosecution as provided by applicable laws, the procuring agency shall take against the contractors after the termination of the contract, the action of suspension for specific period from participating in the public bidding process, for violations committed during the contract implementation stage, which include but not limited to the following:

a. Indulging in Corrupt, Fraudulent as well as Collusive & Coercive Practices.
b. Extraordinary delay in signing or refusal to accept the Notification of Award (NOA) and/or the contract without any cogent reason.

c. Failure of the contractor, due solely to his fault or negligence, to mobilize and start work or performance within the specified period in the Notice of Award (NOA).

d. Submission of fake / frivolous or mutilated Performance Guarantee or Advance Payment guarantee etc.

e. Failure by the contractor to fully and faithfully comply with its contractual obligations without valid cause, or failure by the contractor to comply with any written lawful instruction of the procuring entity or its representative(s) pursuant to the implementation of the contract. For the procurement of infrastructure projects or consultancy contracts, lawful instructions include but are not limited *to* the following:

    i. Employment of competent technical personnel, competent engineers and/or work supervisors; and Deployment of committed equipment, facilities, support staff and manpower; and

    ii. Provision of warning signs and barricades in accordance with approved plans and specifications and contract provisions;

    iii. Stockpiling in proper places of all materials and removal from the project site of waste and excess materials**,** including broken pavement and excavated debris in accordance with approved plans and specifications and contract provisions;

    iv. Renewal of the effective dates of the performance security after its expiration during the course of contract implementation.

f. Assignment and subcontracting of the contract or any part thereof or substitution of key personnel named in the proposal without prior written approval by the procuring entity.

g. For the procurement of goods, unsatisfactory progress in the delivery of the goods by the manufacturer, supplier or distributor arising from his

fault or negligence and/or unsatisfactory or inferior quality of goods**,** as may be provided in the contract or as under:

i. Deviations from specifications and terms & conditions of the purchase order/contract.

ii. Provision of fake prototype/type test reports

iii. Provision of fake inspection call FAT/Type test

iv. Failure to rectify the fault/damage/problem during period of warrantee

v. Supply of goods through inappropriate way such as smuggling of goods

vi. Supply of stolen goods/re-sold goods.

vii. Provision of fake /forged custom /taxes /duties documents

h. For the procurement of consulting services, poor performance by the consultant of his services arising from his fault or negligence. Any of the following acts by the consultant shall be construed as poor performance and is liable to be Blacklisted:

i. Defective design resulting in substantial corrective works in design and/or construction;

ii. Failure to deliver critical outputs due to consultant's fault or negligence; and

iii. Specifying materials which are inappropriate, substandard, or way above acceptable standards.

iv. Allowing defective workmanship or works by the contractor being supervised by the consultant.

v. Submitting CV's of key personnel in the prequalifying process or bid documents of professionals that are not in actual employment of the bidder or without consent of experts.

vi. Acting together (Contractor & Consultant) in secret toward a fraudulent or illegal end

i. For the procurement of infrastructure projects, poor performance by the contractor or unsatisfactory quality and/or progress of work arising from his fault or negligence. Any of the following acts by the constructor shall be construed as poor performance:

i. Negative slippage of 15% and above within the critical path of the project due entirely to the fault or negligence of the contractor; and
ii. Quality of materials and workmanship not complying with the approved specifications/Drawing(s) arising from the contractor's fault or negligence.
iii. Unnecessary delay in completion of project

iv. Failure to rectify fault/problem/damages during defect liability.

j. Willful or deliberate abandonment or non-performance of the project or contract by the contractor resulting to substantial breach thereof without lawful and/or just cause.

k. In addition to above, other grounds for blacklisting of firms/individuals include but are not limited to the following:

i. Obtaining fraudulent payments;

ii. Obtaining contracts by misleading the purchaser;

iii. Refusal to pay IESCO dues etc.;

iv. Failure to fulfill contractual obligations Changes in the status of firm's ownership/partnership etc., causing dissolution of the firm which existed at the time of inspection prior to original registration of the firm

v. Registration of a firm with a new name by the Proprietor or family or a nominee thereof of a firm that has been already blacklisted;

vi. Contractors who have negotiated Plea Bargain under the National Accountability Ordinance 1999, or contractors involved with any other criminal proceedings conducted by any investigation agency where default has been proved specifically in relation to supplies made to or contracts concluded with IESCO or department thereof;.

vii. Non-compliance of the existing policy/rules/law of GoP during execution of contract.

viii. Hiring of underage personnel for assignments or works violating Child Labor (Prohibition and Regulation) Amendment Bill, 2016.

ix. Non-Adherence to safety codes.

For the Blacklisting of a Firm, in addition to the penalty of suspension for a certain period, the performance security posted by the contractor shall also be forfeited.

CHAPTER NO. 3

FORMULATION OF "IESCO STANDING COMMITTEE FOR BLACKLISTING"

3.1 Defining Structure of Committee

A permanent Committee namely "IESCO's Standing Committee for Blacklisting" comprising of the following members shall examine the justification of the reasons given by the Project Authority prior to blacklisting / debarment of any firm/supplier/contractor/ individual.

i.	**General Manager Technical**	**Convener**
ii.	Director General/ Manager (Legal) IESCO	Member
iii.	Representative of Finance Director (Not Less than the Rank of Manager)	Member
iv.	Deputy Manager (Village Electrification Cell)	Member
v.	Deputy Manager Procurement PMU	Member

The quorum for committee meeting will be 3 members including the Convener, the presence of Convener is mandatory. Committee shall evaluate the case and develop consensus however, in case of conflict among the member of committee, decision of convener shall be considered final.

3.2 Provision of Additional Member

Depending upon the nature of the case, the Committee may consult or appoint / nominate additional members from within IESCO with the approval of Chief Executive Officer (CEO) IESCO, provided that the Committee consists of an odd number of individuals as per spirit of Rule 48(1) of the PPRA Rules. Independence of any additional members shall be ensured while making the selection of such additional members. Furthermore, the aforementioned Standing Committee shall also be authorized to seek external expert advice or call any employee of IESCO as and when required.

3.3 Timeline for Finalization of Recommendations

The committee shall finalize its recommendations within the time specified in this mechanism.

CHAPTER NO. 4

PROCEDURE FOR SUSPENSION AND BLACKLISTING.

4.1 The Competitive Bidding Stage

4.1.1 Initiation of Action

Upon receipt of or obtaining information and / or knowledge that any person(s) is involved in practices mentioned in Article 2.1 and 2.2 of the Mechanism, the concerned project Authority / formation may initiate the suspension and blacklisting proceedings by filing its recommendations with the procuring agency or procuring agency also motu proprio (by itself) commence the proceedings upon prima facie (self-sufficient) determination that the bidder/ prospective bidder/ JV/ Person/Entity has committed any of the grounds for blacklisting during the competitive bidding stage as mentioned in article-2.1 & article-2.2 of the policy.

The Project Director or Project implementation Agency shall provide substantial evidence for the person/entity/JV/Firm against whom the case for blacklisting has been initiated.

4.1.2 Notification

Upon verification of the existence of grounds for blacklisting, the procuring agency shall immediately notify the contractor concerned in writing, advising him that:

a. Complaint for suspension and blacklisting has been filed against him, or he has been considered by the procuring agency for suspension and blacklisting, stating the grounds for such;
b. He has the opportunity to explain his position regarding why he should not be suspended and blacklisted;
c. Hearing shall be conducted before the procuring agency or “IESCO’s Standing Committee for Blacklisting”, upon his request, where he may present documentary evidence, verbal testimony and cross-examine the witnesses presented against him; and
d. The consequences of being suspended and blacklisted.

Within seven (7) calendar days from receipt of notification, the bidder shall submit its written answer with documentary evidence to the procuring agency or “IESCO’s Standing Committee for Blacklisting” with a manifestation for request of hearing to determine questions of fact, if he so desires. No time extension shall be allowed. if contractor fail to answer within the stipulated period, the procuring agency shall issue a resolution recommending its blacklisting with the immediate suspension of the contractor from participating in any bidding process of the agency for a certain period and the forfeiture of his bid security.

4.1.3 Hearings

If a hearing is requested by the contractor, the procuring agency shall immediately set the date and time for hearing. The hearing shall be non-litigious and shall be terminated within five (5) days. The procuring agency shall constitute an independent “Hearing Committee” comprising of odd Number members. The procuring agency may also invite a representative from PPRA or a duly recognized private group in a sector or discipline relevant to the procurement at hand as an observer for each hearing.

If no request is made, the procuring agency shall make a determination of the case based on the complaint, answer, documentary evidence submitted and facts verified. If the procuring agency is convinced that the contractor/bidder is at fault, it shall issue a resolution recommending for its blacklisting with suspension of the bidder from participating in any bidding process of the agency and the forfeiture of his bid security.

4.1.4 Decision

The Head of the Procuring Entity shall, within fifteen (15) days from receipt of the resolution and the records of proceedings, determine whether reasonable cause exists for the suspension of the contractor and the forfeiture of the latter’s bid security. If the Head of the Procuring Entity determines that such reasonable cause exists, he shall issue a decision regarding its blacklisting and suspending the contractor from participating in any bidding process of the agency, and further declaring that his bid security is forfeited. Otherwise, he shall dismiss the case.

The decision shall clearly and distinctly state the facts, evidence and the law on which it is based, as well as the date of effectiveness of the penalty, if any.

In case a contractor commits more than one offense or a combination of offenses for the same project/contract in a particular agency, each violation shall be met the corresponding penalty.

4.1.5 Notice of Decision

The procuring agency shall furnish the suspended contractor a copy of the decision immediately from its promulgation.

4.2 Contract Implementation Stage

4.2.1 Initiation of Action

Procuring Agency shall commence the proceedings upon prima facie (self-sufficient) determination that the contractor has committed any of the grounds for blacklisting during the contract implementation stage as mentioned in bidding document/Contract agreement or any event as mentioned in article-2.1 & article-2.3 of the policy of written complaint from Engineer/ consultant/ supervisory office.

The Project Director or Project implementation Agency shall provide substantial evidence for the person/entity/JV/Firm/Contract against whom the case for blacklisting has been initiated.

4.2.2 Notification

Upon verification of the existence of grounds for blacklisting, the procuring agency shall immediately notify the contractor concerned in writing, advising him that:

Within seven (7) calendar days from receipt of notification, the contractor shall submit its written answer with documentary evidence to the procuring agency with a manifestation for request of hearing to determine questions of fact, if he so desires. No time extension shall be allowed.

If the contractor fail to answer within the stipulated period, the procuring agency shall issue a resolution recommending the blacklisting with immediate suspension of the contractor from participating in any bidding process of the agency and the forfeiture of his bid security.

4.2.3 Hearings

If a hearing is requested by the contractor, the procuring agency shall immediately set the date and time for hearing. The hearing shall be non-litigious and shall be terminated within five (5) days. The procuring agency shall constitute an independent “Hearing Committee” comprising of odd Number members. The procuring agency may also invite a representative from PPRA or a duly recognized private group in a sector or discipline relevant to the procurement at hand as an observer for each hearing.

If no request is made, the procuring agency shall make a determination of the case based on the complaint, answer, documentary evidence submitted and facts verified. If the procuring agency is convinced that the contractor is at fault, it shall issue a resolution recommending for blacklisting with suspension of the contractor from participating in any bidding process of the agency and the forfeiture of his performance security.

4.2.4 Decision

The procuring agency shall, within fifteen (15) days from receipt of the resolution and the records of proceedings, determine whether reasonable cause exists for the suspension of the contractor and the forfeiture of the latter's performance security. If the Head of the Procuring Entity determines that such reasonable cause exists, he shall issue a decision for blacklisting the contractor with suspending the contractor from participating in any bidding process of the agency, and further declaring that his performance security is forfeited. Otherwise, he shall dismiss the case.

The decision shall clearly and distinctly state the facts, evidence and the law on which it is based, as well as the date of effectivity of the penalty, if any.

In case a contractor commits more than one offense or a combination of offenses for the same project/contract in a particular agency, each violation shall be met the corresponding penalty

4.2.5 Notice of Decision

The procuring agency shall furnish the blacklisted contractor a copy of the decision immediately from its promulgation.

CHAPTER NO. 5

REVIEW AGAINST DECISION OF THE PROCURING AGENCY

5.1 Filing an Appeal for Review against decision

The Contractor shall have the right to lodge request to review the blacklisting decision, if the same is convinced that some concrete evidence proves the case otherwise in favor of the Contractor. For this purpose, the same will file an appeal within five (5) days from receipt of the notice of decision.

5.2 Constituting Decision Review Committee

The procuring agency shall constitute an independent “Decision Review Committee” comprising of three members and external observer(s) preferably PPRA representative.

5.3 Timeline for Deciding the Appeal

Committee shall resolve with finality the review application within ten (10) days from the filing thereof and furnish blacklisted/suspended contractor/bidder a copy of the resolution immediately from its promulgation.

5.4 Finalization of the Decision

The decision of the committee shall become final and executor after the lapse of fifteen days from the receipt of the notice of decision or decision of review application. If an appeal is filed, the affirmed, modified or reversed decision shall become final and executory upon receipt thereof by the department and person/entity concerned. Upon finality of the decision suspending the contractor, the procuring agency shall issue a Blacklisting Order disqualifying the erring contractor from participating in the bidding of all projects.

CHAPTER NO. 6

APPEAL

6.1 Filing an Appeal with the Authority

The Contracting Firm shall have the right to file an appeal with the Authority within ten days from the date of receipt of the decision for either or both of the following causes, provided that only a single application shall be filed with the Authority:

a. The decision is not in conformity with the evidence and/or facts presented, hence does not construe grounds for Blacklisting laid down under Rule 19 of the PPRA Rules – 2004; and
b. Newly discovered evidence or facts which could not be discovered and produced at the investigation and which when presented would probably alter the result of the investigation.

CHAPTER NO. 7

PERIOD OF DEBARMENT

7.1 Period of Debarment for Blacklisted Firms

The Blacklisting shall be for a reasonable specified period of time and as a general rule of prudence, the period may not exceed three years. The following time periods shall be considered for debarment on account of blacklisting;

Causes of Blacklisting	Time for Debarment
Corrupt & fraudulent & collusive practices, criminal breach of trust.	03 years
Submission of fake documents including financial instruments like securities & guarantees, submission of false Financial statement / Audit reports etc.	03 years and forfeiture of securities
Making false statement and allegation to gain undue advantage	03 years and forfeiture of securities
Commission of embezzlement, theft, cheating, forgery, bribery, falsification or destruction of records, receiving stolen property, false use of trademark, securing fraudulent registration, giving false evidence, furnishing false information.	03 years and forfeiture of securities
Breach of confidentiality of evaluation process as mentioned in Appendix 1 hereto	06 month to 02 years as mentioned in Appendix-1 and forfeiture of securities
Extraordinary delay in signing or refusal to accept a procurement contract without cogent reasons, when the bid has been accepted by IESCO	06 month to 02 years as determined by the committee and forfeiture of securities
Non-satisfactory performance as mentioned in Appendix-2	2 years and forfeiture of securities
The contractor was blacklisted by the government or the donor agency and subsequently adopted by IESCO	3 years or the time period for which the concerned agency debarred the contractor, whichever is higher

In case the person/ contractor / firm/ consortium appeared in Consolidated Blacklisting Report shall also be considered debarred in participation of bidding process.

Note: **All the penalties given herein above will be in addition to the consequences already agreed upon by the parties in the contract or any other documents.**

CHAPTER NO. 8

APPRAISAL TO PROCUREMENT COMMITTEE/BOARD OF DIRECTORS

8.1 Appraisal of Blacklisted Firms to Procurement Committee/ Board of Directors (BoD)

The Procuring Agency shall apprise the Procurement Committee/Board of Directors (BoD) before communicating its Blacklisting decision to the Authority, if a Firm/Company/Bidder/JV/Manufacturer/Subcontractor/ Consultant etc. is declared blacklisted by the IESCO.

CHAPTER NO. 9

COMMUNICATION OF NOTIFICATION TO AUTHORITY

9.1 METHODOLOGY FOR COMMUNICATION OF NOTIFICATION TO THE PPRA/NTDC/WAPDA/DISCOS

9.1.1 Unless otherwise provided in these policies, the blacklisting agency concerned shall submit to the PPRA /NTDC/WAPDA /DISCOs, within seven (7) calendar days after the issuance of the blacklisting order/delisting orders made by the agency, the following documents:

a. Blacklisting Order duly signed by the Head of procuring agency containing, among others, Department/Office Order or Board Resolution number, name and address of the blacklisted person/entity, license number, if applicable, project/contract and location/amount, specific ground(s)/offense(s) committed as provided in article-9, sanction imposed and its date of start and completion, date of issuance of the order to blacklist, and other conditions which can extend duration of sanctions in article-9.

b. Delisting Order duly signed by the blacklisting agency containing, among others, Department/Office Order or Board Resolution number, name and address of the blacklisted person/entity, name of project/contract and location, specific sanction being lifted and the number of previously issued blacklisting Department/Office Orders or Board Resolutions, effectively date of delisting, and date of delisting approval.

9.1.2 The PPRA shall prepare the Consolidated Blacklisting Report every quarter, based on the submitted Blacklisting Orders and disseminate the same to procuring agencies. The report shall be further posted in the PPRA website and shall indicate the number of times a person/entity has been blacklisted, the type of offense/violation committed, the penalty imposed, and the blacklisting agency concerned. The PPRA shall delist from such report those whose sanctions are lifted automatically after serving the given penalty as provided for in article-9 hereof and those whose sanctions are lifted through the issuance of Delisting Orders.

9.1.3 In the case of procurement of infrastructure projects, a blacklisting agency should decide to refer the case of its blacklisted person/entity to Pakistan Engineering Council (PEC)/SECP for license suspension/revocation, it shall submit

to PEC/SECP a copy of the decision accompanied with supporting documents.

9.1.4 All existing blacklisting reports of the Government or any of its procuring agencies, as well as the list of constructors/Consultant/consulting firms whose licenses are suspended or revoked by the PEC as of the date of effectiveness, are hereby adopted and made part of the PPRA Consolidated Blacklisting Report upon the issuance of these orders.

9.2 EFFECTIVENESS

These guidelines / mechanism or any amendments thereof shall take effect immediately after its approval from Board of Directors of IESCO.

9.3 AMENDMENTS

In the implementation of this policy, the IESCO/PPRA may introduce modifications thereto through the amendment of its specific provisions as the need arises. Any amendment to this policy shall be applicable to government projects advertised for bid after the effectiveness of the said amendment.

9.4 DELISTING

A blacklisted person/entity shall automatically be delisted after the period for the penalty shall have elapsed, unless the blacklisting agency requests the PPRA/NTDC/DISCOs/WAPDA to maintain the blacklisted person/entity in the PPRA/PPRA/NTDC/DISCOs/WAPDA Consolidated Blacklisting Report due to justifiable reasons. In the latter case, the blacklisted person/entity shall be delisted only upon the blacklisting agency's issuance of a Delisting Order.

APPENDIX-1

PROCESS TO DEAL WITH COMPLAINTS

It has been frequently observed that after opening of tenders, the bidders start to influence the evaluation process. Such misleading attempts results in delay in finalizing of award of contract and cause financial loss to the National exchequer and stain its sanctity. The evaluation process is confidential till publication of award of contract process.

Provision of guidelines of international donor agencies and PPRA provides sufficient opportunity to bidders for redressal of their grievances. Hence, the attempts made by the bidders during evaluation process or thereafter to influence the contract award decisions fall under the definition of corrupt and fraudulent practices. Therefore, during bidding stage, the following mechanism shall be adopted in case of receipt of any complaint from the bidder.

i. Anonymous complaints shall not be entertained.

ii. The Procuring Agency reserves the right to call for an affidavit from the complainant verifying the truthfulness and correctness of the contents of the complaint.

iii. The notice of displeasure and explanation will be immediately sent to those firms who lodge the complaint during the evaluation process.

iv. If the firm itself or through its agent or any third party does not refrain from making complaints in the same tender, the official warning will be sent and their case will be sent to IESCO's Rights Protection Committee which may analyses the situation and suggest action including the rejection of the bid of the complainant, However, Project Authority with prior approval of CEO IESCO. May reject the bid even in first instance depending upon nature of the case or provision of the Bidding Documents.

v. If the same bidder itself or through its agent or any third party lodges complaint in another tender floating in parallel before decision of Committee, its bid will straight forwardly be rejected by the project authority. It may also be debarred to participate in the next tender for six months under intimation to the Committee and CEO IESCO.

vi. If the same bidder itself or through its agent or any third party lodges complaint third time in the same or any other tender within a period of one years, its bid will be rejected and bid security will be forfeited by the project authority. It may also be debarred to participate in the next tender for one year under intimation to the committee and CEO IESCO.

vii. In order to monitor the record of the bidders, a data base will be maintained at IESCO's website and the offices of the project authorities regarding firms / supplier / contractors/consultant who consistently lodge complaints during the evaluation process by making clandestine access to confidential record and hamper the award of contract process.

viii. In order to monitor the record of the persons, a data base will be maintained at IESCO's website and offices of the project authorities regarding such persons who consistently lodge frivolous complaints during the evaluation process by making clandestine access to confidential record and hamper the award of contract process.

NOTE:

It is clarified that the process provided above in Appendix-I is to discourage anonymous and frivolous complaints only and does not mean to prevent any person aggrieved by any act of the procuring agency from lodging a genuine complaint /grievance as provided under Rule-48 of the PPRA Rules-2004.

APPENDIX-2

GUIDELINES FOR EVALUATION OF PERFORMANCE OF CONTRACTORS

i. After signing of the contract, the Project authority (or the Consultant / Engineer) must monitor and evaluate the Contractor's performance, that is, whether the Contractor is fulfilling his obligations based on the terms of the contract and plans that were developed and agreed upon with the Project authority at the time of signing of contract or during kick-off meetings. In case of breach of contract or consistent non-performance security or debarment / blacklisting.

ii. Though the contractor's performance evaluation is an on-going process, which takes place throughout the duration of the contract and also during the Defect Liability / Warranty Period, hence a Contractors Performance Evaluation Report shall be drafted by the project authority once all of the contractual obligations of the latter have been completed so that the project authority have gained a more complete picture that will help it in formulating a more objective judgment.

iii. The performance evaluation report may be prepared for all contracts of more than Rs. 50 million. When based on the Evaluation Report, the performance of the contractor is non-satisfactory in. EPC contract(s) (or the contractor receives 02 No Notices of Default within same contract or against consecutive contract (s) within a period of 2 years) and 03 No supply contracts awarded within a period of 02 years, the procuring agency may initiate the case of blacklisting of the contractors in accordance with the terms of this mechanism.

iv. In case of any extra-ordinary delay in performance of a single contract of vital and critical importance, the procuring agency shall have the right to terminate the contract, recover the loss and debar the bidder/firm/JV/contractor/consultant from participation in future tenders. The procuring agency shall be the sole judge to determine the importance of the project.

v. The above said assessment will be in addition to the provisions already agreed by the parties in the contract or any other documents.

ISLAMABAD ELECTRIC SUPPLY COMPANY LIMITED

No. /IESCO/ISB Dated:

Form for Hearing

Through Registered AD, Courier Service or email or Fax

_____

_____

_____

1. A committee for investigation of blacklisting Proceedings in furtherance of Rule 19 PPRA, 2004 has been constituted to investigate and decide upon the allegations at Para-2/below. You are required to appear in person or defend in writing with evidence on_____ at IESCO Head Office as to why you should not be blacklisted for:

2.

**********Add charge**********

3. You are being given an opportunity to be heard and are required to appear in person or defend in writing with evidence on————————at IESCO Head Office. In case of you failure to attend or pay heed the Committee shall proceed ex-parte.

4. [To be added in the third notice]. As of final notice you are directed to furnish a satisfactory explanation in writing with supporting evidence within three days of receipt of this notice, to show cause as to why the blacklisting penalty may not be imposed. Failing to pay heed to this last notice shall stand a presumption against you that you have no explanation to offer and the matter shall be proceeded ex-part.

General Manager (Technical)
IESCO Head Office,
Street No. 40, Sector G-7/4.
Islamabad - 46000

NATIONAL TRANSMISSION & DESPATCH COMPANY

CHIEF ENGINEER (SUBSTATION DESIGN) NTDC

No. CESSD/NTDC/MSR/DM-II/AM-III/ 455-97 **Date** 13 **/04/2023**

1. M/s FICO Engg Co. (Pvt). Ltd, Office No. 41, Ground floor, Leeds Centre, Gulberg III, Lahore.
2. M/s Pak Elektron Ltd., 14-Km, Ferozepur Road, Lahore.
3. M/s Perfect Elektro Mek (PEMPAK), 22-A Perfect Site, 21-km, Ferozepur Road, Lahore.
4. M/s Tariq Electric (Pvt). Ltd, Taij Garh Road, Yadgar Shuhada Stop, G.T. Road, Manawan Lahore.
5. M/s Zubair Ghaznfar (Pvt.) Ltd. (ZGL), 15km, Sheikhupura Road, Faisalabad.
6. M/s Network Services International (NSI), 8km, Main Raiwind Road, ADJ. ABB Turbocharger, Lahore.
7. M/s M.K Engg. (Pvt.) Ltd, Al-Jannat Road, Chowk Masjid Nimra, Sagian Bypass, Lahore.
8. M/s Bilal Switchgear Engineering (Pvt) Ltd, Plot No.1, Street No.5, Muhammad Nagar, 28-Allama Iqbal Road, Lahore.
9. M/s Green T&D, 104-J Johar Town, Lahore.
10. M/s South Asian Electric Concern, Hanif Park Opposite, Afzaal Pul (Canal Bank) Harbanspura, Lahore.
11. M/s Ghafoor Engineering, Service Road, Mehmood Booti, Lahore.
12. M/s Multi-tech, Office No. 4, 2nd Floor Liaqat Plaza, Liaqat Chowk, Sabzazar, Lahore.
13. M/s Siemens Pakistan Engg. Co., 15-A, Sir Agha Khan Road, Lahore.
14. M/s Schneider Elect. Pak. Pvt. Ltd., 14-A, Ali Block, New Garden Town, Lahore.
15. M/s GE Grid Solution, 71B Garden Block, Garden Town, Lahore.
16. M/s ABB Pakistan Engg. Congress Building, 97-A/D-I, Gulberg III, Lahore.
17. M/s Siddique Sons Engineering (SSE), T-02 (A&B), 3rd Floor, Rehman Business Centre, 32-B-III, Gulberg-III, Lahore.
18. M/s EPESOL Pvt. Ltd., 71-B Garden Block, New Garden Town, Lahore.
19. M/s Baig Electric Co. (Pvt.) Ltd., 2-Km, Katar Bund Road, Off Multan Road, Thokar Niaz Baig, Lahore.
20. M/s Elmetec (Pvt.) Ltd, 19-km, Ferozepur Road, Lahore.
21. M/s Metels Technologies, Rana Nisar Ahmad Road, 1-Km Bhoptian Chowk, Defence Road, Off Raiwind Road, Lahore.
22. M/s M-Tech International (Pvt). Ltd., 22-km Off Ferozepur Road, Lahore.

SUBJECT: **ADDITIONAL SAFETY MEASURES IN 11KV METALCLAD SWITCHGEAR PANEL**

In order to improve the reliability and human/equipment safety while manufacturing 11kV metal clad switchgear panels, the following additional safety measures are recommended by this office in light of the clause 7.3.3 of NTDC Specification P-44:2018 (amended to date):

- It shall be possible to move the circuit breaker from service position to test position and vice versa without opening the circuit breaker compartment door.
- The circuit breaker shall not move from test to service position unless the circuit breaker compartment door is closed.
- The circuit breaker compartment door shall not open unless the circuit breaker is in the test position.
- Provisions for opening the Circuit breaker compartment door in case of an unusual circumstance shall be provided by a security key.

143-WAPDA House, Lahore. ☎: +92-42-99202190 : +92-42-99202502 : ce.sd@ntdc.com.pk

- In addition to that, you are also advised to add the following warning on instruction plate of panel.

  "Only authorized personnel is allowed to use the security key to open the circuit breaker compartment door in an unusual circumstance after de-energizing the panel."

The above recommendation shall be followed in true letter and spirit.

This is being issued with the approval of Chief Engineer (Substation Design) NTDC.

MANAGER (S&R) SSDESIGN
O/O CHIEF ENGINEER (SS DESIGN) NTDC

Copy to:

1. GM (D&E) NTDC, WAPDA House Lahore.
2. CEO FESCO, Canal Road, Abdullahpur, Faisalabad.
3. CEO GEPCO, 565-Model Town, G.T Road, Gujranwala.
4. CEO HESCO, WAPDA Offices Complex Hussainabad, Hyderabad.
5. CEO IESCO, Street No. 40, Sector G-9/4, Islamabad.
6. CEO LESCO, LESCO H/Q, Queens Road, Lahore.
7. CEO MEPCO, MEPCO Complex Khanewal Road, Multan.
8. CEO PESCO, Mini WAPDA House, Shami Road, Peshawar.
9. CEO TESCO, Mini WAPDA House, Shami Road, Peshawar.
10. CEO QESCO, Zarghoon Road, Quetta.
11. CEO SEPCO, Al-Sehra Building, Minara Road, Sukkur.
12. CE(S&S) NTDC, 1st Floor, PIA Tower Egerton Road Lahore.
13. CE (Dev) PMU FESCO, Canal Road, Abdullahpur, Faisalabad.
14. CE(Dev) PMU GEPCO, 565-Model Town, G.T Road, Gujranwala.
15. CE(Dev) PMU HESCO, WAPDA Offices Complex Hussainabad, Hyderabad.
16. CE Dev) PMU IESCO, Street No. 40, Sector G-7/4, Islamabad.
17. CE Dev) PMU LESCO, LESCO H/Q, Queens Road, Lahore.
18. CE(Dev) PMU MEPCO, MEPCO Complex, Khanewal Road, Multan.
19. CE(Dew) PMU PESCO, Mini WAPDA House, Shami Road, Peshawar.
20. CE(Dev) PMU TESCO, Mini WAPDA House, Shami Road, Peshawar.
21. CE(Dev) PMU QESCO, Zarghoon Road, Quetta.
22. CE(Dev) PMU SEPCO, Al-Sehra Building, Minara Road, Sukkur.
23. Manager (GS) SSD, NTDC, Wapda House Lahore for information and to ensure implementation of above recommendations during protype/type test approvals.
24. Master File.

143-WAPDA House, Lahore. ☎: +92-42-99202190 ☎: +92-42-99202502 ✉: ce.sd@ntdc.com.pk

Manager Design (EHV)
No 4011
Date 24-06-2022

24/6/22

NATIONAL TRANSMISSION & DESPATCH COMPANY

CHIEF ENGINEER (SS DESIGN) NTDC

No. CED/NTDC/MSR/DM-II/110/ 8337-90 DATE 23 /06/2022

1. M/s FICO Engg. Co. (Pvt.) Ltd., Office No. 41, Ground Floor, Leeds Centre, Gulberg III, Lahore
2. M/s Pak Elektron Ltd., 14-km, Ferozepur Road, Lahore
3. M/s Perfect Elektro Mek (PEMPAK), 22-A Perfect Site, 21 -km Ferozepur Road, Lahore
4. M/s Tariq Electric (Pvt.) Ltd., Taij Garh Road, Yadgar Shuhada Stop, G. T. Road, Manawan, Lahore
5. M/s Zubair Ghazanfar (Pvt.) Ltd. (ZGL), 15km, Sheikhupura Road, Faisalabad
6. M/S Network Services International (NSI), 8 km, Main Raiwind Road, ADJ. ABB Turbocharger, Lahore
7. M/s M.K Engg. (Pvt.) Ltd., Al-Jannat Road, Chowk Masjid Nimra, Saglan By-pass, Lahore
8. M/s Bilal Switchgear Engineering (Pvt) Ltd., Plot No. 1 , Street No. 5 Muhammad Nagar, 28Allama Iqbal Road, Lahore
9. M/s Green T&D, 104 - J, Johar Town, Lahore
10. M/s Ghafoor Engineering, Service Road, Mehmood Booti, Lahore
11. M/s South Asian Electric Concern, Hanif Park Opp. Afzaal Pul (Canal Bank) Harbanspura, Lahore
12. M/s Multi-tech, Office No. 4, 2nd Floor Liaquat Plaza, Liaquat Chowk, Sabzazar, Lahore
13. M/s Siemens Pakistan Engg. Co., 15-A, Sir Agha Khan Road, Lahore
14. M/s Schneider Elect. Pak. (Pvt.) Ltd., 14-A, Ali Block, New Garden Town, Lahore
15. M/s GE Grid Solution, 71 B Garden Block, Garden Town, Lahore
16. M/s ABB Pakistan Engg. Congress Building, 97-A/D-I, Gulberg III, Lahore
17. M/s Alstom Pakistan (Pvt) Ltd, 3 rd Floor, K.S.B Building, 16/2 Sir Agha Khan Road-3, Lahore
18. M/s Siddique Sons Engineering (SSE), T-02 (A&B), 3 rd Floor, Rehman Business Centre, 32-B111, Gulberg-III, Lahore
19. M/s EPESOL Pvt. Ltd., 71-B Garden Block, New Garden Town, Lahore
20. M/s Elmetec (Private) Limited, 19 km, Ferozepur Road, Lahore
21. M/s Baig Electrical Co. (Pvt.) Ltd. 2-14m, Katar Bund Road, Off. Multan Road , Thokar Niaz Baig , Lahore
22. M/s Metalx Technologies, Rana Nisar Ahmad Road, I km Bhoptian Chowk, Defence Road, Off Raiwind Road, Lahore
23. M/s M-Tech International (Pvt.) Ltd., 22-km Off Ferozepur Road, Lahore

SUBJECT: NTDC SPECIFICATION P-44:2018 FOR 11 KV METAL-CLAD SWITCHGEAR PANELS

It is intimated that Amendment-01 in NTDC specification P-44:2018 for 11 kV Switchgear Panels has been approved by the competent authority for use in future and attached herewith for circulation amongst various departments of NTDC, DISCOs, PPMC etc.

22/6/22

CHIEF ENGINEER (SS DESIGN) NTDC

Cc:
1. Dy. Managing Director (P&E), NTDC, WAPDA House Lahore
2. Dy. Managing Director (AD&M), NTDC, WAPDA House Lahore
3. General Manager (D&E) NTDC, 157- WAPDA House Lahore
4. GM (Asset Management) North, NTDC, 411- WAPDA House Lahore
5. GM (Asset Management) South, NTDC, RCC Building, Sehwan Road, Jamshoro
6. GM (Technical) NTDC, WAPDA House Lahore

143-WAPDA House, Lahore ☎: +92-42-99202190 🖷:+92-42-99202502

Cc:

7. GM (TSG),NTDC, NKLP, Lahore
8. GM (Technical) PPMC, 5th Floor, Evacuee Trust Complex, Islamabad
9. Chief Engineer (P&C) NTDC, 130- WAPDA House Lahore
10. Chief Engineer (S&S) NTDC, PIA Tower Lahore
11. Chief Engineer (PMU) NTDC, WAPDA House Lahore
12. Chief Engineer (HV&SC) Lab Rawat, Islamabad
13. Chief Engineer (C&M) NTDC, WAPDA House Lahore
14. CE (Dev) PMU FESCO, Canal Road, Abdullahpur, Faisalabad
15. CE (Dev) PMU GEPCO, 565-Model Town, G.T Road, Gujranwala
16. CE (Dev) PMU HESCO, WAPDA Offices Complex, Hussainabad, Hyderabad
17. CE (Dev) PMU IESCO, Street No. 40, Sector G-7/4, Islamabad
18. CE (Dev) PMU LESCO, LESCO H/Q, Queens Road, Lahore
19. CE (Dev) PMU MEPCO, MEPCO Complex, Khanewal Road, Multan
20. CE (Dev) PMU PESCO, Mini WAPDA House, Shami Road, Peshawar
21. CE (Dev) PMU TESCO, Mini WAPDA House, Shami Road, Peshawar
22. CE (Dev) PMU QESCO, Zarghoon Road, Quetta
23. CE (Dev) PMU SEPCO, Al-Sehra Building, Minara Road, Sukkur
24. Engr. Farooq Rashid, Chief Engineer o/o GM (PSP), NTDC
25. All Managers of Substation Design Department, NTDC
26. PS to MD NTDC

- Master File/ Relevant File

NTDC SPECIFICATION NO. P-44:2018
11 kV METALCLAD SWITCHGEAR
AMMENDMENT NO. 01

Following amendment in the light of Table-5 of IEC 61869-1 is being made in NTDC specification No. P-44:2018 for insulating material class "E":

1. Replace existing Sr. No. (k) of Clause 13.6 with the following:

Sr. No.	Type Designation	Metering (M)	Protection (P)	Metering and Protection (MP)
k)	Temperature rise, °C, Max	65	65	65

2. Replace existing Clause 13.8.1 with the following:

Temperature Rise

The temperature-rise of the current transformers when carrying primary current equal to the rated continuous thermal current (1.2 times the rated current) with a unity power factor & burden corresponding to the rated output under service conditions shall not be more than 65°C.

Specification Review Committee		
Engr. Taqi-ud-Din Chief Engineer (P&C), NTDC	Engr. Muhammad Shoaib Chief Engineer (C&M), NTDC	Engr. Shahid Shafi Sial Chief Engineer (SS Design), NTDC
Engr. Farooq Rashid Chief Engineer (PSP), NTDC	Engr. Anwar Ahmad Khan General Manager (AM), NTDC	Engr. Dr. Khawaja Riffat Hassan General Manager (D&E), NTDC

Annex-A

NTDC SPECIFICATION P-44-2018 FOR 11kV METAL CLAD SWITCHGEAR PANELS AMENDMENT NO. 1

1. **Clause 12.5.2.3** revised as:

   Five Element Over Current & Earth Fault Relay shall be provided for capacitor panel in which the fifth element of relay shall be SEF element for connection to neutral unbalance relay. However, if the manufacturer intends to provide 4 element relay, in which for Phase to Earth Fault Detection Derived or residual feature/function to be used this may be acceptable, but in such cases Fourth Element shall be SEF for connection to Neutral Unbalance Protection. The minimum pick up value of Sensitive earth fault element shall be 1% of rated CT current. For detail specification clause 12.5.1 shall be followed.

2. **Clause 12.5.1.5 (g)** revised as:

   Over Current & Earth Fault relays with built-in sensitive earth fault protection (Note: Sensitive Earth Fault Protection feature shall only be provided in case system is grounded via. resistor or transformer or as per application required) shall have a minimum setting range of 1% to 120% of rated CT current for sensitive earth fault with tapping of minimum 0.1% interval.

3. **Clause 12.5.1.5 (h)** revised as:

   The high set Sensitive Earth fault protection shall have a minimum setting range of **1% to 150%** of rated CT current with tapping of minimum 0.1% interval.

4. **Clause 12.5.1.10** revised by dropping SOTF feature as,

   The relay shall have built-in Cold Load Pick-Up, Broken Conductor, Negative Sequence Overcurrent and Inrush Harmonic Restraint features with settable time delay.

5. **Clause 12.5.5.4** revised as:

   The relay shall also initiate an alarm if the continuity of supply to tripping circuit or DC auxiliary supply fails. The relay shall be equipped with at-least 1 NO and 1 NC contacts or alternatively with 2 way changeover contacts (for any additional contact as per scheme requirements multiplication of contacts may be performed using auxiliary relay). All contacts for alarm functions shall be volt –free and self-reset on healthiness of both tripping circuit and DC auxiliary supply.

6. **Clause 12.5.3.5** is added as:

   The Over/Under Voltage relay shall have 3 Phase P.T./V.T. input connections.

7. **Clause 12.3.5 (h)** revised as:

Shall have serial interfaces RS-232, USB or RJ45 (Two ports one at front and one at back) & IEC 61850 compliant single Fibre Optic port (for NTDC & IPPs) for on-line and off-line transmission of relay operation data, feeder load data, sequential event and fault recording , remote setting etc.

8. **Clause 12.5.1.5 (d)** revised as:

The high set over current & earth fault element shall have a setting range of 100% to **at least 2000%** of rated CT current with tappings a minimum of 5% intervals. The tripping time of high set elements shall not be more than **40 ms** at current greater than two times the setting.

9. **Clause 12.2.1** revised as:

System frequency is 50Hz and continuous operating temperature shall be in range from -10°C to 55°C.

10. **Clause 20.2.5** revised as:

Type tests carried out on a representative switchgear outgoing panel of a manufacturer shall be applicable to industrial and consumer switchgear panel(s) provided that the circuit breaker & all allied accessories/equipment to be used shall exactly be of same design & geometry like shape & dimensions, their operating conditions, current & voltage ratings, breaker capacity, country of origin etc. subject to performance of Short time withstand and peak withstand current test, Dielectric test and temperature rise test as specified at an independent lab approved by Design NTDC.

Type tests carried out on 11kV outgoing switchgear panel in compliance to Clause 20.2 of this specification shall be applicable for 11kV capacitor bank control switchgear panel provided the circuit breaker & all allied accessories/equipment to be used of same design & geometry like shape & dimensions, their operating conditions, current & voltage ratings, breaker capacity, country of origin etc.

11. **Clause 7.1.2** , following lines be added at the end:

For 11kV industrial panel, energy storing device of CB shall only be charged manually by hand crank.

(Dr. Khawaja Riffat Hassan)
General Manager (Design & Engineering) NTDC
(Member)

(Engr. Sajid Ullah)
General Manager (Asset Management) North NTDC
(Member)

(Engr. Manzoor Ahmed)
General Manager (Project Delivery) North NTDC
(Member)

(Engr. [illegible])
Chief Engineer (SS Design) NTDC
(Secretary)

(Engr. Bashir Ahmed Bhatti)
General Manager (Technical) NTDC
(Convener)

NATIONAL TRANSMISSION & DESPATCH COMPANY

CHIEF ENGINEER SUBSTATION DESIGN (NTDCL)

No. CED/NTDC/MGS/ 17321-35 Dated: 15/10/2019

M/s All Panel Manufacturers

SUBJECT: **ACCURACY TEST OF ENERGY METER FOR THE INSPECTION OF MEDIUM VOLTAGE SWITCHGEAR PANELS**

The accuracy test is required to be performed on energy meters installed in all type of panels offered for inspection as per specification P-44-2018 (amended to date). The accuracy test of energy meter will be witnessed by nominated inspector. Therefore, you are advised to make necessary arrangement for the said testing before offering the panels for inspection.

CHIEF ENGINEER SS DESIGN (NTDC)

15-10-19

C.C:

i) G.M (D&E)
ii) All Managers under Chief Engineer SS Design
- Master file

143-WAPDA HOUSE Lahore Ph # 042-99202638 Fax # 042-99202502 Email: cedesign@ntdc.com.pk

NATIONAL TRANSMISSION & DESPATCH COMPANY

CHIEF ENGINEER (SS DESIGN) NTDC

No. CED/NTDC/MSR/ 10728-32 DATE 24/07/2018

M/s FICO Engg. Co. (Pvt.) Ltd., Office No. 41, Ground Floor, Leeds Centre, Gulberg III, Lahore
M/s Pak Elektron Ltd., 14-km, Ferozepur Road, Lahore
M/s Elmetec (Private) Limited, 19 km, Ferozepur Road, Lahore
M/s Baig Electrical Co. (Pvt.) Ltd. 2-Km, Kutar Bund Road, Off. Multan Road , Thokar Niaz Baig ,Lahore
M/s Metelx Technologies, Rana Nisar Ahmad Road, 1km Bhoptian Chowk, Defence Road, Off Raiwind Road, Lahore

SUBJECT: **RESERVATIONS REGARDING CT/PT SECTION OF REVISED NTDC SPECIFICATION P-44:2018**

Ref: 1) This office letter No. CED/NTDC/MSR/9077-81 dated 19.06.2018
2) Your letter dated 25.06.2018

The matter is already discussed by this office with Chief Engineer (Protection & Control), NTDC and communicated to you vide this office letter referred at *[1]*. i.e.

Reservation No. 6

Clause 13.6: Notes (b)

It is clarified that rated VA burden for metering core of CT may be considered as 10 VA at all secondary winding tap position i.e. remains the same irrespective of CT ratio for accurate measurement of reading/metering.

Whereas the VA burden for protective core of CT is 15VA at secondary lowest tap position and shall be multiplied correspondingly on higher taps for protection considerations.

Moreover, you can proceed to finalize CT/PT design as per proposed dimensions submitted vide your letter referred at *[2]*.

25.07.18
(Muhammad Iqbal)
MANAGER SS DESIGN (S&R)
O/o CHIEF ENGINEER (SS DESIGN) NTDC
25/7/2018

143-Wapda House Lahore Ph. #: +92-42-99202190 Fax: +92-42-99202502

The General Manager (T&D)
WAPDA House, Lahore

Date: 25-June-2018

Subject: Reservations Regarding Revised Specification P-44:2018

Dear Sir,

With reference to your letter CED/NTDC/MSR/9077-81 Dated 19-06-2018, We like to submit as follows;

Reservation No. 5

As already submitted in our letter dated 23.04.18, VA Burden for metering & Protection in a particular panel remains the same irrespective of CT ratio. Also no such requirement is given in IEC.

Therefore as agreed by you for metering core the VA Burden for protective core should also be considered as 15VA irrespective of all secondary winding positions.

Thanking you and assuring you of our best cooperation at all times.

For & on behalf of following Managers of 11KV CTs and PTs

Mehfix Technologies

Fico Electric (Pvt)Ltd

Pak Elektron (Pvt)Ltd.

Baig Electrical Co (Pvt) Ltd

Elmetec (Pvt) Ltd

CE (Design) NTDC

No. 5627		Date 26/6/18	
Projects	T/L	PP	EHV
AM (A)	Civil	GS	S&R

Director (Design) S & R
Diary No. 955
Dated 27-6-18

For review and comments of this office as well as from (ELPAC)

Scanned by CamScanner

The General Manager (T&D)
WAPDA House, Lahore

Date: 25-June-2018

Subject: Reservations Regarding Revised Specification P-44:2018

UNDERTAKING

With reference to your letter No. CED/NTDC/MSR/9077-81 dated 19.06.18, Reservation No. 7, we the following manufacturers UNDERTAKE that the Drawings of 11 kv CT's & PT's submitted by us will comply with NTDC specification P-44:2018

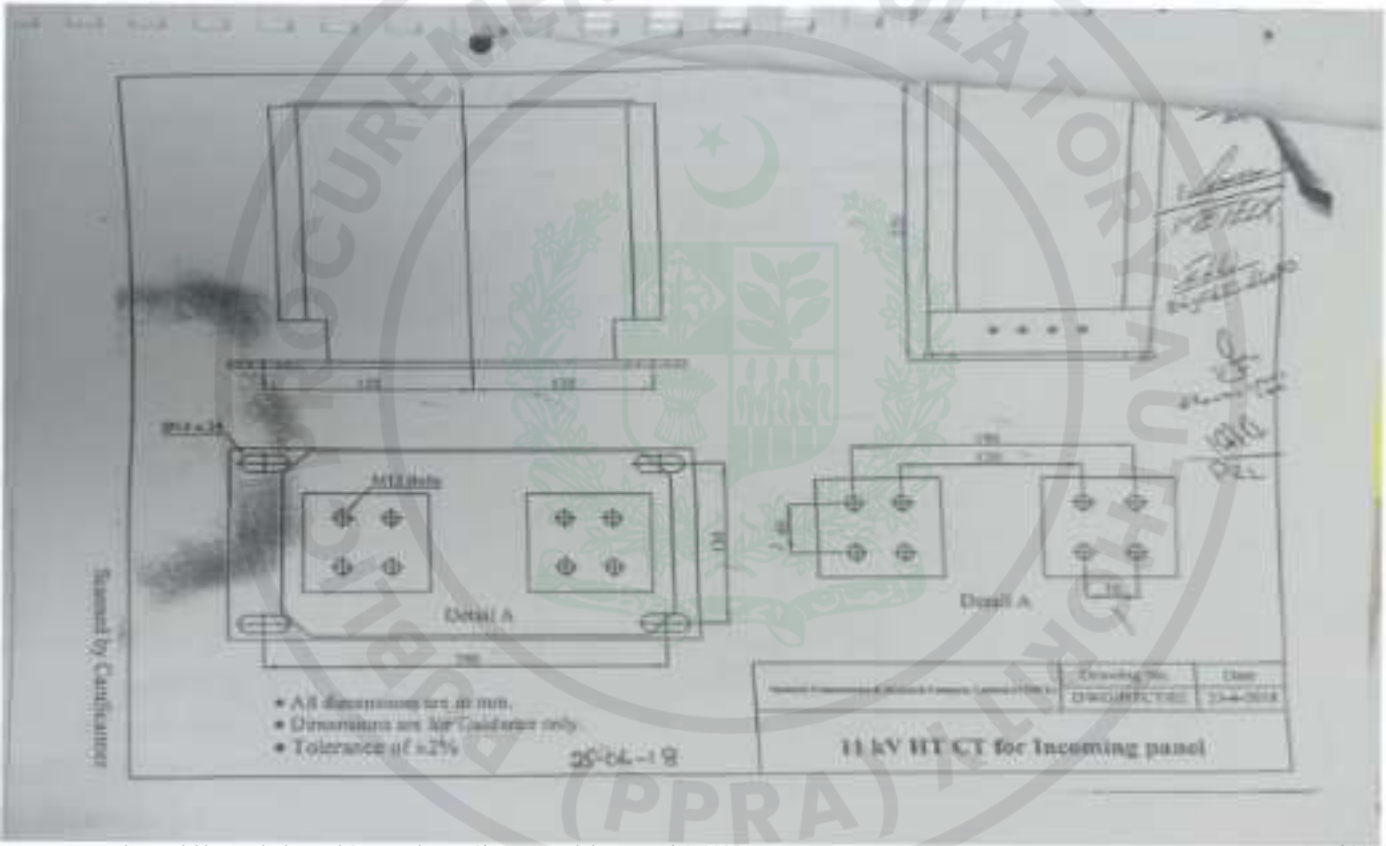
Metelx Technologies

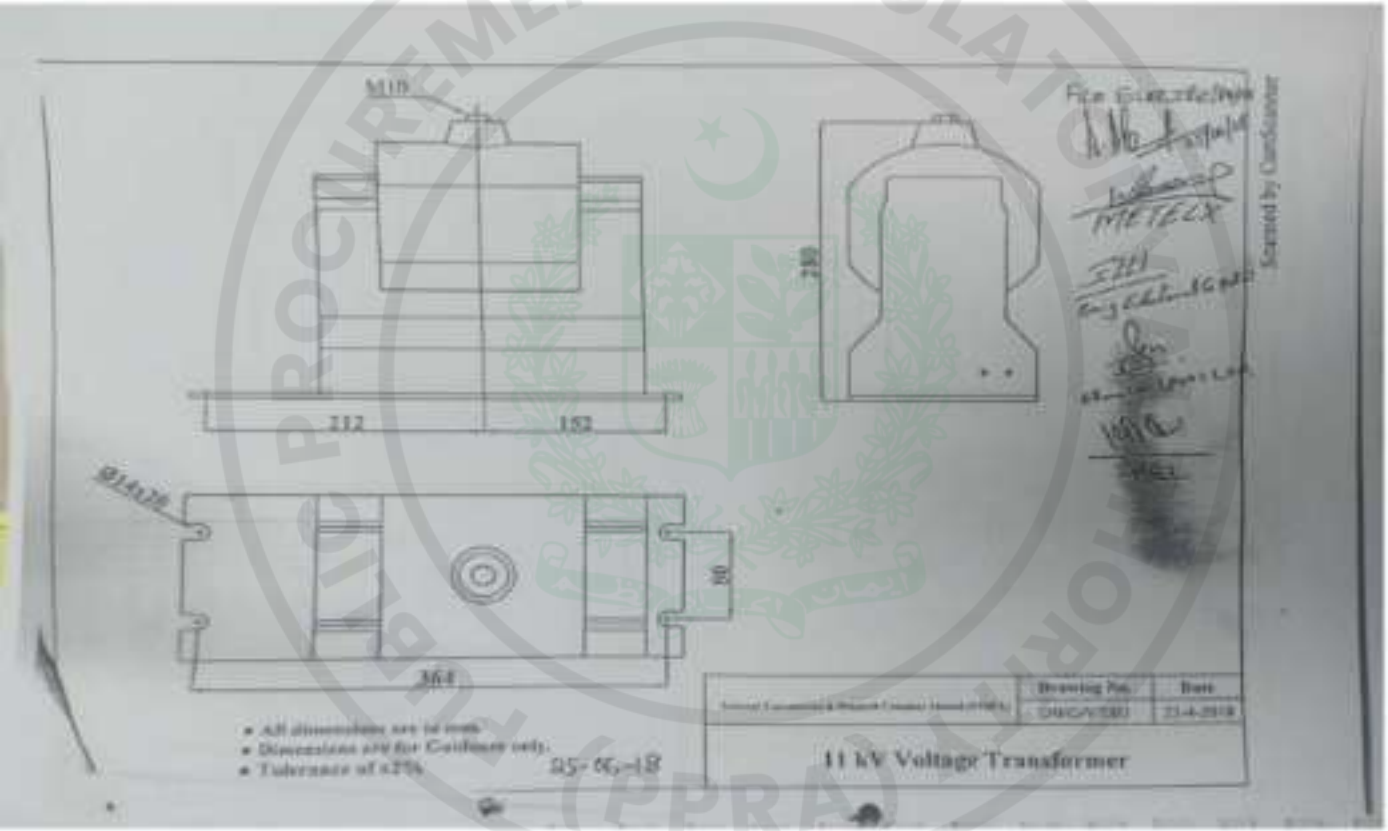
Fico Electric (Pvt)Ltd

Pak Elektron (Pvt)Ltd.

Baig Electrical Co (Pvt) Ltd

Elmetec (Pvt) Ltd




M10
212
152
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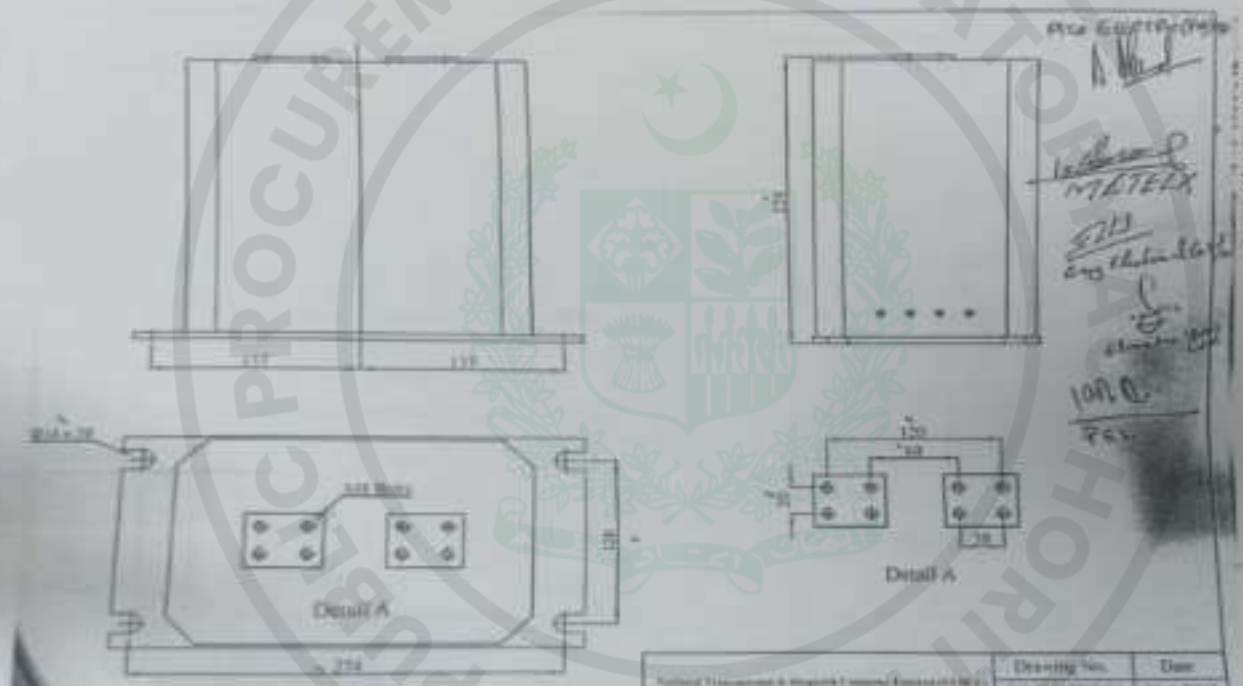
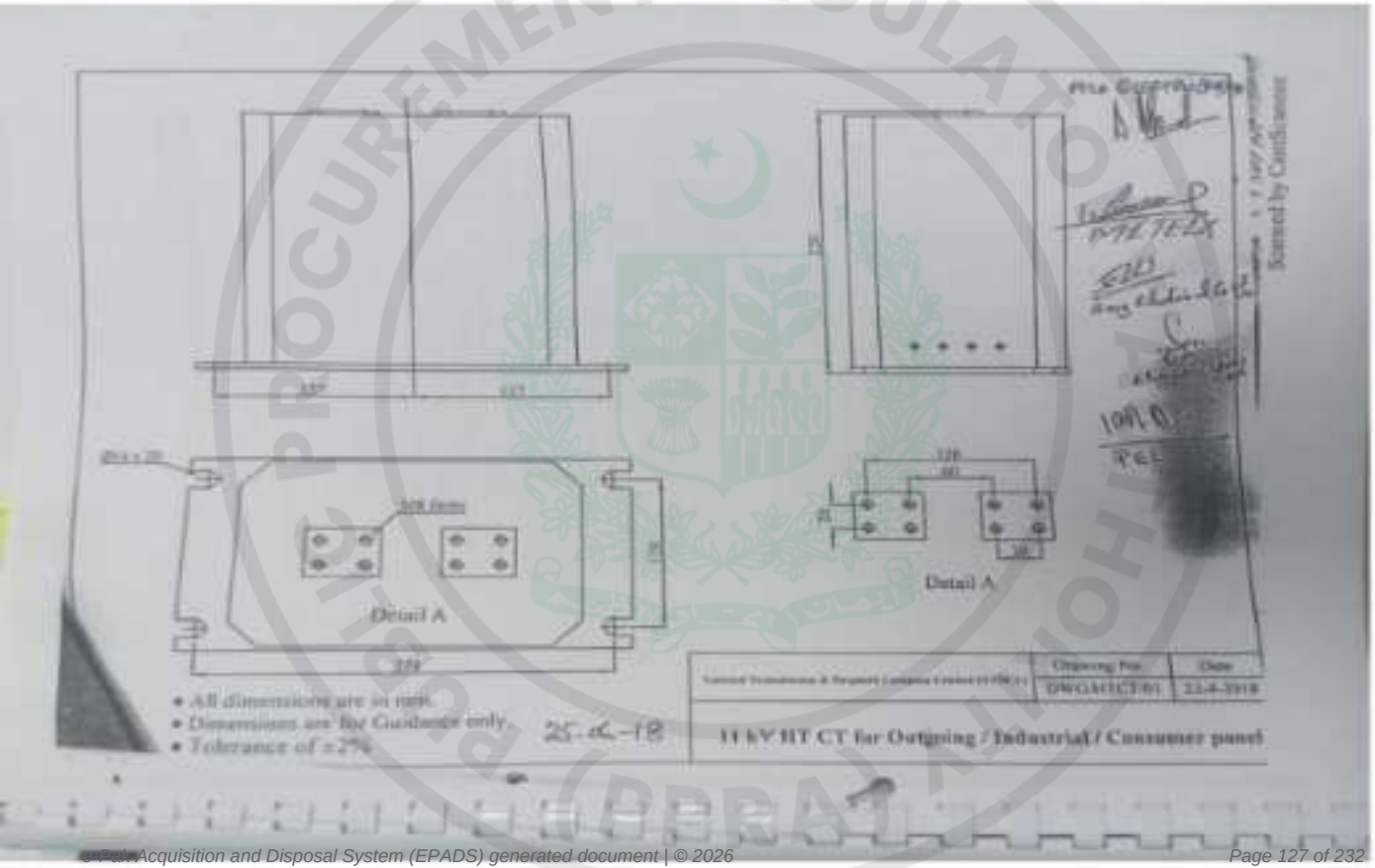
All dimensions are in mm.
Dimensions are for Guidance only.
Tolerance of ±2%
Drawing No.
Date
11 kV Voltage Transformer





NATIONAL TRANSMISSION & DESPATCH COMPANY LIMITED

NTDC SPECIFICATION P-44:2018

11kV METAL-CLAD SWITCHGEAR

SUBSTATION DESIGN NTDC

CONTENTS

PRINTING HISTORY

- First edition in August, 1968
- Second edition in December, 1979
- Third edition in 1985
- Fourth edition in 1987
- Fifth edition in April, 1996
- Sixth edition in Mar, 2018

NTDC SPECIFICATION P-44:2018
11kV METAL-CLAD SWITCHGEAR

0.0 FOREWORD

0.1 This specification has been prepared by Substation Design Department NTDC. This sixth edition cancels and replaces all the five editions published in 1968, 1979, 1985, 1987, 1996 and its amendments. This specification also supersedes P-115:77(11kV CT specification) & the technical requirement for capacitor control panel as given in specification P-165:89 & its amendments (if any).

0.2 This specification is intended for the procurement of material and does not include all the necessary provisions of a contract.

0.3 This specification is subject to revision as and when required by Substation Design Department NTDC. No other department is authorized to issue any change/amendment in it.

1.0 SCOPE

1.1 This specification is applicable for 11kV Metal-Clad Switchgear for indoor installation to be mounted on floor and opening in the bus-bar section so that bus bar compartment lies along all the units of a group of switchgear with bottom entry of power cables.

2.0 REFERENCE STANDARDS

2.1 The metal-clad switchgear and all auxiliary equipment which form an integral part of the switchgear shall be designed, manufactured and tested in accordance with the following International Electro-Technical Commission (IEC) Publications as amended to date:

IEC Publication 62271-1	Common specification
IEC Publication 62271-100	High voltage alternating current circuit breakers
IEC Publication 62271-102	High voltage AC disconnectors with earthing switches
IEC Publication 62271-103	High voltage switches for rated voltages above 1 kV and less than 52 kV
IEC Publication 62271-200	AC metal-enclosed switchgear and control gear for rated voltages above 1 kV and up to and including 52 kV
IEC Publication 60255	Measuring relays and protection equipment
IEC Publication 61869-2	Current transformers
IEC Publication 61869-3	Voltage transformers
IEC Publication 60051	Direct acting indicating analogue electrical measuring instruments and their accessories
IEC Publication 60468	Method of measurement of resistivity of metallic materials
IEC Publication 60529	Degree of protection (IP Code)
NTDC Specification P-151:2008	Requirements for protection relays

2.2 In case the requirements laid down herein differ from those given in the above IEC Publications in any particular, the switchgear shall comply with the requirements indicated herein in regard to that item.

3.0 DEFINITIONS

For this purpose, the definitions of relevant IEC Standards shall apply. Some of them are recalled here for ease of reference.

3.1 Switchgear and Control-gear

General term covering switching devices and their combination with associated control, measuring, protective and regulating equipment.

3.2 Enclosure

Part of switchgear and controlgear providing a specified degree of protection of equipment against external influences and specified degree of protection against approach to or contact with live parts and contact with moving parts.

3.3 Compartment

Part of switchgear and controlgear enclosed except for openings necessary for interconnection, control or ventilation.

3.4 Partition

Part of switchgear and controlgear separating one compartment from other compartments.

3.5 Shutter

Part of switchgear and controlgear that can be moved from a position where it permits contacts of a removable part, or moving contact of a disconnector, to engage fixed contacts, to a position where it becomes a part of the enclosure or partition shielding the fixed contacts.

3.6 Main Circuit

All the conductive parts of metal-enclosed switchgear and controlgear included in a circuit which is intended to transmit electrical energy.

3.7 Auxiliary Circuit

All the conductive parts of metal-enclosed switchgear and controlgear included in a circuit (other than the main circuit) intended to control, measure, signal and regulate.

3.8 Circuit-Breaker Class E2

Circuit-breaker designed so as not to require maintenance of the interrupting parts of the main circuit during its expected operating life, and only minimal maintenance of its other parts (circuit-breaker with extended electrical endurance).

3.9 **Circuit-Breaker Class C2**

Circuit-breaker with very low probability of restrike during capacitive current breaking as demonstrated by specific type tests.

3.10 **Circuit-Breaker Class M2**

Frequently operated circuit-breaker for special service requirements and designed so as to require only limited maintenance as demonstrated by specific type tests (circuit-breaker with extended mechanical endurance, mechanically type tested for 10,000 operations).

3.11 **Circuit-Breaker Class S1**

Circuit breaker intended to be used in a cable system.

3.12 **No-Load Line-Charging Breaking Capacity**

Breaking capacity for which the specified conditions of use and behavior include the opening of an overhead line operating at no-load.

3.13 **No-Load Cable-Charging Breaking Capacity**

Breaking capacity for which the specified conditions of use and behavior include the opening of an insulated cable operating at no-load.

3.14 **Capacitor Bank Breaking Capacity**

Breaking capacity for which the specified conditions of use and behavior include the opening of a capacitor bank.

3.15 **Capacitor Bank Inrush Making Capacity**

Making capacity for which the specified conditions of use and behavior include the closing onto a capacitor bank.

3.16 **Out-of-Phase (making or breaking) Capacity**

Making or breaking capacity for which the specified conditions of use and behavior include the loss or the lack of synchronism between the parts of an electrical system on either side of the circuit-breaker.

3.17 **Opening Time**

a) For a circuit-breaker tripped by any form of auxiliary power, the opening time is the interval of time between the instant of energizing the opening release, the circuit-breaker being in the closed position, and the instant when the arcing contacts have separated in all poles;

b) For a self-tripping circuit-breaker, the opening time is the interval of time between the instant at which, the circuit-breaker being in the closed position, the current in the main

circuit reaches the operating value of the over-current release and the instant when the arcing contacts have separated in all poles.

3.18 **Arcing Time (multi pole switching device)**

Interval of time between the instant of the first initiation of an arc and the instant of final arc extinction in all poles.

3.19 **Break Time**

Interval of time between the beginning of the opening time of a mechanical switching device and the end of the arcing time.

3.20 **Closing Time**

Interval of time between energizing the closing circuit, the circuit-breaker being in the open position, and the instant when the contacts touch in all poles.

3.21 **Make Time**

Interval of time between energizing the closing circuit, the circuit-breaker being in the open position, and the instant when the current begins to flow in the first pole.

3.22 **Pre-Arcing Time**

Interval of time between the initiation of current flow in the first pole during a closing operation and the instant when the contacts touch in all poles for three-phase conditions and the instant when the contacts touch in the arcing pole for single-phase conditions.

3.23 **Open-Close Time (during auto-reclosing)**

Interval of time between the instant when the arcing contacts have separated in all poles and the instant when the contacts touch in the first pole during a reclosing cycle.

3.24 **Dead Time (during auto-reclosing)**

Interval of time between final arc extinction in all poles in the opening operation and the first re-establishment of current in any pole in the subsequent closing operation.

3.25 **Re-closing Time**

Interval of time between the beginning of the opening time and the instant when the contacts touch in all poles during a reclosing cycle.

3.26 **Re-Make Time (during reclosing)**

Interval of time between the beginning of the opening time and the first re-establishment of current in any pole in the subsequent closing operation.

3.27 **Close-Open Time**

Interval of time between the instant when the contacts touch in the first pole during a closing operation and the instant when the arcing contacts have separated in all poles during the subsequent opening operation.

3.28 **Make-Break Time**

Interval of time between the initiation of current flow in the first pole during a closing operation and the end of the arcing time during the subsequent opening operation.

3.29 **First-Pole-to-Clear Factor (in a three-phase system)**

When interrupting any symmetrical three-phase current the first-pole-to-clear factor is the ratio of the power frequency voltage across the interrupting pole before current interruption in the other poles, to the power frequency voltage occurring across the pole or the poles after interruption in all three poles.

3.30 **Out-of-Phase Conditions**

Abnormal circuit conditions of loss or lack of synchronism between the parts of an electrical system on either side of a circuit-breaker in which, at the instant of operation of the circuit breaker, the phase angle between rotating vectors, representing the generated voltages on either side, exceeds the normal value and may be as much as 180° (phase opposition).

3.31 **Normal Current**

Current which the main circuit of a circuit-breaker is capable of carrying continuously under specified conditions of use and behavior.

3.32 **Rated Short-time Withstand Current (Ik)**

The r.m.s value of the current which the switchgear and controlgear can carry in the closed position during a specified short time under prescribed conditions of use and behavior. (Ik = Isc)

3.33 **Rated Duration of Short Circuit**

The interval of time for which switchgear and controlgear can carry, in the closed position, a current equal to its rated short-time withstand current.

3.34 **Rated Peak Withstand Current (Ip)**

The peak current associated with the first major loop of the rated short-time withstand current which switchgear and controlgear can carry in the closed position under prescribed conditions of use and behavior.

3.35 **Rated Short-Circuit Breaking Current (Isc)**

The rated short circuit breaking current is the highest circuit current which the circuit breaker shall be capable of breaking under prescribed conditions of use and behavior.

3.36 **Rated Cable Charging Breaking Current**

The rated cable charging breaking current is the maximum cable charging current which the circuit breaker shall be capable of breaking at its rated voltage under prescribed conditions of use and behavior.

4.0 SERVICE CONDITIONS

4.1 Atmospheric Conditions

It may be assumed that the air is not normally heavily polluted by dust, smoke, aggressive gases, vapors or salt spray. However, at certain times of the year, severe dust storms may be experienced and certain areas are subjected to heavily polluted atmosphere. For this purpose, special lacquer coating on bus bar support insulators shall be applied to protect against the effects of humidity and other pollutions.

4.2 Ambient Temperature

Maximum	+ 50 °C
Maximum mean over any 24 hours	+ 45 °C
Mean in any year	+ 30 °C
Minimum	- 10 °C

4.3 Relative Humidity

The relative humidity may range up to 100 %. The maximum values of the ambient temperature and humidity, however, do not occur simultaneously. During the monsoons, high humidity may persist for many days at a time, with temperature ranging from 30 °C to 40 °C.

4.4 Altitude

Installations will be up to 1000 meter above sea level.

4.5 Supply System

The switchgear shall be suitable for installation in 11kV 3-phase AC supply system with the following characteristics:

Nominal system voltage	11 kV
Rated voltage	12 kV
Frequency	50 Hz

5.0 CONSTRUCTIONAL REQUIREMENTS

5.1 General

5.1.1 The switchgear panel shall be equipped with a draw-out type circuit breaker and all associated equipment mentioned in this specification for indoor use to be mounted on the floor and shall be

supplied in the form of a single switchgear panel for straight forward extension of existing installations on either side. The frame and supporting parts are designed as a compound construction of welded/bolted/riveting sections.

5.1.2 The metal-clad panel shall consist of cable compartment situated at rear bottom, CB compartment situated at front, bus-bar compartment situated at rear top, and relay & meter compartment situated at front top of the panel. All live parts such as circuit breakers, busbars, current and voltage transformers etc. shall be enclosed within grounded metal compartments separated by grounded metal barriers. The bus-bar and cable compartments shall be separated from the CB compartment through automatic shutters to prevent exposure of live parts when the CB is in disconnected/test position. Necessary means shall be provided to separate CB & cable compartments when CB is in connected positions.

5.1.3 All secondary wiring and instruments, meters, relays etc. shall be isolated from ground metal barriers and from all primary circuit elements with the exception of short lengths of wires at instrument transformer terminals.

5.1.4 Switchgear shall be designed and manufactured to secure safety during operation, inspection, cleaning and maintenance and shall be so arranged as to minimize the risk of fire arising or spreading. Each switchgear panel shall be completely covered on both sides to ensure against spreading of fire to the adjacent panels. Fire retardant pipe/shrouds shall be provided for covering the bus bar joints & connections to the adjacent panels on both sides. Fiber glass sheet having minimum thickness of 3mm for covering of bus bar chamber on both sides of each panel shall also be installed.

5.2 **Standardization of switchgear Panels**

5.2.1 To accomplish the interchangeability requirement of switchgear panels manufactured by different manufactures, certain dimensions of the switchgear panel, bus-bars & their joints, CT's and PT's etc. have been standardized as per drawing Nos. PDW/DF-423, PDW/DF-447, PDW/TS-1630, PDW/DF-297, PDW/TS-2010 and PDW/TS-4932.

5.2.2 The mounting arrangement of energy meter shall be provided in such a way that various types of energy meters can be fixed on the same arrangement.

5.2.3 At every switchgear panel, the incoming AC/DC circuits shall be connected to the terminal block of the panel from where the supply shall further be distributed through miniature circuit breakers of appropriate rating and characteristics.

5.3 **Standard Types of Panels**

The switchgear Panels shall be of the following types:

a) Incoming panel for connecting the 11kV switchgear to the power transformer.

b) Outgoing panel for connecting supply to 11kV feeder.

c) Bus-coupler panel for connecting two Incoming panels where two power transformers are installed and for gird station auxiliary supply.

d) Industrial panel for giving 11kV supply to individual consumer.

e) Ring main panel for giving 11kV supply to individual consumers fed from two different feeders.

f) Consumer panel for giving connection to an individual consumer from the grid stations through an express or dedicated 11kV feeder.

g) Capacitor bank control panel for the automatic switching of the capacitor banks

5.4 **Interchangeability**

All removable components of the same type and rating in a given assembly shall be physically and electrically interchangeable.

5.5 **Short-circuit Strength**

Each switchgear panel shall be designed to carry and withstand following thermal and mechanical stresses:

a) Rated short-time withstand current for main and earthing circuit (1s): 25kA

b) Rated peak withstand current for main and earthing circuits: 63kA

5.6 **Protection and Metering**

5.6.1 **Over-current Protection**

All switchgear panels shall have over-current & earth fault protection. For incoming, outgoing & consumer panels, the over-current relays shall operate on 110 VDC. For industrial & ring main panels, the relay shall be arranged to operate on AC or any alternate arrangement in case of operation of relay on DC. Arrangement will be approved by the office of Chief Engineer (SS) NTDC.

5.6.2 **Differential Protection**

Incoming panels shall be provided with three additional current transformers for differential protection. The differential protection zone of power transformers is required to trip the 11kV incoming circuit breakers.

5.6.3 **DC Supply and Trip Indications**

Supervision relay(s) shall be provided for continuously monitoring the healthy conditions of breaker trip circuit and presence of DC supply on all applicable panels. The presence of healthy trip circuits shall be indicated by the continuous glow of a lamp.

5.6.4 **Hooter**

5.6.4.1 One hooter with its acknowledge and canceling arrangement shall be installed in the incoming panel to indicate failure of DC mains supply, DC supply failure to any panel, failure of P.T. MCB supply and failure of healthy trip circuit and tripping of any breaker. In all switchgear panels NC contact of each MCB shall be used for alarm purpose, completely wired. Tripping of any one MCB shall initiate an alarm signal.

5.6.4.2 One hooter and its acknowledgement and canceling arrangement shall also be installed in the capacitor bank control panel.

5.6.5 **Metering**

5.6.5.1 Arrangements for metering shall be provided as shown in drawing No. PDW/TE-580 & 581. The voltage coils of all energy meters, instruments & relays of the outgoing & capacitor panels shall be connected to the voltage transformer of the corresponding bus section installed in incoming panels.

5.6.5.2 For switchboards with bus coupler, the voltage transformer of each bus section shall be operated independently. However, when the corresponding incoming feeder is out of service and the bus coupler is closed, the voltage transformer in service shall feed all the panels. Therefore, P.T. selection scheme shall be developed in each relevant panel to fulfill the requirement.

5.6.5.3 In case of industrial, consumer and ring main panels, independent voltage transformers shall be provided for metering of energy. Moreover, the metering equipment in these panels shall be housed in separate, lockable and sealable compartment.

5.7 **Signaling Lamps**

5.7.1 The indicating lamps shall be of 22 mm panel mount LED type with life of minimum 35,000 Hours and shall not be greater than 4 W at 150 V. Signaling lamps shall be provided with name plate.

5.7.2 For each panel, two signaling lamps "RED" and "GREEN" shall be provided to indicate "ON" and "OFF" positions of the circuit breaker respectively.

5.7.3 Yellow signaling lamp indicating DC trip circuit healthiness shall be provided.

5.7.4 Blue signaling lamp indicating "OFF" position of P.T. supply shall be provided.

5.7.5 Purple signaling lamp indicating AC alarm supply failure shall be provided.

5.7.6 White signaling lamp/signaling relay indicating fault indication shall be provided.

5.8 **Surge Arrestors**

Surge arrestors having rated voltage 12 kV and nominal discharge current of 10 kA shall be installed in the outgoing, capacitor control & consumer panels near to the cable termination. The surge arrestors shall conform to NTDC Specification P-181:2012 amended to date.

5.9 **Insulation and Clearances**

5.9.1 Switchgear panels shall be designed for the following insulation level:

a) Lightning impulse withstand voltage: 95 kV

b) Power frequency withstand voltage for one minute.: 36 kV

5.9.2 The minimum phase to phase and phase to ground clearance in air shall be 160 mm. In case of clearances less than the above specified value, insulation barrier plates of fire retardant fiber glass having thickness 3.0 mm (min.) shall be provided. The insulation barrier between the poles of breaker shall be of manufacturer's recommended material.

5.9.3 The insulation sheets, covers and sleeves shall be made of material having good fire-resistant properties. Materials liable to catch fire shall not be used in construction of the panels. The insulating materials for barriers, covers and sleeves etc. shall essentially have non-hygroscopic, non-corrosive, non-tracking and non-inflammable properties such as reinforced fiber glass, epoxy resin etc., specially made to suit the intended applications with respect to mechanical, electrical and thermal requirements. Complete details regarding mechanical, electrical and thermal characteristics of the insulating material along with proposed locations for installation shall be supplied for approval.

5.9.4 At locations such as breaker terminals or interconnections where it is not possible to meet above clearances, smaller clearances with insulation will be permitted subject to approval and withstanding insulation tests.

5.10 **Earthing**

5.10.1 All metal parts of a switchgear panel shall be effectively bonded together to form a continuous earthing. Hinged doors shall be connected to the panel body by means of flexible copper earthing straps having minimum 30 mm² cross-section.

5.10.2 Each panel shall be provided with a copper earth strip of cross section 25×5 mm and all earthed parts shall be firmly bonded to it. The earth strip shall be so arranged that the strips of adjacent panels can be brought out at both ends of the panel and connected together on either side as required to form a common earth bus as shown in drawing No. PDW/TS-2010. Earthing terminals for taking 7 to 15 mm dia. copper wire for connection to the substation earthing system shall also be provided.

5.10.3 The earthing connections of the auxiliary equipment e.g. CTs & PTs etc. to the main earth busbar shall be made by means of 16 mm² solid copper strip or flexible insulated copper cable. All cable glands/brackets shall be connected to the main earth busbar by means of 25×5 mm solid copper strip.

5.10.4 The withdrawable metallic parts of the switchgear shall be provided with a separate earthing conductor within the switchgear unit frame fixed along the switchgear in such a manner that permanent direct earth connections are established which shall be capable of carrying short circuit currents. The circuit breaker frame shall also remain earth connected in the test and disconnected position and also in any intermediate position whilst the auxiliary circuits are not totally disconnected. On insertion, the normally earthed metallic parts of CB shall be connected to earth prior to the making of the male/fixed and female/movable contacts.

5.10.5 The bus coupler panels shall also be provided with an external earthing point.

5.10.6 Two independent earthing points with earthing lugs shall be provided in industrial and ring main panels.

5.11 **Circuit Connections**

5.11.1 **Incoming Panel**

Each incoming panel shall have provision of incoming circuit by means of underground cables. Space shall be provided for the cable connections with dry termination of 5 Nos. per phase single core 500 mm² (1000 MCM) cross-linked polyethylene (XLPE) aluminium/copper cables having outer diameter of 50 mm approx.

5.11.2 **Outgoing and Consumer Panels**

Each outgoing and consumer panel shall have sufficient space and provisions for the dry termination of three (one per phase) single core 500mm² (1000 MCM) cross-linked polyethylene (XLPE) aluminium/ copper cables having outer diameter of 50mm approx.

5.11.3 **Capacitor Bank Control Panel**

Each capacitor bank control panel shall have sufficient space and provisions for the dry termination of three single core 240mm² (500 MCM) cross-linked polyethylene (XLPE) aluminium/copper cables per phase having outer diameter of 35mm approx.

5.11.4 **Others**

Each bus coupler, industrial and ring main panel shall have sufficient space for provision of dry termination for the following cables:

a) One 3-core, 120mm² cross-linked polyethylene (XLPE) aluminium/copper cable for bus coupler panel having outer diameter of 60 mm approx.

b) One 3-core, 35mm² to 120mm² cross-linked polyethylene (XLPE) aluminium/copper cable for ring main and industrial panels having outer diameter 60 to 75 mm approx.

5.11.5 The cable termination pads shall be supported on 12kV post insulators. The manufacturer shall provide terminals with high tensile steel bolts, nuts and washers for cable connections in accordance with drawing No. PDW/DF-444.

5.12 **Special Tools and Accessories**

5.12.1 A set of special tools and accessories shall be supplied which always include, but not be limited to the following:

a) Operating attachment/handle for the withdrawal and insertion of the circuit breaker trolley (one per two panels).

b) Spring charging handle for manual charging of the spring (one per two panels).

c) Instrument compartment door locking key (one per panel).

d) Bus bar coupling pieces made of copper as per drawing No. PDW/TS-2010 with nuts, bolts and washers for each switchgear panels for interconnection throughout the length of adjacent panels forming a common bus duct except for industrial/ring main unit (Nine per panel).

e) Two interconnection pieces for connecting earth bus bars of adjacent panels as per drawing No. PDW/TS-2010 for each switchgear panels except industrial/ring main unit.

f) Four grouting bolts for mounting the switchgear panel on the floor.

g) Operation and maintenance catalogues for circuit breaker, relays, energy meter and complete set of schematic diagrams (one set per five panels).

h) End box complete with fixing arrangement (Two per five panels).

i) One earthing kit for each incoming, industrial and ring main panels for safety while carrying out maintenance.

j) Guide/Extension plate of 600mm×900×2.5mm with guide rails to facilitate the truck movement on the floor in case of truck type circuit breaker (one per panel).

k) Trolley to facilitate insertion or removal in case of cassette type circuit breaker (Two per five panels/ as per requirement of purchaser)

l) Nine fire retardant pipes/shrouds for covering busbar joints & interconnections as per clause 11.3 of this specification.

m) Laminated wiring diagram of VCB & Panel with each panel.

5.12.2 The tools/accessories listed from a) to f) shall be housed in a tool box for the safe storage.

5.12.3 The earthing kit is equipped with three flexible insulated short-circuiting copper cables for each phase having length of at-least one meter joined together in a junction box and one insulated earth cable having length of at-least 1.5m for connection to system earthing. Threaded copper ball head cap clamps suitable for tightening the ball pin having diameter above 20 mm by means of insulating operating stick from a distance of at least one meter shall be crimped on each short-circuiting cable while earth clamp shall be crimped with the earth cable. The size of flexible insulated copper cables shall be 95 mm². The earthing kit shall be designed to carry and withstand rated short-time withstand current of 25 kA for 1 sec. The insulated stick shall withstand the power frequency voltage of 300kV per meter for 5 minutes. The complete earthing kit shall be packed in a carrying bag for storage and transportation.

6.0 COMPONENTS OF SWITCHGEAR PANELS

The components of all types of switchgear panels are listed in Table-I. Each switchgear panel shall be supplied with Cable termination pads, signaling lamps and Push buttons for electrical ON & OFF as per their requirement.

TABLE – I: Components of Metal-Clad Switchgear Panels

Sr. No.	Item Description	Incoming Panel	Outgoing Panel	Bus-Coupler Panel	Capacitor Control Panel	Consumer Panel	Industrial Panel	Ring Main Panel
1	Circuit breaker	1	1	1	1	1	1	1
2	Load break switch	-	-	2	-	-	-	2
3	Earthing switch	-	1[ii]	-	1[ii]	1[ii]	-	-
4	Single phase, 2-core CT for over-current protection and metering	3	3	-	3	-	-	-
5	Single phase, 1-core CT for over-current protection	-	-	-	-	3	3	3
6	Single phase, 1-core CT for metering	-	-	-	-	3	3	3
7	Single phase, 1-core CT for differential protection	3	-	-	-	-	-	-
8	Single phase voltage transformer	3	-	-	-	3	3	3
9	Surge arrestors	-	3	-	3	3	-	-
10	Over-current and Earth-fault relay	1[ii]	1[ii]	-	1[ii]	1[ii]	1[ii]	1[ii]
11	Two step capacitor unbalance detection Relay	-	-	-	1[ii]	-	-	-
12	Under voltage/over voltage relay	-	-	-	1	-	-	-
13	DC trip circuit supervision relay (TCS)	2	2	-	2	2	1[i]	1[i]
14	Trip & lockout relay	-	-	-	1	-	-	-
15	Energy meter	1	1	-	-	1	1	1
16	Ammeter	3	3	-	1	1	3	3
17	Voltmeter 0 -15kV with 7 position selector switch	1	-	-	1	1	1	1
18	Power factor meter	1	1	-	1	1	1	1
19	Hooter and its acknowledgement	1	-	-	1	-	-	-
20	Power quality analyzer	1[i]	-	-	-	1[i]	-	-

i) If required by purchaser/end user.
ii) Three Phase four element Over Current & Earth Fault Relay shall be used as per clause 12.5.

iii) Three Phase five elements Over Current & Earth Fault Relay shall be used with built-in two step capacitor unbalance detection protection in Capacitor Control Panel as per clause 12.5.

iv) For industrial and ring main panels, the relays shall be arranged to operate on AC or any alternate arrangement in case of operation on DC with the approval of o/o Chief Engineer (SS) NTDC.

v) For industrial and ring main panels, DC Supervision relay shall be provided in case of operation on DC.

7.0 CIRCUIT BREAKER

7.1 General Requirements

7.1.1 The circuit breaker shall be draw-out vacuum type suitable for indoor installation with unique traceable tracking identification. The circuit breaker shall be triple pole, fixed with cast resin post insulators, and coupled electrically as well as mechanically on a common base frame so as to operate simultaneously. All drive parts, auxiliary & control switches, charging motor, over-current & under voltage releases, anti-pumping system, anti-slam system, lockout relay for interlocking, closing & trip coils, spring charged indicator, counter, etc. shall be placed in a closed cabinet. The complete CB shall be mounted on the withdrawable truck or on trolley with carriage arrangement to facilitate its insertion/removal.

7.1.2 The CB shall be provided with an energy storing device which shall be charged both manually by hand crank as well as electrically by an electric motor. In a closed position, the circuit breaker can be brought for mechanical "ON" & "OFF" from front of CB and electrically "ON" & "OFF" by means of push buttons in the instrument compartment while showing position indication.

7.1.3 The circuit breaker shall be vertically/horizontally isolated, suitable for automatic tripping, re-closing, shall have interlocking devices, arc control devices, disconnecting devices, automatic safety shutters with locking facility and all necessary accessories to make a complete operating unit. The circuit breaker shall be suitable for single shot, 3-pole rapid auto re-closing.

7.1.4 The circuit breaker shall be capable of making and breaking all short circuit currents, symmetrical & asymmetrical, up to and including the rated short circuit breaking currents. The circuit breaker shall also be capable of switching covered by transients over & under voltage and over-currents in the system i.e. switching the no load currents of transformers, switching of shunt capacitor banks, switching under condition of single/double earth faults, switching under condition of phase opposition (out of phase condition) and the switching the charging current of cables. To achieve these requirements, necessary devices shall be equipped in the operating mechanism.

7.1.5 In case the CB is mounted on truck, the wheels of truck on the operator side shall have rotating facilities with locking arrangement in ON position to prevent moving of circuit breaker and shall have provision of earth to withstand the short circuit stresses. In case of carriage/cassette arrangement, trolley shall be used only for removal of CB outside the switchgear panel or vice versa.

7.1.6 The circuit breaker shall incorporate anti-pumping & anti-slam feature which shall be the integral part of circuit breaker to avoid continuously energizing the circuit breaker closing coil, once the circuit breaker has already closed. Moreover, circuit breaker shall be trip free.

7.1.7 The mechanical strength and physical characteristics of the insulation structure shall be such that it can withstand the shocks of circuit breaker operations within the rated capacities as well as reasonable strains of connecting conductors under the specified service conditions.

7.1.8 Circuit breaker shall be so constructed that the interval between instants the contacts of the individual poles touch or separate shall not exceed 10ms during closing or opening operation.

7.1.9 It shall be possible to make independent adjustments to each unit of circuit breaker where circuit breaker comprises three independent units.

7.1.10 Where single rods & tubes are used for raising or lowering the moving contacts of the circuit breaker they shall be securely pinned at each end to prevent rotation or displacement of the contacts. Tubes shall be plugged securely where contacts or other parts are fixed to the tube.

7.2 **Vacuum Interrupter of VCB**

7.2.1 The vacuum interrupter which is a core component of VCB requires reliable operation such that even after repeated fault interruptions, the contact resistance is not impaired and remains constant due to contact pressure throughout its service life without maintenance. The arc interrupting mechanism shall be designed with ample mechanical and electrical factors of safety in all its parts. The X-radiation level during operation shall be kept within permissible safety limits according to international standards.

7.2.2 The vacuum interrupter tube shall have excellent vacuum tightness and mechanical characteristics. A permanent mark shall be provided on the lower interrupter support to check the contact wear/end of service life of vacuum interrupter (sticker is not acceptable).

7.3 **Interlocks**

7.3.1 At least the following interlocks shall be provided in the operating mechanism of circuit breaker to ensure safe operation in the correct sequence under all service conditions:

a) The withdrawal or engagement of a circuit breaker shall be prevented unless it is in the open position.
b) It shall be impossible to move the circuit breaker in service position unless the low voltage plug is inserted to the auxiliary circuit.
c) It shall be impossible to move the circuit breaker from service while it is in closed position.
d) The closing operation of the circuit breaker shall be prevented when the circuit breaker is already in closed position or under opening operation phase.
e) The closing of VCB of incoming circuit breaker shall be blocked in case of PT MCB Trip or PT supply failure.
f) VCB of incoming circuit breaker shall be tripped in case of PT MCB trip or PT supply failure in order to block Energy Metering. Alarm & annunciation signal shall also be generated in case of PT MCB Trip or PT supply failure.
g) Complete withdrawal of circuit breaker shall not be possible unless auxiliary circuit is disconnected

h) The operation of a circuit breaker shall not be possible unless it is in a service, disconnected, removed, test or earthing position.

7.3.2 For bus-coupler panel, electrical interlocking shall be such as that the CB shall not close if the circuit breakers of incoming panels on both sides of bus-coupler panel are in the closed position.

7.3.3 In addition, the manufacturer shall provide sufficient number of interlocks to provide full safety for the operator when parts of the circuit breaker or its mechanism become malfunctioning during the operation of the switchgear.

7.4 Operating Device Movement

The direction of motion of operating devices and handles wherever possible, shall be in accordance with the following.

a) Rotary handles shall be moved clockwise for switching ON and counter clockwise for switching OFF.

b) Handles and levers with an essentially straight-line movement shall move upwards or to the right (in case of handles moving vertically or horizontally respectively) for a closing operation and shall move in the opposite direction for an opening operation. Handles shall move horizontally and away from the operator for a closing operation and towards the operator for an opening operation.

c) For push or pull buttons which are located one above the other, the upper button shall be the ON button and the lower button shall be the OFF button. For push buttons placed side by side, the right-hand button shall be the ON button and the left-hand button shall be the OFF button. The ON button shall be colored red and the OFF button shall be colored green.

7.5 Characteristics and Ratings

The circuit breakers shall have the following characteristics and ratings:

a)	Nominal voltage	11kV
b)	Rated voltage	12kV
c)	Normal current at reference ambient temp. of 50 °C	
	i) Incoming & Bus-coupler panels	2500 A
	ii) Other switchgear panels	630 A
d)	Rated Frequency	50 Hz
e)	Rated auxiliary circuit DC voltage	110 V
f)	Rated Short circuit breaking current	25 kA
g)	Rated Peak withstand current	63 kA
h)	Rated Short circuit making current	63 kA
i)	Duration of short circuit	1 sec
j)	First pole to clear factor	1.5

k)	Rated TRV (Peak) for terminal faults		20.6 kV
l)	Rated TRV (Peak) for Out of Phase		30.6 kV
m)	One-minute AC withstand voltage		36 kV
n)	Lightning Impulse withstand voltage		95 kV
o)	Single capacitor bank breaking current		As per IEC
p)	Rate of rise of recovery voltage (RRRV)		As per IEC
q)	Operating sequence		
	i)	Outgoing, consumer and capacitor bank control panels (with fast auto-reclosing)	O-0.3sec-CO-3min-CO
	ii)	Others (without fast auto-reclosing)	O-3min-CO-3min-CO
r)	Break time		As per IEC
s)	Dead time		As per IEC
t)	Opening time		As per IEC
u)	Closing time		As per IEC
v)	Spring charging time		≤15sec
w)	Close-Open time		As per IEC
x)	Circuit Breaker Class		
	i)	w.r.t Mechanical Endurance	M2
	ii)	w.r.t Electrical Endurance	E2
	iii)	w.r.t. Capacitive Current Breaking	C2
	iv)	w.r.t Connection to Cables	S1

7.6 **Isolation of Breaker**

7.6.1 A set of six female silver-plated copper clip/flat/tulip (preferably on higher rating) type contacts for 2500A & 630A CBs shall be provided for separating the CB from silver plated male contacts to be fixed in cast resin spouts to eliminate possibility of misalignment and to ensure separation of compartments. Further for cassette type VCB complete VCB including cradle of high grade shall be provided from original manufacturer as a part of circuit breaker (no alternate will be acceptable). In the isolation/ withdrawal position of CB from live part, the shutter shall be closed automatically.

7.6.2 Silver plated plug contacts shall be provided between separable units to complete the secondary circuits. They shall be of the pressure loaded self-aligning type. In case the connection of auxiliary circuit wiring plug with circuit breaker socket is to be made manually the plug shall be held tightly in the socket with spring loaded clips. Wiring of auxiliary circuit to circuit breaker shall be routed through flexible steel pipe or high quality flexible plastic pipe.

7.7 **Operating Mechanism**

7.7.1 The operating mechanism shall be spring charged electrically as well as manually with push buttons for closing and opening of the circuit breaker. The closing springs shall be charged with 240 V AC

variation range of +10% and -15%. The closing springs, if charged, should not be capable of release while the circuit breaker is closed.

7.7.2 The energy stored in motor compressed spring shall be sufficient for an open-close-open operation at rated short circuit current. The motor shall not require more than 15s to recharge the closing springs after a C-O or O-C operation. If the closing mechanism is not fully recharged, the mechanism shall be locked out and an alarm initiated.

7.7.3 The mechanism of circuit breaker shall be so arranged that emergency manual spring charging by using hand crank and release of the springs is possible without electrical operation. The circuit breaker shall be provided with the indicator to show the charged/discharged state of spring.

7.7.4 The rated control and auxiliary supply voltages shall be 110 VDC. Operating mechanism of the breaker and all other associated accessories/components shall operate satisfactorily within the range of voltage given below:

11kV Panels	Closing Circuits (Volts)		Tripping Circuits (Volts)	
Incoming, outgoing, consumer & capacitor protection panels	110VDC (93V-121V)	-	110VDC (77V-121V)	
Industrial & Ring main Panels	110VDC (93V-121V)	230VAC (150V-250V)	110VDC (77V-121V)	230VAC (150V-250V)

7.7.5 Trip coils to be provided in each type of panel shall be as under:

Incoming Panel	Two DC trip coils.
Outgoing, Consumer, Bus-Coupler and capacitor bank control panels	Two DC trip coils.
Industrial & ring main panels	Three (03) AC trip coils or alternatively DC shunt trip coil with capacitor trip unit arrangement and will be approved by O/o C.E (S&S) NTDC.

7.7.6 The VA capacity of trip coils shall be such that they are capable to perform mechanical endurance test without being over heated or change in characteristics.

7.7.7 A 5-digit operation counter without resetting shall be provided to record the number of opening operations of the circuit breaker. It shall be visible and readable from outside the switchgear.

7.8 **Circuit Breaker Auxiliary Switch and Control Contacts**

7.8.1 The connection to the circuit breaker is established by means of multiple pin plug and flexible cable. The auxiliary switch shall have adequate number of contacts so that, in addition to contacts actually used in circuit connections, at least four NO and four NC spare contacts shall be provided for future use. The PT supply of incoming panel shall be routed through auxiliary contacts of circuit breaker.

7.8.2 Auxiliary contacts shall be suitable for the number of electrical and mechanical operating cycles specified for the switching device. The operating characteristics of auxiliary contacts shall comply with the requirements of relevant IEC standard.

7.9 **Rating Plate**

Each circuit breaker and its operating devices shall be provided with a rating plate marked with the following data/information in an indelible manner.

a) CB Manufacturer's name with country of origin.
b) Circuit breaker type/designation.
c) Serial No. of circuit breaker along with date of manufacturing of Breaker.
d) Interrupter manufacturer's name with country of origin.
e) Type designation of interrupter.
f) Rated voltage, kV
g) Rated frequency, Hz
h) Rated normal current, A
i) Rated insulation level
j) Lightning impulse withstand voltage, kV
k) One-minute power frequency withstand voltage, kV
l) Rated short-circuit breaking current, kA
m) Rated duration of short-circuit
n) Rated short-circuit making current, kA
o) Single capacitor bank breaking current, A
p) Rated operating sequence
q) Rated supply voltage and frequency of closing and opening devices
r) Rated supply voltage and frequency of control & auxiliary circuits
s) Weight

7.10 **Tests on Circuit Breaker**

7.10.1 The tests shall be made in accordance with the procedure mentioned in IEC Publication 62271-100 and as specified herein.

7.10.2 **Routine Tests**

The following routine tests shall be made on circuit breaker.

a) Measurement of the resistance of interrupter & main circuit.
b) Verification of components used in operating mechanism, their conformance to that of type tested sample.
c) Checking of interlocking arrangement and other requirements as per clause 7.4.
d) One Minute AC Voltage Withstand test (36 kV)
e) Mechanical operation tests.
f) Tests on auxiliary & control devices (2kV for 1 min)

7.10.3 **Type Tests**

7.10.3.1.1 Duly certified and complete type test reports for tests as specified herein carried out at an STL approved lab on circuit breaker having same design, voltage ratings shall be acceptable in lieu of actual tests. The validity of the type tests reports shall be as per type test policy of NTDC.

7.10.3.1.2 In case of non-production of the requisite type test reports or if the type test reports are otherwise not acceptable to the Design NTDC following type tests shall be performed on circuit breaker at STL approved lab or any independent lab approved by Design NTDC in the presence of two representative of Design NTDC at the cost & arrangement of the manufacturer including travel expenses, boarding, lodging and daily allowance for the inspector to prove compliance with the requirement as listed in this specification.

Table-II

No.	Description of Tests	Current Rating
a)	Dielectric tests	630A & 2500A
b)	Measurement of resistance of main circuit and interrupter	630A & 2500A
c)	Temperature rise test	630A & 2500A
d)	Short time withstand and peak withstand current tests	630A & 2500A
e)	Extended mechanical endurance test at ambient air Temperature	630A & 2500A
f)	Short circuit current making and breaking tests	630A & 2500A
g)	Capacitor bank breaking & Capacitive current switching test	630A & 2500A
h)	Short circuit life test	630A
i)	Electrical endurance test	2500A
j)	Small inductive current breaking test	630A & 2500A
k)	Measurement of contact wear	630A & 2500A

7.10.3.2 **Short Circuit Life Test**

The circuit breaker shall be subjected to short circuit life test. The tests shall be carried out according to the test duties as indicated in Table-III based on IEC 62271-100 except as modified herein.

a) The short circuit breaking currents and the respective number of operations for each test duty as mentioned in Table-III shall be applied in one stretch. The time interval between operations shall not exceed 3 minutes. In case, the time interval between any operations is more than 3 minutes, the complete respective short circuit breaking current test series/operations shall be repeated except if allowed in IEC standard.

b) Single phase short circuit breaking test has been included to show that operation of the circuit breaker is not adversely affected by unbalance forces produced. This test duty will consist of close-open operations at rated pole i.e. Red, Yellow or Blue phase and applied in one stretch in each pole.

c) The transient recovery voltage shall meet the requirement with the specified values as for three phase tests by dividing voltages by first pole to clear factor 1.5, time co-ordinate remaining unchanged. The applied voltage shall not be less than phase to neutral value i.e. $12/\sqrt{3}$ kV.

d) Small inductive current breaking test shall be carried out during electrical life test to determine significant variation in chopping level of VCB if any. These shall be done at beginning and at the end of life cycle test.

e) The vacuum interrupter may be replaced with new ones after conducting small inductive current breaking test at beginning and before start of life cycle test series, if so desired by manufacturer/supplier. Small inductive current breaking test shall not be carried out separately if already carried out as part of short circuit life test.

f) The short circuit life test shall be preceded and followed by a temperature rise test and no-load operation test.

Conditions after Life Test Series

The circuit breaker shall be deemed to have passed the life test provided:

a) The characteristics of no load closing and opening test made before and after completion of the test series shall show no significant change.

b) The circuit breaker shall be capable of closing and opening at its rated normal current at the rated voltage although its short circuit making and breaking performance may be impaired. The main contacts shall be capable of carrying out rated normal current of the circuit breaker continuously without exceeding temperature rise limits specified in IEC62271-100 and withstanding the voltage specified under dielectric tests.

c) There shall be no mechanical or electrical insulation failure during the test series so as to impair the performance of the circuit breaker.

d) There shall be no indication of significant leakage current to the circuit breaker earth structure.

e) Re-strike during interruption is permissible so long as CB interrupt the short circuit current successfully. Over voltages produced during the life test shall be measured and shall not exceed the value specified in IEC 62271-100.

f) The change in average chopping current values measured at beginning and end of the life test shall not exceed more than 30%.

Table – III

Test duty	Short circuit breaking current	No. of operations
1	0.8 kA	CO: 30
	1.25 kA	CO: 40
	2.0 kA	CO: 50
2	3.1 kA	CO: 100
	5.0 kA	CO: 100
	8.0 kA	CO: 60
3	12.5 kA	CO: 60
	16.0 kA	CO: 55
4	25 kA (Symmetrical)	CO: 25
5	25 kA (Asymmetrical)	O: 5
Single Phase	25 kA	CO operations per each phase: 20

7.10.3.3 **Small Inductive Current Breaking Test**

These tests shall be carried out to ascertain:

1) the true chopping level of the vacuum circuit breaker
2) the over voltage levels for the two types of chopping (i.e. true and virtual)

The maximum switching over-voltage resulting in each condition shall be recorded and, in case this value exceeds 27 kV peak, suitable surge arresters as per clause 5.8 complying with NTDC Specification P-181:2012 (amended to date) shall be installed at appropriate place inside the relevant switchgear panels.

a) Switching of magnetizing current of an unloaded oil immersed three phase power transformer rate 11/33 kV, 4MVA connected to the circuit breaker via 30m long single core 500MCM, XLPE insulated aluminum cable.

b) Switching of 2 Nos. oil immersed, three phase distribution transformers rated 11/0.4kV, 1000KVA at (a) no load and (b) while supplying inductive loads of 10A (P.F=0.3), and 100A (P.F=0.5), the transformers being connected to the circuit breaker via 250m long three phase overhead distribution line consisting of ACSR dog conductor in horizontal formation and 50 m long single core 500 MCM, XLPE insulated aluminum cable.

Since the type of chopping whether true or virtual that might be expected in a given condition and the resulting over voltages in a particular type of chopping depend largely on the parameters of the supply and load circuits, the test circuit shall be so arranged as to present the actual service conditions as closely as practicable. For this purpose, actual transformers may be used which should have approximately the same relevant characteristics as would be expected from the above transformer or, alternatively, the transformers may be replaced by an equivalent circuit to obtain the desired load condition. The cable and overhead line may, if necessary for practical reason, be simulated by adding in parallel equivalent lumped capacitance of the values given below between the circuit breaker under test and the transformers.

Equipment		Equivalent Capacitance (nF)	
		Case (i)	Case (ii)
i)	Cable	12	20
ii)	Overhead line	-	5.5

In addition, 170 nF capacitance to earth shall be connected in each phase on the source side of the test circuit to account for the capacitances of cable associated with and connected to other circuit breakers in the switchboard. The transformers to be used for these tests are assumed to have the following typical values for the magnetizing current, iron losses and stray capacitance. In case the characteristics values in the actual transformers are different from the pertinent values given below (slight variations, which are not likely to influence the test results, may be ignored), suitable resistance and or inductance may be connected in the load circuit in a manner to compensate for the difference.

Sr. No.	Transformer Data	No-Load Current	Iron Losses	Stray Capacitances
i)	11/33 kV 4MVA	1 % (2.1 A)	0.1 % (4 kW)	16 nF
ii)	11/0.415kV 1MVA	2 % (1.05 A)	0.15 % (1.5 kW)	6 nF

Any change or simplification of the specified circuit shall however, not be considered except with regard to its effects on test result in either type of chopping. In order to take into account, the effect of moment of contact separation on the test result, 10 to 15 opening operations shall be performed in each test condition varying the instant of switching on the voltage wave successively by about 20 electrical degrees.

7.10.3.4 **Temperature Rise**

The temperature rise test of the main circuit, auxiliary circuits & devices of the breaker when carrying rated current shall be according to IEC-62271-100. However, the limits of temperature rise specified in the relevant IEC standard shall be reduced by 10°C to account for higher ambient condition required in this specification.

Note: The quality of the coated contacts shall be such that a continuous layer of coating material remains in the contact area after type tests, otherwise the contacts shall be regarded as "Bare". Manufacturer shall specify the thickness of coating during type tests.

7.10.3.5 **Capacitor Bank Breaking Test**

The capacitor Bank Breaking test shall be carried out as per relevant IEC standard. The rated capacitor bank breaking current for circuit breakers of different current ratings are given here.

Sr. No.	Rated Current of Circuit Breaker (A)	Capacitor bank breaking Current (A)
i)	630	500
ii)	2500	1600

8.0 LOAD BREAK SWITCH

8.1 General

8.1.1 The load break switch shall generally conform to relevant IEC standard and the general requirements listed herein.

8.1.2 The load break switches shall be air break type equipped with HRC fuses suitable for installation in 12kV switchgear system for switching the load currents. The HRC fuses shall be installed on the connecting blades of the load break switch or alternatively separate HRC fuses shall be provided with load break switch for the protection of outgoing feeders. The fuse shall be refill type having continuous current rating of 200A. It shall be triple pole fixed with cast resin post insulators and manually make and break operated. The poles shall be coupled mechanically on a common base frame so as to operate simultaneously. The isolator gap shall be visible under all circumstances for safety reasons.

8.1.3 The load break switch including its operating switch drive shaft shall be so constructed that these cannot come out of their open or closed positions by gravity, vibrations, reasonable shocks or accidental touching of the connecting rods or handle.

8.1.4 The load break switch shall be so designed that no dangerous leakage current can pass from the terminal of one side to any of the terminal of the other side of the switch. It shall permit locking in both the open and closed position. Mechanical indicators to show the positions shall be provided.

8.1.5 The frame of each load break switch shall be provided with a reliable earth terminal and earth connection to the earth conductor. The diameter of the clamping screw shall be at least 12mm and the connecting point shall be marked with the "Earth" symbol.

8.1.6 The load break switch shall be able to bear on the terminals the total electrodynamics forces to which these may be subjected during short circuit operation without impairing its reliability or current carrying capacity.

8.1.7 The load break switch shall have 3 positions as indicated in single line diagram No. PWD/TC-580. It shall be capable of being closed for connection to either bus section and the middle position shall be the "OFF" position.
As an alternative to the triple pole 3 position switch, two 3 phase switches with interlocking arrangement may be provided as shown in drawing No. PDW/TE-580 and PDW/TE-581 as applicable. The interlocks shall be such that when one switch is closed, it shall not be possible to close the other.

8.1.8 Mechanical interlocks shall be provided as under to prevent any malfunction:

a) Both the switches shall not be "ON" at the same time.
b) Locking arrangement shall be provided for the switch in "ON" and "OFF" position for safety purposes.

8.2 **Ratings**

8.2.1 The load break switch shall have the following ratings:

a)	Rated voltage		12kV
b)	Nominal voltage		11kV
c)	Rated current		400A
d)	Rated short time and peak withstand current (1sec)		25kA & 63kA
e)	Rated short circuit making current, peak		63kA
f)	Electrical Endurance		E1
g)	Mechanical Endurance		M1
h)	Lightning impulse withstand voltage	across isolating distance	110kV
		to earth	95kV
i)	Power frequency withstand voltage	across isolating distance	40kV
		to earth	36kV

8.3 **Tests on Load Break Switch**

8.3.1 The load break switch shall be tested in accordance with the requirements laid down herein and in accordance with IEC.

8.3.2 **Type Tests**

Duly certified and complete type test reports for tests carried out at an Independent lab acceptable to Substation Design NTDC on the Load Break switch having same design, voltage ratings shall be acceptable in lieu of actual tests. The validity of the type test reports shall be as per type test policy of NTDC. In case of non-production of the requisite type test reports or if the type test reports are otherwise not acceptable to the Design NTDC, the following tests shall be performed on the Load Break Switch having same voltage & current ratings as ordered in presence of two (02) representatives one from Design, NTDC and other from purchaser at any independent lab approved by Design NTDC at the cost and arrangement of the manufacturer including travel expenses, boarding, lodging and daily allowance for the representatives.

a) Dielectric tests
b) Temperature-rise tests
c) Measurement of resistance of main circuit
d) Short time withstand current and peak withstand current tests
e) Tests to prove the ability of the switch to make and break the specified currents
f) Tests to prove satisfactory mechanical operation and endurance

8.3.3 **Routine Tests**

The following routine tests shall be carried out on each load break switch by the manufacturer.

a) Dielectric tests
b) Contact resistance measurement
c) Operation tests

8.4 **Rating plate**

8.4.1 The load break switch shall be provided with a rating plate containing the following information:

a) Manufacturer's name with country of origin
b) Type and designation
c) Serial number
d) Rated voltage, kV
e) Lightning impulse withstand voltage, kV
f) Normal current, A
g) Short time withstand current
h) Weight, kg
i) Date of Manufacturing

9.0 EARTHING SWITCH

9.1 General

Earthing switch shall generally conform to relevant IEC and the general requirements listed herein. Earthing switch shall be high speed type, spring operated and independent manual operation type with rated peak withstand current of 63kA. Earthing switch shall be operated from front of the panel with suitable indication on front. Following interlocks shall at least be provided.

a) Earthing switch must be mechanically interlocked with the circuit breaker so that it cannot be operated unless the circuit breaker is in removed/test position.

b) The circuit breaker truck / carriage cannot be inserted when the earthing switch is in closed position.

9.2 Ratings

Earthing switch shall have the following ratings:

a)	Rated voltage	12kV
b)	Nominal voltage	11kV
c)	Rated Short time withstand and peak withstand current (1sec) (rms, peak)	25kA, 63kA
d)	Rated short circuit making current (rms, peak)	25kA, 63kA
e)	Rated lighting impulse withstand voltage 1) To earth and between poles 2) Across the isolating distance	 95 kV (peak) 110 kV (peak)
f)	Rated one-minute Power Frequency withstand voltage 1) To earth and between poles 2) Across the isolating distance	 36kV 40 kV
g)	Electrical Endurance	E1
h)	Mechanical Endurance	M1

9.3 Tests on Earthing Switch

Earthing switch shall be tested in accordance with the requirements laid down herein and the relevant IEC Publications.

9.3.1 Type Tests

Duly certified and complete type test reports for tests carried out at an independent lab acceptable to Design NTDC on the earthing switch having same design, ratings shall be acceptable in lieu of actual tests. The validity of the type tests reports shall be as per type test policy of NTDC. In case of non-production of the requisite type test reports or if the type test reports are otherwise not acceptable to the Design NTDC, the following tests shall be performed on the earthing switch having same voltage & current ratings as ordered in presence of two representatives one from Design, NTDC and other from purchaser at an independent lab approved by Design NTDC at the cost and arrangement of the manufacturer including travel expenses, boarding, lodging and daily allowance for the representatives.

a) Short time and peak withstand current tests.
b) Mechanical endurance test.
c) Test to prove short-circuit making performance of earthing switches.
d) Measurement of resistance.

9.3.2 **Routine Tests**

The following routine tests shall be carried out on each earthing switch.

a) Contact resistance measurement
b) Operation tests

9.4 **Rating plate**

The earthing switch shall be provided with a rating plate containing the following information:

a) Manufacturer's name with country of origin
b) Type and designation
c) Serial number
d) Rated voltage, kV
e) Short time withstand current
f) Weight, kg
g) Date of Manufacturing

10.0 **ENCLOSURE**

10.1 **General**

10.1.1 The enclosure shall conform in general to clause 5.102 of IEC-62271-200. All live parts including bus-bars, connections, circuit breaker, load break switches, voltage transformers, current transformers etc. shall be suitably enclosed. The degree of protection shall be IP3X and service continuity category LSC2B in accordance with relevant IEC standard. Enclosure shall be capable to meet internal arc fault criteria as per IEC 62271-200 classification IACAFLR 25kA for 0.5 sec.

10.1.2 Access to parts such as bus bars, main connections, current & voltage transformers and all other components for normal maintenance operation shall be through bolted plates or hinged doors with locking facilities.

10.1.3 The enclosure shall have a hinged door in the front and bolted plates at the rear. The instrument compartment door and rear bolted plates shall have proper sealing arrangement. All doors shall be provided with rubber gasket to minimize dust entrance.

10.1.4 Four grouting holes of diameter 14 mm shall be provided in the base plate of the switchgear panel.

10.1.5 Guide rails shall be provided at the base to ensure smooth entry of breaker truck into the panel.

10.1.6 An extension plate 600mm x 900mm x 2.3mm shall be provided with guide rails for each row of wheels of trolley. This shall have suitable arrangements for bolting on front of panel so that extension plate can be mounted flush with the floor on which the panel is installed.

10.1.7 For industrial, consumer and ring main panels, separate metering compartments shall be provided in which all the metering equipment, energy meters and all secondary wiring shall be housed. The over-current relay and the indicating instruments shall be mounted separately.

10.1.8 The depth for enclosure of incoming panels shall be 2400 mm maximum. The enclosure for bus coupler panel shall be fabricated in two parts i.e. load break switch compartment and breaker compartment. The two compartments shall be held together by suitable welding/bolting arrangement.

10.1.9 The cable entry bottom plates shall be made of aluminium sheet of at least 3.0 mm thickness in two parts, one fixed and other movable for adjustment of cable entry with brass cable glands.

10.1.10 Inspection windows (dully sealed) covered by a transparent polycarbonate sheet with metallic shutters shall be provided on front and back of panel at a suitable place.

10.1.11 Temperature indicators with sensors will be provided in all compartments (i.e. busbar, cable & CB) with display on front panels along with alarm function with selectable temperature range from 20 ℃ to 100 ℃.

10.2 **Construction**

10.2.1 The enclosure shall be made of high grade wrinkle free steel sheet of minimum thickness of 2.3mm. The supporting structure and frame shall be formed from angles, channels, folded sections of sheet metal fastened together with suitable stiffeners so that the enclosure shall be rigid and self-supporting and internally sectionalized through partitions for circuit breaker, main busbar, CTs/PTs and LV instrument compartments.

10.2.2 The circuit breaker compartment includes the complete assembly of circuit breaker, interrupter and operating mechanism mounted on truck or carriage/cassette.

10.2.3 Current and voltage transformer mountings and cable termination shall be located in a separate compartment having the provision for sealing independently. The condition of cables and CTs/VTs shall be visible through inspection window.

10.2.4 Four (04) lifting eyes shall be provided for lifting the complete individual panel from corners by means of slings. The holes of the lifting eyes shall have a minimum diameter of 45mm.

10.3 **Shutter**

10.3.1 The shutter having partitioned design class PM as per IEC 62271-200 shall be provided to prevent incidental contact with live parts when the circuit breaker is in test position, in disconnected position or has been removed. They shall be earthed and if they become part of the enclosure they shall provide the degree of protection specified for the enclosure.

10.3.2 The isolating contacts shall be adequately interlocked and protected by automatic shutters with locking facility. The shutter consists of moving & fixed plates. The shutters shall be marked "BUSBARS" and "CABLE". For bus-coupler panel, shutters shall be marked "BUSBAR-1" and "BUSBAR-2".

10.4 **Vermin Proofing**

The enclosure shall be completely vermin proof with special regard to the danger of flashover both in service and isolated positions. Provision shall be made to ensure complete vermin proofing of the cable entry holes.

10.5 **Painting**

10.5.1 All interior and exterior surfaces of steel sheet enclosure shall be thoroughly cleaned, rust proofed to prepare the metal surface for painting through process of degreasing and phosphating. The paint shall have a hard-durable surface and excellent weathering and fire-resistant properties.

10.5.2 Powder coating paint with weather resistance quality shall be used.

10.5.3 The paint thickness shall be at least 0.08mm on flat surface and 0.06mm on curved surfaces. The panels shall be finished in light grey color equivalent to RAL 7032.

10.6 **Circuit Labeling**

A plain plastic sheet of black color background with white letters in English shall be provided on each panel. The size of sheet shall be 200mm × 60mm × 3mm and it shall be fixed on the front of the enclosure.

10.7 **Metering Compartment for Industrial, Consumer and Ring Main Panels**

The metering compartment which shall house the metering equipment shall be separately lockable and sealable from the outside. This compartment will have an internal partition separating the HT side from the LT side but access to the equipment shall be possible only by breaking the main seals of the metering compartment. No access to the metering circuits shall be possible (even with the panel de-energized and the breaker trolley removed) without breaking the seals and opening the locks.

10.8 **Ventilating openings, Vent outlets**

10.8.1 Ventilating opening and vent outlets shall be so arranged or shielded that a wire of 2 mm diameter cannot be brought into a position which should reduce the insulation level of the main circuit below the specified level. Such opening may make use of wire mesh or the like provided that it shall have a suitable mechanical strength.

10.8.2 Three (03) pressure relief flaps/explosion vents having at least 200 x 600 mm shall be provided each on the roof of bus bar compartment and CTs & PTs compartment of switchgear panel and with circuit breaker compartment to quickly release of hot gases pressure within the switchgear assembly and dissipate the exhaust from an explosion due to electrical arcing within a switchgear assembly without spreading the explosive detritus, smoke, or airborne chemicals to adjacent panels. The vent outlets shall be covered by perforated aluminum sheet of 1.5 mm to 2 mm thickness. The diameter of perforations shall be 2.0 mm maximum and the center to center distance shall be 4.0 mm. The steel cover of thickness 1.25mm to 1.5mm for explosion vents shall be provided. All the four corners of explosion vents shall be spring loaded. The design of vents shall prevent entry of dust.

11.0 BUS-BARS

11.1 Copper bus bars (one set for each phase) made of 99.9% IACS electrical conductivity shall be provided. Test reports as per relevant standard shall be submitted with the bid.

11.1.1 The size of main bus-bars for connections to adjacent panels shall be as under:

Incoming, Outgoing, Bus-coupler, Consumer and Capacitor bank control panels	2×100mm×10mm
Industrial and ring main panels	1×60mm×5mm/300mm^2 (area)

11.1.2 The size of dropper bus-bars for connections from main bus-bars to circuit breaker shall be as under:

Incoming and Bus-coupler panels	3×80mm×10mm
Outgoing, Consumer, Capacitor bank Control, Industrial and ring main panels	1×60×5mm

11.1.3 All bus bars shall be tin plated and firmly jointed according to drawing no. PDW/DF/297. The bus bars shall be capable of being extended without difficulty on either side.

11.2 Insulators/Bus-bar Supports

The bus bars shall be supported on cast resin insulators. The insulators shall conform to relevant international standard and shall be free from imperfection of all sorts. The standard color of the glaze shall be brown. The characteristics of the insulators shall be as under:

Sr. No.	Characteristics	Ratings
a)	Minimum creepage distance	300 mm
b)	Dry arcing distance (min.)	175 mm
c)	Dry one-minute power frequency withstand voltage	50 kV
d)	Lightning impulse withstand voltage	95 kV
e)	Failing load bending	10 kN

Duly certified complete test reports carried out as per relevant IEC from an independent lab on offered insulators by the manufacturer having same design characteristics, shall be provided. Name of manufacturer should be embossed on the insulator.

11.3 Bus-bar Insulation

The bus bars including droppers, connections to CT/PTs and surge arrestors shall be completely covered with insulation of red color capable of withstanding Power Frequency voltage for one (01) minute. The insulation shall be of non-corrosive, non-tracking, flame-retardant and heat shrinkable type to ensure that it fully adheres to bus-bars. The manufacturer's name or trade mark shall be printed on the insulation sleeves. Sleeve used should be subject to prior approval by Design NTDC. The material of insulating sleeves and bus bar joint covers shall not melt, crack, split, drip, flow or

ignite when busbar temperature is raised to 280 deg. C. by an induced current nor shall burn when subjected to effects of power arc of 15 kA for one second. The supplier shall provide test reports of the above-mentioned properties in accordance with IEC/ ASTM or equivalent standard.

12.0 RELAYS

All protection relays used in 11KV switchgear panels shall be numeric type except Trip & Auxiliary relays and all relays shall be subjected to approval by NTDC. For this purpose, NTDC Specification P-151:2008 (amended to date) will be followed.

12.1 General

12.1.1 The relay shall be designed, manufactured and tested according to relevant IEC standards. The switchgear panel manufactures shall furnish at least three years warranty for the relays from the date of supply of switchgear.

12.1.2 The relays shall be of the back connected, dust proof, flush mounting on the front of the switchgear with connections at the rear.

12.1.3 Relays for incoming, outgoing, consumer and capacitor bank control panels shall operate on 110V DC with a tolerance of +20% and -15%. DC-1 & DC-2 auxiliary supplies automatic changeover circuit be designed for redundant power supplies to said relays. However, for industrial and ring main panels, the relays shall be arranged to operate on AC or any alternate arrangement in case of operation of relay on DC with the approval of Chief Engineer (S&S) NTDC.

12.1.4 Separate and independent relays shall be provided for each protection function except where it is specified that built-in function of relay shall be used.

12.1.5 All protection, control and measurement devices and components shall be approved by NTDC.

12.1.6 All protection relays shall be provided with at least six (06) output contacts and one (01) live status contact for healthiness of relay. Binary inputs shall be provided as per requirement of the scheme.

12.1.7 The independent test blocks shall be provided with each protection relay to facilitate testing by secondary injection test set via test plugs without disconnecting any wire or permanent connection and without affecting the other devices and protection functions. Moreover, test blocks shall be wired in such a manner that trip and alarm from the device and DC supplies to the devices are interrupted upon insertion of the test plug. The test block shall permit to supply test currents and voltages into the individual relays during testing. The CT circuit, PT circuit, DC power supplies and trip outputs to each protective device shall be routed through the test blocks.

12.1.8 Test blocks shall isolate the trip contacts of main protection relays on both sides. Injection sockets shall be arranged so that it shall not be possible to open circuit the current transformer secondary circuits when inserting test plugs. The trip functions shall be blocked when inserting the test plugs.

12.2 Ratings

12.2.1 System frequency is 50 Hz and continuous operating temperature shall be in range from -40°C to 75°C (min.)

12.2.2 Unless otherwise specified, the current circuit for the relays shall be suitable for 5A, 50Hz and voltage circuit shall be rated for 63.5V, 50Hz (Ph-N) or 110V, 50Hz (Ph-Ph).

12.2.3 The performance of the relay contacts shall be in accordance with IEC 60255-1.

12.2.4 Relays shall be capable of withstanding for one minute:

a) When a voltage of 2kV AC, 50Hz is applied on control wiring, MCB, relay, measuring equipment, tripping & closing coil of circuit breaker etc. to test Insulation from ground.

b) When 500VDC is applied on control wiring to test insulation from ground (Insulation resistance).

12.2.5 The accuracy class of all relays shall conform to the applicable requirements of approved international standards.

12.3 **Numerical Relays**

12.3.1 Relays shall be of NTDC approved types complying with IEC 60255 (British Standard 142), shall have approved characteristics, flush mounted, in dust and moisture proof cases and shall comply with BS 2011 test classification 20/40/04. The components of each relay shall be suitable for operation under the local climatic conditions.

12.3.2 The relays shall be type tested from KEMA or equivalent independent laboratory in accordance with the latest IEC standards, with particular attention to the EMI immunity.

12.3.3 **a. For NTDC Grid Stations & IPPs/SCADA Application**

All protection relays shall be of numerical type and shall have serial interface (at relay front & back) and single Fiber Optic Interface (Dual FO channel if specified) compliant with IEC-61850 standard protocol to facilitate data communication with station control system. The protection schemes shall include all hardware and software to permit both local & remote setting/interrogation/real time monitoring/fault & event evaluation from the engineering/operator work station of the control room.

b. For DISCOS (Incoming, Outgoing, Consumer, Industrial & Ring Main Panels)

All protection relays shall be provided with serial RS232/RJ45 or USB Ports interface (as the case may be) for uploading/downloading relay setting files & retrieve of fault/event records from protection relays. (Note: clause 12.3.3(a) shall be applicable only, if Discos particularly specify in tender document or the case may be the requirement of IEC-61850 compliant Fiber optic port for SAS system).

12.3.4 In case 11kV switchgear panels are installed for turnkey projects (or as specified), where Substation Automation System (SAS) are available all necessary optical distribution frames/optical splicing cassette, fiber optic cables and connectors shall be installed in panel for communication with SAS.

12.3.5 The numerical relays provided shall have following features:

a) Shall be based on digital signal processing and algorithmic based functions using multiple CPUs.
b) Programmable scheme logic.
c) Remote setting/interrogation.
d) Measured quantities displayed and real-time monitoring on laptop computer.
e) Shall be of compact design and modular software.
f) Shall have continuous self-monitoring and diagnostic features or shall have automatic relay and circuitry testing features.
g) Shall have selection functions from protection software library and shall be complete with Menu-driven user interface program.
h) Shall have serial interfaces (redundant ports at front & back) and IEC 61850 compliant single Fiber Optic port (for NTDC & IPPs) for on-line and off-line transmission of relay operation data, feeder load data, sequential event and fault recording, remote setting etc.
i) Shall have time-tagged events/disturbance record. Relay shall have facility of historic fault information of at least five system faults and on demand shall display relay operations, fault recording, protection operating times and feeder load data prior to fault etc. from each system disturbance.
j) Shall have both front and rear serial-ports for further data exploitation, equipment parameterization, retrieval of fault records etc.
k) Shall be suitable for operation based on 110 VDC and 230 VAC auxiliary power sources as specified.
l) Shall have built-in AC/AC and DC/DC converters for any of its modules required auxiliary supply other than 110V DC and 230V AC.
m) All overcurrent & earth fault protection relays shall have built-in cold load pick up & switch on to fault features.

12.3.6 The design of offered Modern numeric relays should be hardened against transient surge and over voltages caused by the CT/VT and DC circuits and associated field devices. The routing of cables shall be such as to limit interference to a minimum. Any auxiliary supplies necessary to power solid state circuits shall be derived from the main station battery and not from batteries built into the relay. Continuously energized relays including those with economy resistors will not be accepted for any application.

12.3.7 Numerical relays shall have built-in RS232/USB serial communication port at the front to communicate directly with the personal computer/laptop without converter/adopter to facilitate local interrogation, setting-up and recorded data extraction and Ethernet communication port at the rear equipped with communication software for local/remote access of data and parameter download. The relay shall have also built-in HMI (Human Machine Interface) Keypad facility for local access to relay settings, monitoring and retrieving the fault/event data recorded. Individual protection units shall be provided with an integral user interface to facilitate changes in setting and observation of indications without the use of remote communications.

12.3.8 Numeric relays shall also remain stable under conditions of Radio Interference. Radio Interference tests acceptable to the Engineer shall have been carried out by the Manufacturer and in this case RFI test reports shall be submitted for the Engineers approval. If such tests have not been carried out, the contractor shall carry out RFI tests to the satisfaction of the Engineer and submit test report for approval.

12.3.9 Hardware and Software shall be checked by software sub-routine continuously. Important components supervised shall include:

a) CPU's and associated Memory (ROM, RAM, EEPROM etc.)
b) Input signal validity (A/D converter)
c) O.S. Software
d) Protection function software
e) Watchdog and self-monitoring software
f) Output signal integrity
g) Algorithm execution / logic performance
h) Digital input conversion system
i) I/O logic points
j) Power Supply Noise/Failure
k) Internal Clock

12.3.10 Functional elements in numeric relays shall have LED indicators on the front panels to enable identification of their operation, faulted phases, zones, hardware and software status etc.

12.3.11 All numerical data communication shall comply with standard protocols.

12.3.12 The numeric relay must have user friendly software which shall also support all the previous versions.

12.3.13 **Operator Interface**

a) All numerical protection systems shall be provided with an integral local user interface, to enable communication with the relay without the use of external equipment. Any facilities provided for connection to an external computer shall be an additional feature to the local user interface. No exceptions to this requirement shall be permitted.

b) Relay serial communication facilities should allow all information which is available locally at the relay front panel to be accessed remotely. It should also be possible to carry out bulk transfer of settings and fault record information using appropriate licensed PC based software. The necessary software for communication with each relay type shall be provided as part of the contract.

12.3.14 **Identification**

Each protection relay shall have a unique identifier that is clearly visible. The software reference and issue level shall be identified. The marking of all relays shall comply with Clause 12 of IEC 60255-6.

12.3.15 Each protection relay shall be provided with LCD display facilities on which shows:

a) The current transformer ratio.
b) Voltage transformer ratio (if applicable)

12.3.16 **Settings**

Each Protection shall provide a means by which the user can easily apply the required settings, which is also secure from inadvertent operation. A display of the selected settings shall be provided on the protection relay.

12.4 **Testing Facilities**

12.4.1 Separate testing facilities shall be provided for each current and voltage transformer secondary circuit so that as to give access for testing of protection relays, metering system and associated circuits. These shall consist of test block mounted adjacent to relays, or any other testing arrangement approved by Engineer of NTDC.

12.4.2 Test facilities shall be provided for testing of the protection/signaling schemes. These facilities shall include all features necessary to permit testing with line in service with minimum risk of unwanted tripping.

12.4.3 Test facilities for testing of protection relays, metering system and associated circuits are as follows:

a) The outputs of current transformers can be short circuited to neutral and disconnection from relay circuits.
b) The output of voltage transformers can be disconnected from relay circuits.
c) Currents and voltages can be applied to relays free from any connections to the current or voltage transformers.
d) Current and voltage earth connections shall not be disturbed by use of testing devices.
e) Whilst in service, the currents and voltages can be measured without interrupting relay inputs.

12.5 **Operating Characteristics**

12.5.1 **Over Current and Earth Fault Protection Relay**

12.5.1.1 Over Current & Earth Fault Protection shall be numerical type only.

12.5.1.2 The relay shall have at least two (2) stages, each stage can be independently selectable as definite time or inverse time characteristics. The relay shall have non-directional three phase over current elements, one earth fault element along with independent instantaneous settings for phase & earth fault currents.

12.5.1.3 For capacitor protection, the relay shall also have built-in independent 2-stages high sensitive earth fault protection element which shall be used for two step capacitor unbalance detection protection. Each stage can be independently selectable as definite time or inverse time characteristics.

12.5.1.4 The relay shall have the facility of selection of following characteristics according to IEC 60255 and BS-142.

a) Standard inverse
b) Very reverse
c) Long time inverse
d) Extremely inverse
e) Definite time

12.5.1.5

a) Relay shall have adjustable settings for both operating current and time. The design of the relay being such that the setting can be carried out without taking relay out of service.

b) The range of current settings for phase fault shall cover at least 5-500 percent of rated CT current with tapings of minimum 5-percent intervals.

c) Earth fault element shall have a minimum range of setting from 5% to 120% of rated CT current with tapping of 5% interval.

d) The high set over current & earth fault element shall have a setting range of 100 % to 2500 % of rated CT current with tappings a minimum of 5-percent intervals. The tripping time of high set elements shall not be more than 20ms at current greater than two times the setting.

e) Time setting (definite time characteristic) for over current, earth fault & instantaneous elements shall be adjustable over a range of 0 to 60 sec with step size of 0.01 sec. Instantaneous elements shall have also an infinity setting.

f) Time Dial setting (Inverse Time characteristic) for both over current and earth fault elements shall be adjustable over a range of at least 0.05 to minimum 1.0 in steps not exceeding 0.01.

g) Over current & earth fault relays with built-in sensitive earth fault protection (Note: Sensitive Earth Fault Protection feature shall only be provided in case system is grounded via. Resistor or transformer or as per application required) shall have a minimum range of setting from 0.1% to 120% of rated CT current with tapping of 0.1% interval.

h) The high set Sensitive Earth fault protection shall have a setting range of 0.1% to 150 % of rated CT current with tapings of minimum 0.1% interval.

i) Time setting (definite time characteristic) for sensitive earth fault protection & its instantaneous elements shall be adjustable over a range of 0 to 60 sec with step size of 0.01 sec. Instantaneous elements shall have also an infinity setting.

j) Time Dial setting (Inverse Time characteristic) for sensitive earth fault protection shall be adjustable over a range of at least 0.05 to minimum 1.0 in steps not exceeding 0.01.

12.5.1.6 Each protection element shall have separate trip and alarm contacts and separate trip indicators. The relay shall have at least Six output configurable contacts and eight programmable LEDs.

12.5.1.7 The relays shall be thermally rated such the operating time of the relay at the highest practical current levels on combination of current and time multiplier settings shall not exceed the thermal with stand time of the relay.

12.5.1.8 The actual relay pick-up current shall not exceed 105% of relay setting and reset value shall not be less than 95% of pick-up current.

12.5.1.9 The relay shall meet with a situation of sudden change in load on switching the feeder.

12.5.1.10 The relay shall have built-in cold load pickup and SOTF features.

12.5.2 **Capacitor Unbalance Detection Relay (Built-in function of Over Current & Earth Fault Protection Relay)**

12.5.2.1 The built-in function of over current & earth fault protection relay shall be used as Capacitor Unbalance Detection protection. Capacitor unbalance detection relay is used in capacitor control panels and operates from 5A secondary of the bank neutral current transformer of Y section. The relay shall have 2-stages and each stage can be independently selectable as definite time or inverse time characteristics. The first stage of the relay shall initiate an audible alarm on the failure of one capacitor unit and the second stage shall cause tripping the circuit breaker on the failure of the second capacitor unit with audible/visible indications and lock-out action of over/under voltage relay in auto control mode. The neutral unbalance protection scheme for the capacitor bank shall consist of double star with neutral connected to the current transformer. The relay must have C.T arrangement for both capacitor unbalance & neutral unbalance protection.

12.5.2.2 The relay shall have all standard characteristics according to IEC standards.

12.5.2.3 Over Current and Earth Fault Protection shall be of Five elements, the fifth element shall be used for two step capacitor unbalance detection protection setting and shall be connected to neutral unbalance C.T. of 50/5A. For detail specification, the clause 12.6.1 above shall be followed.

12.5.2.4 This capacitor unbalance detection function can be attained by utilizing the built-in sensitive earth fault protection function of over current & earth fault relay.

12.5.3 **Over/Under Voltage Relay**

12.5.3.1 Over/Under Voltage protection shall be of numeric type. Over/Under voltage relay is used in capacitor control panels. The over voltage component of the relay shall be capable to provide capacitor protection against over voltage and facilitate auto switch OFF the capacitor bank when bus voltage exceeds a predetermined value for a preset time interval. Similarly, under voltage component of the relay switch ON the capacitor bank when bus voltage falls below a predetermined value for a preset time interval. The operation of relay shall be independent of harmonics and transients in the supply system.

12.5.3.2 The voltage and time sensitive automatic capacitor switching control shall be of single pole type flush mounted and suitable for installation in the switchgear instrument compartment on the front door. The scale and range of operation shall be suitable for switching a 7200kVAR capacitor bank. The accuracy shall be 2% of the full scale. Selector switches shall be provided for manual or automatic operation through "Automatic-Manual" and "Open-Neutral-Close" switches.

12.5.3.3 The voltage sensitive control shall measure line voltage and as function of that quantity control the relay which in turn shall operate the switchgear. The relay shall be electronically controlled with an adjustable time delay. The instrument shall also be provided adjustable bandwidth range for setting switching IN and OUT voltages so that little variation in voltage shall not cause hunting.

12.5.3.4 The relay shall have V.T. fuse failure feature and binary input for detecting P.T. MCB trip status and on operation of P.T. fuse failure Alarm shall be generated and lockout relay be operated for tripping of circuit breaker and close block.

12.5.4 **Trip & Lockout Relay**

12.5.4.1 Trip & lockout relay, shall be required for over current & earth fault protection and capacitor unbalance detection protection for safety reason, in order to close block operation of circuit breaker due to operation of protection relays in capacitor protection panel. It shall be electromechanical, draw out, high burden, hand and electrically reset, hand reset mechanical indication or flag, high speed and of multi-contact construction complying with E.A (ESI) standard 48-4, Class EB2. The relay coil shall be designed for continuous operation of 110 V DC with tolerance of +20% and -15%. The high burden relays shall be immune to AC and capacitance discharge current.

12.5.4.2 Lockout relays shall have at least five (5) years field proven experience. The contact arrangement shall consist of at least 3 NO and 2 NC contacts. Number of relays shall commensurate with the requirement of the protection scheme. The contact rating shall not be less than the following:

Contract Rating	Make and Carry Continuously	Make and Carry for 3-Seconds	Break
AC	1250 VA with maximum of 5A 300 V	7500 VA with maximum of 30 A and 300 V	1250 VA with maximum of 5A and 300 V
DC	1250 W with maximum of 5A and 300 V	7500 W with maximum of 30 A and 300 V	100 W resistive 50 W inductive (L/R=0.04s) with maximum of 5A and 300 V

12.5.4.3 The relays shall be suitable for flush mounting on the front of the cubicle with connections made at the rear of the case.

12.5.4.4 Tripping relay contacts shall be suitably rated to satisfactorily perform their required duty and relay operating time shall not exceed 10 ms from initiation of trip relay operating coil to contact close.

12.5.4.5 Resetting of the indicator and the contact shall be possible without having to open the relay case.

12.5.4.6 The operation and reset coils of electrically reset table trip relays shall have internal cut-off contacts.

12.5.4.7 The contactor/supplier shall submit test evidences of mechanical durability performance of the offered relays for both loaded contacts and un-loaded contacts.

12.5.4.8 The mechanical durability shall be 10,000 operations (minimum) with loaded contact.

12.5.5 **Trip Circuit Supervision Relay**

12.5.5.1 Two (02) Nos. Separate/independent Relays shall be provided for Trip Circuit Supervision.

12.5.5.2 The relay shall be electronic/electromechanical, flush mounted, dust proof, draw out type, hand reset flag with indication target to be reset manually.

12.5.5.3 The trip circuit supervision scheme shall provide continuous supervision of the trip circuits of the circuit breaker both in the open or closed position and independent of local or remote selection at the local operating position. The supervision relay shall include D.C. supply voltage, trip coils, all interconnected cables, auxiliary contacts for trip coils, trip circuit etc.

12.5.5.4 The relay shall also initiate an alarm if the trip supply or auxiliary supply voltage fails. The relay shall be equipped with at least 2 normally open and two normally closed contacts or alternately four 2-way changeover contacts. All contacts for alarm functions shall be volt-free, self-reset.

12.5.5.5 The relay shall have time delay (200 ms) on drop off to avoid mal-operation & to prevent spurious alarms due to voltage dips caused by operation of other equipment or fault in other circuits.

12.5.5.6 The relay shall not only monitor the presence of DC supply but also its level. It shall have provision for initiating a visual indication and audible alarm when the DC voltage falls below 80%.

12.5.6 **Auxiliary Relays**

12.5.6.1 Auxiliary relays shall be of rugged construction and shall have a high degree of reliability even when they have been idle for long periods of time. All auxiliary relay coils and contacts shall be suitable for continuous operation at 110 V DC for 11 KV system with a tolerance of + 20% and -15 %. The relay coils shall be so designed that their consumption is kept to a minimum and yet sufficient contact pressure is ensured when the relay operates to make contacts. The continuous current carrying rating of the contacts make and make rating shall not be less than 5A at 110 V DC.

12.5.6.2 Auxiliary relays shall be of instantaneous type or time delayed as required. The time delay provided in the relays shall not be affected by changing temperature or humidity. Auxiliary and contact multiplier relays in the tripping circuits shall be of high speed type and equivalent or better than class-I relays as defined in IEC-60255.

12.5.6.3 Manual reset auxiliary relays shall be high speed, multi-contact type with operation indicator.

12.5.6.4 Self-reset auxiliary relays shall be for rear of panel mounting, front-connected type.

12.5.6.5 Auxiliary tripping relays shall be self-reset, front-connected type suitable for rear-of-panel mounting.

12.5.6.6 The operative speed of auxiliary relays shall be within 4 to 10 ms depending on application.

12.5.7 **Coils**

12.5.7.1 The current coils of the numerical relays shall withstand the thermal and mechanical stresses at least 35 times the continuous current rating of the coil for one half second or 20 times the continuous rating of the coil for 3 seconds without damage to coil or associated mechanical or electronic components. The continuous rating shall be twice the rated current, with the specified temperature rise.

12.5.7.2 Voltage coils shall withstand thermal stress due to continuous energization at voltage 25% in access of the rated voltage at all settings of the relays.

12.5.9 **Indications**

Operation indicators shall be provided on all elements of relays and shall be designed for hand resetting.

12.5.10 **Test Devices**

Relays shall incorporate test devices which shall be mounted on front of panel so that testing can be carried out from the front of the panels using test plug. The test devices shall be so arranged that the current transformer secondary circuits cannot be open circuited at any position while test plugs or covers are being inserted or removed.

12.5.11 **Testing and Inspection**

12.5.11.1 **General**

12.5.11.1.1 Testing of relays and their components shall be performed in line with NTDC specification, and in accordance with the relevant IEC standards.

12.5.11.1.2 Protection relays and their components shall be subjected to routine tests as per the relevant international standards. Protection relays mounted in cubicles shall be completely wired, tested and inspected. Routine test certificate as per relevant IEC standards shall be submitted to NTDC/DISCOs along with relay.

12.5.11.2 **Routine Tests**

Routine tests shall not be limited to but should cover at least the following:

Secondary injection, scheme checks, relay logic, performance of engineer interface, functional-trip tests, setting ranges and calibration accuracy, response (trip) times, functional availability and application limits, system supervision, performance of communication interfaces with PCMS, events and disturbance records etc.

12.5.12 **Operation and Maintenance Manual of Protection, Control & Monitoring Equipment/Relays**

12.5.12.1 The supplier shall submit operation and maintenance instruction manual to the purchaser.

12.5.12.2 The complete manuals must be provided to NTDC/DISCOs before the delivery of relays or panels. Information in the manuals and documentation for relay system shall not contain less than the following:

a) Specification and characteristics.
b) External connections.
c) Description and drawing of the construction and principle of operation. Additionally, for relay systems, the module layout in interconnection diagrams, internal wiring and component descriptions. For numerical relays, details / information of all applicable software, interfaces, marshalling of BI/BO contacts, programming, optional features etc. shall be provided.
d) All setting calculation instructions explained with examples.
e) All setting and calibrations procedures and instructions.
f) Receiving inspections and acceptance test on instructions.
g) Installation requirements and instructions.
h) Routine maintenance requirements and instructions.

i) Repair and recalibration instructions.
j) Parts list.
k) Design test report.
l) Original manufacturer's instruction manuals and documentation (detailed information of basic and optional features if any) and not brochures shall be provided to Protection & Control department NTDC/DISCOs to acceptance of relays or relays system. Photocopies of manuals shall not be acceptable (i.e. all manuals shall be original as issued by Relay Manufacturers).

12.6 **Rating Data**

The relays shall have a rating data marked with at-least the following:

a) Manufacturer's name
b) Year of manufacture
c) Type of relay
d) Serial number
e) Country of origin
f) Ordering code along with detail ordering sheet
g) Detailed technical catalogue
h) Voltage and frequency etc. as applicable
i) Setting ranges

13.0 **CURRENT TRANSFORMER**

13.1 The current transformers shall be single pole epoxy resin insulated, dry type, self-contained suitable for indoor mounting and shall be tested in accordance with relevant IEC and particular requirements listed herein. The class of insulation shall be at least "E" type.

13.2 The current transformers shall be provided with a steel mounting base as per drawing No. PDW/DF-445 which shall be securely attached to the casting and shall have coating to withstand the weather conditions.

13.3 For dual ratio current transformers, ratio shall be obtained by tapings on the secondary side only. The ratio(s) of current transformer shall be printed on the CT body.

13.4 For Consumer, Industrial and Ring main panels, two separate sets of single-core current transformers i.e. one for over-current protection and the other for metering shall be provided. The metering current transformers shall have necessary provisions for sealing of the secondary terminal box besides being located in a separate independently sealable compartment.

13.5 The transformation ratios required for various types of switchgear of different ratings shall be as follows:

13.5.1 **Over-current Protection & Metering**

Sr. No.	Type of Switchgear Panel	Ratings (Amps)
a)	Incoming panel	2400:1200/5-5Amps or 1600:800/5-5 (as per requirement)
b)	Outgoing and capacitor bank control panels	600:300/5-5
c)	Industrial and ring main panels – Protective and metering CT (as specified by the purchaser)	100/5 or 150/5 or 200/5 or 300/5 or 600/5
d)	Consumer panel – Protective CT – Metering CT	 600:300/5 600:300/5
e)	Outdoor capacitor bank neutral current transformer of protection class	50 / 5

13.5.2 **Differential Protection**

Incoming panel	2400:1200/5Amps or 1600:800/5 Amps (as per requirement)

13.6 **Rating and characteristics**

The rating and characteristics of the current transformers shall be as under:

Sr. No.	Type designation	Metering (M)	Protection (P)	Metering and Protection (MP)
a)	Rated Voltage, Um, kV, rms	12	12	12
b)	Nominal voltage, Un, kV, rms	11	11	11
c)	Rated frequency, Hz	50	50	50
d)	Rated Secondary Output:			
	- Measuring winding: VA.	10		10
	- Protective winding: VA.	-	15	15
e)	Accuracy Class:			
	- Measuring winding.	0.5FS10[x]	-	0.5FS10[x]
	- Protective winding.	-	5P20	5P20

Sr. No.	Type designation	Metering (M)	Protection (P)	Metering and Protection (MP)
f)	Short time current rating at all ratios, kA			
	- Thermal, Ith	25	25	25
	- Dynamic, Idyn	63	63	63
g)	Rated short-circuit duration, sec.	1	1	1
h)	Accuracy limit factor for protection core	-	20	20
i)	One-minute power frequency withstand voltage, kV			
	- Primary winding	36	36	36
	- Secondary winding	3	3	3
j)	Impulse withstand voltage, 1/50 μ sec., kV Peak	95	95	95
k)	Temperature rise, °C , Max.	40	40	40
l)	Partial Discharge, (Maximum) Um, pC 1.2Um/√3	50 20	50 20	50 20

Notes:

a) Panels provided with Power Quality Analyzer shall have Metering C.T. accuracy class of 0.2s.

b) The VA burden of CTs mentioned in table is at secondary lowest tap position and shall be multiplied correspondingly on higher taps.

13.7 **Rated Continuous Thermal Current (Icth)**

The current transformer shall be capable for continuous operation at 1.2 times the rated current.

13.8 **Temperature Rise**

13.8.1 The temperature-rise of the current transformers when carrying primary current equal to the rated continuous thermal current (1.2 times the rated current) with a unity power factor & burden corresponding to the rated output under service conditions shall not be more than 40°C.

13.8.2 Test shall be carried out as per relevant IEC standard.

13.9 **Markings**

The terminals P1 & P2 shall be printed in the CT body. The marking shall carry at least the following information in an indelible manner. No sticker is allowed.

a) Manufacturer's name & trade mark

b) Serial number and type designation
c) Rated primary and secondary currents
d) Rated voltage
e) Rated frequency
f) Rated output and corresponding accuracy class for each core
g) Rated insulation level (e.g., 36/95kV)
h) Rated thermal and dynamic currents (e.g. 25/63kA)
i) Class of insulation
j) For CTs with dual secondary windings, the use of each winding and its corresponding terminals
k) Rated continuous thermal current (e.g., Icth = 120%)

13.10 **Tests on Current Transformers**

13.10.1 Tests shall be performed in accordance with the procedure mentioned in relevant IEC Publication by the manufacturer and the test report shall be submitted.

13.10.2 **Routine Tests**

The following routine tests shall be made on each CT as per relevant IEC.

a) Verification of terminal markings.
b) Power frequency withstand test on primary windings.
c) Power frequency withstand test on secondary windings.
d) Inter-turn over voltage test.
e) Partial discharge measurement
f) Measurement of the resistance of primary and secondary windings. The measured resistance should not exceed the resistance of the type tested CT and approved by Design NTDC.
g) Accuracy tests with 20%, 100% and 120% of rated current (for metering core only).
h) Composite error, current and phase displacement measurements (for protection core only).

The number of current transformers to be tested for accuracy tests and partial discharge test shall be the nearest higher whole number to the cube root of the number of current transformers to be supplied with panels or in loose. If one specimen fails to meet the requirements of any individual test specified above, a second sample shall be selected at random from the same lot. Failure of any specimen from the second sample shall cause rejection of the entire lot.

13.10.3 **Type Tests**

Duly certified complete type test reports for the following tests carried out on Current Transformers at an independent lab having same design, ratios, current & voltage ratings shall be acceptable in lieu of actual tests. In case of non-production of the requisite type test reports or if the type test reports are otherwise not acceptable to the Design NTDC, the following tests shall be performed on the Current Transformer having same ratings and design as ordered in presence of two representatives one from Design, NTDC and other from purchaser at any independent lab approved by design NTDC at the cost and arrangement of the manufacturer including travel expenses, boarding, lodging and daily allowance for the representatives. The validity of type tests shall be per type test policy of NTDC.

a) Short-time current tests.
b) Temperature-rise test.
c) Lightning impulse withstand voltage test.
d) Measurement of the resistance of primary and secondary windings.
e) Power frequency voltage withstand test at Primary & secondary windings.
f) Inter-turn over voltage test.
g) Partial discharge measurement.
h) Accuracy test (for metering core only).
i) Test for composite error, current error and phase displacement measurement (for protection, cores only).
j) Instrument security current tests (for metering cores only).

13.11 **Data and Drawings to be submitted for approval**

a) Schedule of technical data.
b) Excitation curve.
c) Typical composite error curves for the standard burden from 0 to 20 times rated secondary current for protective current transformers.
d) Overall assembly drawing showing front, side and plan views and sufficient cross-sectional views clearly showing the transformer.
e) Dimensional drawings of mounting base and terminals.
f) Side view photo of current transformer.

14.0 VOLTAGE TRANSFORMERS

14.1 The voltage transformers shall be single pole epoxy resin insulated, dry type, self-contained suitable for indoor mounting and shall be tested in accordance with relevant IEC and particular requirements listed herein. The class of insulation shall be at least "E" type.

14.2 The voltage transformers shall be provided with a steel mounting base which shall be securely attached to the casting and shall have coating to withstand the weather conditions.

14.3 The voltage transformer shall be so installed as to be energized prior to the closing of the breaker for incoming, industrial & ring main panels and shall be capable of convenient isolation from the bus bars. For protection against short circuit on secondary side, a triple pole AC miniature circuit breaker shall be installed in the instrument compartment.

14.4 **Rating and characteristics**

The rating and characteristics of the voltage transformer shall be as under:

Sr. No.	Type designation	Rating
a.	Rated Primary Voltage, Um, kV rms	12
b.	Nominal Primary voltage, Un, kV rms	11
c.	Nominal Secondary voltage, Un, V rms	110
d.	Rated frequency Hz	50
e.	Rated Secondary Output, VA	100

Sr. No.	Type designation	Rating
f.	Accuracy Class:	0.5
g.	Rated Voltage Factor,	
	- Continuous duty,	1.2
	- 30 second duty,	1.5
h.	Rated Insulation Level, kV	
	- Power Frequency withstand Voltage of Primary winding	36
	- Impulse withstand voltage, 1/50 μ sec., kV Peak	95
i.	Power Frequency withstand Voltage of Secondary winding	3
j.	Partial Discharge: Um, pC 1.2Um/√3, pC	 50 20
k.	Short circuit withstand duration, sec.	1

14.5 **Temperature-rise**

14.5.1 The temperature-rise of the voltage transformer at the specified voltage, at rated frequency, at rated burden and at any power factor between 0.8 lagging and unity under service conditions shall not be more than 40°C. The voltage to be applied to the voltage transformer shall be 1.2 times the rated primary voltage.

14.5.2 Test shall be carried out as per relevant IEC standard.

14.6 **Short-circuit Characteristics**

14.6.1 Voltage transformer shall be capable of withstanding the mechanical and thermal stresses for one second resulting from short-circuit on secondary terminals with full voltage maintained on the primary terminals. The Voltage Transformer shall be energized from the primary side at rated voltage and the short circuit current applied between the secondary terminals for duration of 1s. The test may be carried out by energizing the secondary winding and applying the short circuit between the primary terminals of voltage transformer.

14.7 **Markings**

The marking shall be in accordance with relevant IEC standard. The marking shall carry at least the following information in an indelible manner. No sticker is allowed.

a) The manufacturer's name & trade mark
b) Serial number and type designation
c) Rated primary and secondary voltage
d) Rated frequency
e) Rated output and accuracy class (e.g., 100VA Class 1.0)
f) Class of insulation
g) Rated insulation level (e.g., 36/95kV)

h) Rated voltage factor and corresponding rated time (e.g., 120% continuous &150% for 30s)
i) Connection diagram and polarity marking

14.8 **Tests on Voltage Transformers**

Tests shall be performed in accordance with the procedure mentioned in relevant IEC Publication and the test report shall be submitted for approval of design NTDC.

14.8.1 **Routine Tests**

The following routine tests shall be made as per relevant IEC standard.

a) Verification of terminal marking
b) Power frequency withstand voltage test on primary windings
c) Power frequency withstand voltage test on secondary windings.
d) Partial discharge measurement.
e) Determination of errors according to requirement of accuracy class.
f) Measurement of resistance of primary and secondary winding. The measured resistance should not exceed the resistance of the type tested PT and approved by Design NTDC.

The number of voltage transformers to be tested for accuracy tests and partial discharge test shall be the nearest higher whole number to the cube root of the number of voltage transformers to be supplied with panels or in loose. If one specimen fails to meet the requirements of any individual test specified above, a second sample shall be selected at random from the same lot. Failure of any specimen from the second sample shall cause rejection of the entire lot.

14.8.2 **Type Tests**

Duly certified complete type test reports for the following tests carried out on voltage transformer at an independent lab having same design, ratios & voltage ratings shall be acceptable in lieu of actual tests. In case of non-production of the requisite type test reports or if the type test reports are otherwise not acceptable to the Design NTDC, the following tests shall be performed on the Voltage Transformer having same ratings and design as ordered in presence of two representatives one from Design, NTDC and other from purchaser at any independent lab approved by design NTDC at the cost and arrangement of the manufacturer including travel expenses, boarding, lodging and daily allowance for the representatives. The validity of type tests shall be per type test policy of NTDC.

a) Temperature-rise test.
b) Lightning impulse voltage test.
c) Power frequency withstand voltage test on primary windings.
d) Power frequency withstand voltage test on secondary windings.
e) Measurement of resistance of primary and secondary winding.
f) Short circuit withstand capability test.
g) Determination of errors.
h) Partial discharge measurement.

14.8.3 **Data and Drawings to be submitted for approval**

a) Schedule of technical data.
b) Overall assembly drawing showing front, side and plan views and sufficient cross-sectional views clearly showing the transformer.
c) Dimensional drawings of mounting base and terminals.
d) Side view photo of voltage transformer.

15.0 **CONTROL WIRING AND TERMINATION**

15.1 Control cable used in wiring shall be of 600V grade multi stranded copper wires and shall conform to NTDC specification P-100 (Amended to date). Voltage circuit shall be made with **2.5mm²** cable and current circuit with **4mm²** cable. All control wiring shall run through steel channels with removable covers in HV compartment. In instrument compartment, the wiring shall be routed through PVC trays.

15.2 Each wire shall be identified by machine lettered permanent printed at least 50mm from the end of wire or plastic identification ferrules. Ground wire has no number and identified by cable color. Following color identification shall be applied:

3-phase AC	1-Phase AC	DC	Color
Phase 1	Phase	Positive	Red
Phase 2	-	-	Yellow
Phase 3	-	-	Blue
Neutral	Neutral	Negative	Black
Ground	-	-	Green

15.3 Each switchgear panel shall be supplied with necessary length of control wiring required for interconnection complete with adjacent panel.

15.4 **Termination**

15.4.1 The control wiring shall be terminated in a terminal block. The terminals shall be tinned copper and may be crimped or compression applied. Only one wire shall be terminated in a terminal block. Termination of more than one wires in a terminal block is not allowed.

15.4.2 Terminal blocks shall be mounted on the rails. Each row of the terminal blocks shall be covered with end plates/brackets. The rated cross section of terminal blocks used in voltage & current circuits shall be 4mm² & 6mm² respectively. Terminal blocks used in current circuit shall be supplied with movable short circuit plates/links covered with insulating material on one side along with screw type test socket quipped with sleeve. Provision shall be available in terminal block for fixation of push-on marking tag. The marking tag shall consist of white background with black printing with max. of three characters.

15.4.3 Terminal blocks shall conform to the requirements of IEC 60947-7-1. Duly certified complete test reports from an independent lab carried out by the manufacturer having same design & ratings shall be provided.

15.4.4 Terminal blocks for AC & DC circuits shall be placed separately. 10% spare terminal blocks of each type shall be provided in the panels. Terminal blocks shall be provided with a slip-on cover of transparent polycarbonate material to avoid any accidental touch.

16.0 INSTRUMENTS

16.1 The instruments installed on the panels shall conform to IEC 60051 and the requirements listed herein. AC moving iron analogue instruments shall be semi flush mounted, back connected, dust proof, having a removable transparent dust tight window cover with a dull black finish and having facility to change the scale from top with or without opening the instrument. The size of instrument shall be 96mm × 96mm unless otherwise specified. The zero adjuster will be provided outside the instrument.

16.2 Power Factor Meter

The Power factor meter shall be suitable and robust enough to withstand the momentary high disturbances without damage or loss of accuracy and comply with the following ratings, characteristics:

Sr. No.	Characteristics	Ratings
a)	Voltage input	110 V
b)	Current input	5A
c)	Accuracy class	1
d)	Rated frequency	50 Hz
e)	Scale range	Lead 0.5 - 1- 0.5 Lag

16.3 Ammeter

16.3.1 The ammeter shall be suitable and robust enough to withstand the momentary high current arising in the circuits during short-circuit conditions without damage or loss of accuracy and comply with the following ratings, characteristics:

Sr. No.	Characteristics	Ratings
a)	Current	1.2 In continous 5.0 In for 30s 10 In for 5s 40 In for 1s
b)	Accuracy class	1
c)	Rated frequency	50 Hz
d)	Secondary current of CT	5A

16.3.2 The full-scale values of ammeters for use with the current transformers shall be 125% of full scale value.

16.4 **Voltmeter**

The Voltmeters shall be suitable and robust enough to withstand the momentary high disturbances without damage or loss of accuracy and comply with the following ratings, characteristics:

Sr. No.	Characteristics	Rating
a)	Voltage	1.2 Vn continous, 2.0 In for 5s
b)	Accuracy class	1
c)	Rated frequency	50 Hz
d)	Secondary voltage of VT	110V
e)	Scale range	0 – 15kV

16.5 **Power Quality Analyzer**

The Power Quality Analyzer shall be suitable and robust enough to withstand the momentary high disturbances without damage or loss of accuracy and comply with the following ratings and characteristics.

1. Panels provided with Power Quality Analyzer shall have Metering CT accuracy class of 0.2s.
2. Power Quality Monitoring equipment/analyzer shall be installed in accordance with EN 50160, IEC 61000-4-30, IEC 61000-4-7, IEC 61000-4-15 & IEC 62586-1 standards.
3. It shall fulfill the highly precise energy management tasks and shall have an accuracy class of 0.2s according to IEC 62053-22 and Class A category according to IEC 61000-4-30.
4. It shall fulfill graphical display with back ground illuminated and transparent front cover and its size shall be preferably 144mm x 144mm.
5. It shall have flush mounting design.
6. It shall have four inputs for AC voltage measurements & 4 inputs for AC current measurements with in/out arrangement.
7. It shall operate on both DC & AC supply voltage:

    a) DC supply voltage 70V to 250V with ± 20% tolerance
    b) AC supply voltage 110V to 240V with ± 20% tolerance 50Hz

8. The typical life of battery shall be:

    a) 10 years for operation with permanently applied supply voltage
    b) At least 02 months over a 10 years' period for operation with sporadically interrupted supply voltage.

9. It shall be capable to measure the following electrical parameters:

    a) Voltage (Phase-N, Phase-Phase)
    b) Current per phase
    c) Power Frequency
    d) Active, Reactive & Apparent Power (Import/Export) in four quadrants
    e) Power factor and active power factor

f) Phase Angle
g) Unbalance voltage & current
h) Harmonics of AC voltage & current are stored up to the 40th order for evaluation
i) THD (Total Harmonic Distortion) of AC voltage & current
j) Flicker

10. It shall monitor the following minimum power quality parameters of Electrical Network as per IEC/EN standards.

a) Power Frequency distortions
b) Power frequency dips
c) Magnitude of Supply voltage and currents and other electrical parameters.
d) Flicker instantaneous, short and long.
e) Supply voltage dips/sags
f) Supply voltage swells
g) Short and long supply Voltage interruptions
h) Transient under/over voltages and currents.
i) Supply voltage unbalance and variations
j) Supply Voltage and current harmonics and THD
k) Supply Voltage and current inter harmonics
l) Mains signaling voltage on the supply voltage/noises
m) Rapid voltage changes
n) Measurement of under deviation and over deviation parameters

11. All parameters shall be fully configurable.
12. Both measurements and events shall be recorded at different time intervals. PQM shall be capable to provide following functions according to EN/IEC standard.

a) Measured recorder
b) Event recorder
c) Trent recorder
d) Waveform captures
e) Load profile
f) Transient log

13. The PQM shall have serial/RJ45/USB interfaces as the case may be for programming of PQM and configuration of electrical parameters and real time monitoring of electrical parameters on laptop computer via PQM software.
14. It shall have at least 8-GB memory for recording recorder data. The store data shall be exported automatically & transmitted to remote station computer/SAS via software and shall be shown in tabular and graphical forms and to generate different standardized power quality reports according to EN 50150 NS & MS or EN 50160 HS or generate use defined reports.
15. The PQM shall have front keypad for manual configuration of electrical parameters.
16. The PQM shall be equipped with RS485 or RJ45 or any other communication port with communication protocols. It shall also be capable to interface with different or same type of PQM devices for development of integrating network and for remote interrogation of PQM data on remote station computer for monitoring and programming of PQM meters and time synchronization in case of DISCOs network.

17. In case of IPPs/NTDC system the PQM shall have IEC 61850 complaint single Ethernet port for communication, monitoring, programming and GPS time synchronization via SAS.
18. The measured/monitoring values shall be recorded with date & time stamps.
19. It shall have at least two binary inputs & outputs.
20. Its degree of ingress protection shall be [P5].
21. The supplier/contractor shall supply all the necessary software for programming of PQM to export recorded data from PQM i.e. measured recorder, event recorder, trend recorder, waveform captures, load profile recording & transient log to station PC & remote-control center for storage & further evaluation/analysis along with connectors, programming and network communication cables and allied aux. equipment without any additional cost and shall be part of supply/contract.

16.6 **Scale Marking**

16.6.1 Marking and symbols of instrument shall be in accordance with IEC 60051. Scale plates shall have a permanent white finish with black graduation and numerals marked at 90 °. The marking shall carry at least the following information in an indelible manner.

a) Accuracy Class.
b) Transformation ratio.
c) Manufacturer's name & country of origin.
d) Scale range calibrated in Red if exceeds the nominal C.T. or P.T. value.

16.6.2 For the instruments which are used in conjunction with current transformers, the number of scales shall be in accordance with the number of CT ratios available on the connected current transformers, there being a separate scale plate for each ratio.

16.6.3 The required number of scale plates shall be fixed on the instruments so that after changing the CT ratio the corresponding scale plate of the instrument could also be changed. The scale plates shall clearly define the corresponding CT ratio. The CT ratio shall be prominently marked on the dial plate. The scale marking shall be evenly distributed between 10% & 100% of the scale range.

16.6.4 Instruments shall conform to the requirements of relevant IEC standard. Duly certified complete test reports from an independent lab carried out by the manufacturer having same design & ratings shall be provided.

17.0 **ENERGY METERS**

The energy meters shall conform to the NTDC specification P-202:2012 amended to date "Energy Meters for Grid Metering".

18.0 **MINIATURE CIRCUIT BREAKERS**

18.1 Miniature circuit breaker shall withstand a continuous duty and shall carry the rated current without exceeding the specified temperature-rise. The rating of MCB shall be as under:

i.	Rated voltage	250 V AC or 110V DC (as applicable)
ii.	Rated current	10 A
iii.	Rated breaking current	10 kA
iv.	Maximum operating time	< 500 m/s (at rated breaking current)

18.2 0Each MCB shall have at least two auxiliary contacts. The power source signaling light shall be 110 VDC.

18.3 DC MCBs shall be used in DC circuits. AC or universal type MCBs shall not be accepted in lieu of DC MCBs.

18.4 MCBs shall conform to the requirements of relevant IEC standard. Duly certified complete type test reports from an independent lab carried out on MCBs by the manufacturer having same design & ratings shall be provided.

19.0 **RATING PLATE**

19.1 The rating plate for each complete panel shall be fixed on the front side of the enclosure as shown in drawing No. PDW/DF-299. The plate shall be made of stainless steel or Aluminium of at-least 1mm thickness. The plate shall be marked with the following engraved text in black color:

i) Switchgear Panel Manufacturer's name
ii) CB manufacturer's name & Country of origin.
iii) Type/designation of CB
iv) Panel serial number
v) Year of manufacture
vi) Rated voltage
vii) Frequency in Hz
viii) Rated insulation level:
   a. Lightning impulse withstand voltage
   b. Power frequency withstand voltage
ix) Current rating of the Circuit Breaker:
   a. Continuous at 50 ℃
   b. Short-time
x) Rated short-time withstand current (for main and earthing circuits)
xi) Rated peak withstand current (for main and earthing circuits)
xii) Rated duration of short circuit (for main and earthing circuits)
xiii) Current transformation ratio of the CTs installed:
   a. Metering
   b. Protection
   c. Differential
xiv) Voltage ratio of voltage transformers where applicable
xv) Diagram of connections as per drawing No. PDW/TE-850
xvi) Weight:
   a. Circuit breaker
   b. Total
xvii) Contract/Purchase Order No. and date
xviii) Reference standard

19.2 The rating plate for circuit breaker, load break switches, relays, instrument transformers, instruments and energy meters shall be fixed on the equipment as specified in the respective clauses.

19.3 **Operating Instruction Plate**

19.3.1 An operating instruction plate indicating all necessary steps to be followed in the required sequence of operation for withdrawing and insertion operations of the circuit breaker shall be fixed right on the front of enclosure for the guidance of the operator.

19.3.2 The instruction plate shall be made of stainless steel or aluminum sheet of minimum 1.0mm thickness and so placed that it immediately catches the eyes of the operator when he intends to perform any operation of the circuit breaker.

19.3.3 The operating instructions on the plate shall be engraved in English as well as in Urdu language in black color.

20.0 **TESTS ON PANELS**

20.1 The components forming part of metal enclosed switchgear shall comply with and be tested according to the tests specified in the relevant clauses of this specification. The tests listed herein shall be made in accordance with the procedure mentioned in relevant IEC standards and as specified herein.

20.2 **Type Tests**

20.2.1 Type tests to be made on a completely assembled Metal Clad switch gear. The type tests may be carried out on a maximum four test specimens followed by grouping of tests as defined in IEC 62271-1.

20.2.2 Following type tests shall be made on representative switchgear incoming & outgoing panels including a complete three pole circuit breaker to be supplied, complete with any disconnecting features, with vent outlets forming part of unit with main connections and bus-bars in presence of two representatives from Design NTDC at an STL approved lab or at any independent lab approved by Design NTDC at the cost & arrangement of the manufacturer including travel expenses, boarding, lodging and daily allowance for the inspectors to prove compliance with the requirements as listed in this specification. The validity of the type tests reports shall be as per type test policy of NTDC.

a) Dielectric tests.
b) Measurement of the resistance of the main complete circuit, Breaker and interrupter in assembled condition and instrument transformers.
c) Temperature-rise test as specified.
d) Verification of the degree of protection of persons against approach to live parts and contact with moving parts.
e) Mechanical operation tests.
f) Extended mechanical endurance test.
g) Verification of making and breaking capacities.
h) Short time withstand and peak withstand current tests on main and earthing circuit.

i) Short-circuit life test as specified for 630A Panel.
j) Electrical endurance test for 2500A Panel.
k) Capacitor bank breaking test.
l) Measurement of contact wear both after short circuit making and breaking tests and short circuit life test.
m) Small inductive test.

However if the circuit breaker had been previously type tested as per requirement of clause 7.10 of this specification then following tests are required to be performed on representative switchgear incoming & outgoing panels in the presence of two representatives from Design NTDC at an independent lab approved by Design NTDC at the cost & arrangement of the manufacturer including travel expenses, boarding, lodging and daily allowance for the inspectors to prove compliance with the requirements as listed in this specification.

a) Dielectric tests.
b) Measurement of the resistance of the main complete circuit, Breaker and interrupter in assembled condition and instrument transformers.
c) Temperature-rise test as specified.
d) Verification of the degree of protection of persons against approach to live parts and contact with moving parts.
e) Short time withstand and peak withstand current tests on main and earthing circuit.

20.2.3 The results of all type tests shall be recorded in type test reports containing data to prove compliance with the specification, and sufficient information shall be included so that the essential parts of the switchgear can be identified. In particular, the following essential information shall include:

- Name of manufacture of switchgear panel.
- Type designation of switchgear panel.
- Rated voltage.
- Rated frequency.
- Rated insulation level.
- Rated normal current.
- Rated short time and peak withstand currents.
- Rated duration of short circuit.
- Rated supply voltage of closing & opening devices and of auxiliary circuit.
- Make, Type, country of origin, Serial No. of circuit breaker.
- Make, Type, country of origin, Serial No. of interrupter.
- Rated short circuit making and breaking currents of circuit breaker.
- Rated operating sequence of circuit breaker.
- Details of operating mechanism and devices employed during tests.
- Rated cable charging breaking current of circuit breaker.
- Rated out of phase making and breaking current of circuit breaker.
- Rated single capacitor bank breaking current of circuit breaker.
- Rated back to back capacitor bank breaking current of circuit breaker.
- Rated capacitor bank inrush making current of circuit breaker.

- Rated back to back capacitor bank inrush making current of circuit breaker.
- Outline drawings and data schedules of switchgear panel.
- Photographs to illustrate the condition of switchgear before and after tests
- Record of test quantities during each test or test duty, as specified in relevant IEC standard.
- Statements of behavior of the switchgear during tests, its condition after test and any parts renewed or reconditioned during the tests.
- The type test reports shall incorporate sufficient information to identify the circuit breaker and general information concerning its supporting structure or metal enclosed unit of which the circuit breaker forms an integral part .Such information shall include but is not restricted to, drawings of breaker general assembly, cross section of the breaker through the axis of arcing contacts, detail of arc control devices, contacts and the operating and coupling mechanism of the breaker, information about the materials used, the outline and other important dimensions such as the travel of moving contact etc. The details of mountings, fixing on insulators, the working details of operating mechanism such as the ampere turns, voltage, cross section of plungers and pole pieces for operating coils.

20.2.4 Type tests carried out on a representative switchgear incoming panel of a manufacturer shall be applicable for bus coupler panel provided the circuit breaker & all allied accessories/equipment to be used shall exactly be of same design, identical in their shape, in their dimensions, in their operating conditions, current & voltage ratings, breaking capacity etc. subject to performance of Short time withstand and peak withstand current test, Dielectric test and temperature rise test as specified on bus coupler panel at an independent lab approved by Design NTDC.

20.2.5 Type tests carried out on a representative switchgear outgoing panel of a manufacturer shall be applicable to industrial, consumer and capacitor bank control switchgear panel(s) provided the circuit breaker & all allied accessories/equipment to be used shall exactly be of same design, identical in their shape, in their dimensions, in their operating conditions, current & voltage ratings, breaker capacity etc. subject to performance of Short time withstand and peak withstand current test, Dielectric test and temperature rise test as specified at an independent lab approved by Design NTDC.

20.2.6 Type testing shall be followed by routine testing as per clause 20.3.1.

20.2.7 **Temperature Rise Test**

The temperature rise test of the main circuit, auxiliary circuits & devices of the panel when carrying rated current shall be according to IEC-62271-200. However, the limits of temperature rise specified in the relevant IEC standard shall be reduced by 10◦C to account for higher ambient condition required in this specification.

Note: The quality of the coated contacts shall be such that a continuous layer of coating material remains in the contact area after type tests, otherwise the contacts shall be regarded as "bare". Manufacturer shall specify the thickness of coating during type tests.

20.2.8 **Measurement of the resistance of Main Circuit and Interrupter**

The measurement of resistance shall be carried out as per relevant IEC standard. The resistance of main circuit measured during routine testing shall not exceed 1.2 times the resistance measured before temperature rise test.

20.2.9 **Tolerances on Test Quantities**

Sr. No.	Designation of the Test	Test Quantity	Tolerances
i)	Power frequency voltage test	Test voltage	±1%
ii)	Impulse voltage test	Peak value Front time Time to half value	±3% ±30% ±20%
iii)	Temperature rise test	Test current Frequency Ambient temperature	+2% +2% to -5% +10 to +40°C

20.3 **Routine Tests**

20.3.1 The following routine tests shall be made on all switchgear panels at the manufacturer's works during pre-delivery inspection:

a) Verification of name plate data, marking on CTs, PTs & and other instruments.
b) Visual inspection, verification of dimensions & components used in operating mechanism and other constructional details to verify their conformance to the approved drawings as well as of type tested sample.
c) Checking of interlocking arrangement and other requirements.
d) Inspection of accessories and components to be supplied with the panels.
e) Measurement of the resistance of the main circuit, Breaker and Interrupter.
f) Mechanical operation tests to ensure the proper functioning of the shutter, mechanical interlocks, etc.
g) Tests of auxiliary electrical devices.
h) Verification of the interchangeability of components of the same rating and construction.
i) Power frequency withstand voltage tests on the main circuit.
j) Tests on control and auxiliary circuits. This includes dry short duration power frequency voltage withstand test, inspection of auxiliary & control circuits, verification of conformity to the circuit diagram and wiring, components, functional tests, verification of protection against electric shock and degree of protection (IP Code)
k) Test on bus-bar insulation. The insulated bus-bar selected randomly shall withstand Power frequency for one (01) minute applied between the bus-bar sample and an electrode (metallic foil) effectively covering the outer surface of the insulation but sufficiently far from the ends of the sample of bus-bar.
l) Testing of C.Ts, P.Ts, metering equipment and protection relays via. Test Set.

20.3.2 The acceptance/inspection certificate clearly indicate the performance of above tests during pre-delivery inspection/testing and test results shall be submitted to the Purchaser.

21.0 SPARE PARTS

The requirements of spare parts to be supplied against an order shall be clearly indicated by the purchaser in the schedule of prices keeping in view the available stock of spares. A list of commonly required spares is given below for guidance of purchaser for each group of twenty (20) switchgear panels of same characteristics and ratings

a) Complete trolley 1 Nos.
b) Current transformer 3 Nos.
c) Voltage transformer 3 Nos.
d) Vacuum bottles 3 Nos.
e) Complete insulation housing
f) Busbar spouts with contacts, 1 Set.
g) Bus-bar support insulators 1 Set
h) Set of trip coils (DC & AC) as applicable.
i) Operating mechanism complete 1 No.
j) Charging motor 1 No.
k) Overcurrent relay each type used 1 No.
l) Supervision relay, 1 No.
m) Socapex 1No.
n) Test Block 1No.
o) Hooter 1 No.
p) Set of signaling Lamps, 1 No.
q) Ammeter with spare parts 2 No.
r) Voltmeter 1 No.
s) Power Quality Analyzer 1 No.
t) Power factor meter 1 No.
u) Terminal blocks 10 Nos.
v) Auxiliary relays 02 Nos.
w) Test Plug for Testing of Protection Relays 2 No.
x) Set of insulating sheets 3 Sets used for insulating, covering and partitioning.

22.0 DRAWINGS AND DESCRIPTIVE DATA

22.1 Data to be provided by Purchaser/End User

Following data/requirement shall be provided by the purchaser/end-user.

a) Type of Panel with rating.
b) Requirement of Earthing switch and Power Quality Analyzer.
c) Any specific requirement of tools & accessories other than clause 5.12.
d) Requirement for relays as per clause 12.3.3.
e) Requirement of spare parts.

f) Any other special requirement.

22.2 **Drawings & Data to be submitted with the bid**

22.2.1 Overall assembly drawing showing front, back side and plan views with doors closed and open of switchgear panel. Sufficient cross sections and parts views shall be indicated to clearly show all the equipment. All leading dimensions and clearances shall also be indicated.

22.2.2 Supply record of offered type, current & voltage rating of switchgear panels for last five years on the following format:

Sr. No.	Contract/Purchase Order No. & date	Quantity	Current/Voltage rating	Delivery period	Client Address/ Phone/ Fax No./ E-mail, etc.

22.2.3 The schedule of technical data completely filled-in attached hereto. The word indicating "as per specification/standard", "equivalent" will not be acceptable.

22.2.4 Manufacturer's catalogues/drawings as required in the schedule of technical data.

22.2.5 Non-submission of completely filled - in schedule of technical data and supply record on the above format or submission of incomplete information/data as mentioned above with the bid, may render the bid non-responsive.

22.3 **Drawings & Data to be submitted for approval**

The supplier/manufacturer shall be required to furnish the following for approval:

a) The schedule of technical data completely filled-in attached hereto. The word indicating "as per specification/standard", 'equivalent' will not be acceptable.
b) List of all the components/equipment, their manufacturer's name & country of origin used in the manufacture of switchgear panels.
c) Complete wiring and schematic diagram.
d) Overall assembly drawing showing front, side and plan views. Sufficient cross-sections and part views shall be included to clearly indicate all the equipment and insulation barrier plates. All leading dimensions and clearances shall be indicated. The sizes, and lengths of all sheets, angles, and shapes shall be provided.
e) The drawings of support insulators, bus-bars, cable entry plates, lifting eyes, hinges, locking and sealing facilities and handles etc.
f) The equipment used in the CB and in their operating mechanism, etc.
g) The drawing showing detailed physical arrangements and connection of the load break switch.
h) Detail of Earthing Arrangement.

23.0 **PACKING AND TRANSPORTATION**

The switchgear panels and all allied accessories shall be supplied in packing suitable for transport by rail/road and sea as per international practice. Special precaution may be essential for protection

of insulation during transport to prevent moisture absorption due, for instance, to rain, snow or condensation for one year.

24.0 ATTACHMENTS

Following data sheets and drawings are attached herewith:

a) Schedule of Technical Data
b) Drawings
   i) PDW/DF-297
   ii) PDW/DF-299 A
   iii) PDW/DF-299 B
   iv) PDW/DF-300
   v) PDW/DF-423
   vi) PDW/DF-444
   vii) PDW/DF-445
   viii) PDW/DF-446
   ix) PDW/DF-447
   x) PDW/TE-580
   xi) PDW/TE-581
   xii) PDW/TE-582
   xiii) PDW/TE-1331
   xiv) PDW/TE-1630
   xv) PDW/TS-2010
   xvi) PDW/TS-4932

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DATE OF APPROVAL:			
APPROVED BY:			
Mr. Naeem Hassan	Mr. Ashraf Elahi	Mr. Raja Liaqat	Mr. Rao Afzal
CE (S.S.D) NTDC (Secretary)	**GM (D&E) NTDC (Member)**	**GM (A.M) North NTDC (Member)**	**GM (P.D) North NTDC (Member)**
Qazi Mir Ahmed			
GM(TECH) NTDC (Convener)			

SCHEDULE OF TECHNICAL DATA
FOR 11kV METAL-CLAD SWITCHGEAR PANELS
(NTDC SPECIFICATION P-44:2018)

A.	GENERAL			Proposed Data	Deviation from P-44:2018 (If any)
1.	Switchgear Manufacturer's name				
2.	Switchgear Manufacturer's address				
3.	Type test reports attached		YES/NO		
4.	Type/designation of switchgear panel on which following type tests performed.				
5.	**Details of Type Test if performed. (Attach Type test report)**		**Date of Test**	**Name of Lab.**	
	-	Lightning Impulse Voltage Withstand test.			
	-	Power frequency withstand Voltage test.			
	-	Measurement of the resistance of the main circuit.			
	-	Temperature-rise test.			
	-	Short time and peak withstand current tests.			
	-	Verification of the degree of protection.			
	-	Verification of making and breaking capacities.			
	-	Mechanical operation tests.			
	-	Tests on non-metallic partitions and shutters.			
	-	Internal arcing test.			
	-	Short-circuit life test as specified			
	-	Capacitor bank breaking test.			
	-	Measurement of contact wear both after short circuit making and breaking tests and short circuit life test.			
	-	Mechanical endurance test as specified.			
B.	**RATINGS OF SWITCHGEAR PANEL**				
1.	Nominal Voltage		kV		
2.	Rated Voltage		kV		
3.	Rated Current		A		

4.	Rated short-circuit withstand current for main and earthing circuit	kA		
5.	Rated peak withstand current for main and earthing circuit	kA		
6.	Lightning Impulse Withstand Voltage.	kV		
7.	Power frequency withstand Voltage.	kV		
8.	Phase to phase clearance	Mm		
9.	Phase to ground clearance	Mm		
10.	Thickness of insulation sheet between phases	Mm		
11.	Material of insulation sheet	Mm		
12.	Size of control cable used in voltage circuit	mm^2		
13.	Size of cable used in current circuit.	mm^2		
14.	Whether the switchgear is completely covered on both sides?	YES/NO		
15.	Whether fire retardant pipes are provided for connection to adjacent panels on both sides?	YES/NO		
16.	Whether fiberglass sheet having min. thickness of 4mm for covering the bus-bar chamber on both sides of each panel has been installed?	YES/NO		
17.	Whether control cables run through steel channels with removable cover?	YES/NO		
18.	Whether color coding of control cables as per clause 14.2 is used?	YES/NO		

B.	**CIRCUIT BREAKER**		**Proposed Data**	**Deviation from P-44:2018 (If any)**
1.	Manufacturer's name. (Attach Manufacturer's catalogue with the bid)			
2.	Manufacturer's address.			
3.	Type/designation			
4.	Country of origin			
5.	Suitability for 3-phase operation and rapid reclosing for outgoing feeders			
6.	Current rating of circuit breaker on which type tests were performed.	A		
7.	Mass of complete circuit breaker			
8.	No. of breaks in series per pole			
9.	No. of poles			
10.	No. of close open operations possible with the stored energy			

11.	Minimum clearance in air between poles			
12.	Minimum clearance in air between poles to earth			
13.	Type Tests (Copy of type test reports attached)	YES/NO		
14.	Type/ordering code of CB installed in switchgear panel on which type tests performed.			
15.	Type/designation of interrupter installed in CB on which type tests performed.			
16.	**Details of following Type Test if performed. (Attach Type test report)**	**Date of Test**	**Name of Lab.**	
	- Dielectric tests			
	- Short time withstand and peak withstand current tests			
	- Extended mechanical endurance test at ambient air temperature			
	- Short circuit current making & breaking tests			
	- Capacitor Bank Breaking and Capacitive Current Switching Tests			
	- Short circuit life test			
	- Measurement of resistance of interrupter in assembled condition			
	- Electrical endurance test			
17.	Rated voltage	kV		
18.	Lightening impulse withstand voltage	kV		
19.	Power frequency withstand voltage	kV		
20.	Rated frequency	Hz		
21.	Circuit Breaker Class			
	- w.r.t Mechanical Endurance			
	- w.r.t Electrical Endurance			
	- w.r.t Capacitive Current Breaking			
	- w.r.t Connection to cables			
22.	Rated capacitor bank breaking current	kA		
23.	Rated short circuit breaking current	kA		
24.	Percentage DC component	%		
25.	Rated short time withstand current	kA		
26.	Rated duration of short circuit	Sec.		

27	Rated short circuit making current		kA		
28.	Rated peak withstand current		kA		
29.	First pole to clear factor				
30.	Rated transient recovery voltage for terminal faults		kV		
31.	Rated operating sequence				
32.	Break time				
33.	Dead time				
34.	Opening time				
35.	Closing time				
36.	Spring charging time				
37.	Arcing time				
38.	Close-Open time				
39.	Time between two operations necessary to restore the initial conditions and/or to prevent undue heating of parts of circuit breaker, t.		Seconds		
40.	Current capability of offered circuit breaker at 20 °C (Attach Load Current Vs Ambient Temp. curve)				
41.	Temperature rise at normal rated current				
	-	Contacts	°C		
	-	Terminals	°C		
	-	Other metal parts	°C		
42.	Resistance of main circuit of CB.		μΩ		
43.	Guaranteed mechanical life of circuit breaker and operating mechanism and category assigned for mechanical test				
44.	No. of mechanical operating cycles the circuit breaker is capable to performing without the need for mechanical adjustments				
45.	No. of opening operations the circuit breaker is capable to perform without maintenance at:				
	-	Rated normal current			
	-	10 % rated breaking current			
	-	30 % rated breaking current			
	-	60 % rated breaking current			
	-	100 % rated breaking current			

C.	INTERRUPTER		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & address. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation			
3.	Country of origin			
4.	Type tests reports attached			
5.	Type of interrupter installed in CB on which following type tests were performed.			
6.	Rated voltage			
7.	Rated normal current			
8.	Rated short circuit breaking current			
9.	Rated duration of short circuit			
10.	Rated single capacitor bank breaking current			
11.	Lightening Impulse withstand voltage			
12.	Power frequency withstand voltage			
13.	Type of circuit breaker on which the offered interrupter was type tested			
14.	Resistance of interrupter on which type tests were performed (attach document)			
15.	Dimensions (Drawing attached)			
16.	Interrupter weight.			
17.	Contact Force			
18.	Mechanical Life			
19.	Electrical Life at rated normal current			
20.	Interrupter contact material			

D.	OPERATING MECHANISM		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name and country of origin of trip coil			
2.	Manufacturer's name and country of origin of closing/opening coil			
3.	Rated voltage of closing coil (Max./Min.)	V		
4.	Rated voltage of DC trip coil (Max./Min.)	V		
5.	Rated power consumption of Closing coil	W		
6.	Rated power consumption of Trip coil	W		

7.	Motor for spring charge mechanism:			
	- Manufacturer's name and country of origin			
	- Rated voltage	V		
	- Rated power consumption	W		
8.	Time required for motor to recharge the closing spring			
9.	Type of auxiliary switches			
10.	Total Nos. of Auxiliary contacts			
11.	Total number of Auxiliary contacts			
12.	Number of spare Auxiliary contacts			
13.	Whether lockout preventing closing facility is provided?			
14.	Whether anti-pumping feature has been provided?			

E.	CB ISOLATING CONTACTS		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Material			
3.	Whether isolating contacts are silver-plated?			
4.	Whether type testing of offered CB was done with the same make & type of isolating contacts?			
5.	Dimensions of isolating contact (Attach drawings)			
6.	Whether isolating contacts are clip type for outgoing panel? (Attach drawing)	YES/NO		
7.	Whether isolating contacts are tulip type for incoming panel? (Attach drawing)	YES/NO		

F.	LOAD BREAK SWITCH		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name and country of origin (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation			
3.	Type tests reports attached	YES/NO		
4.	Rated voltage	kV		
5.	Rated current	A		
6.	Electrical Endurance class			

7.	Mechanical Endurance class			
8.	Rated short time and peak withstand current	kA		
9.	Rated short circuit making current	kA		
10.	Rated lightening impulse withstand voltage:	kV		
11.	Rated power frequency withstand voltage:	kV		
12.	No. of positions of load break switch.	Nos.		
13.	Type of HRC fuse used in LBS			
14.	HRC fuse Manufacturer's name & country of origin (Attach Manufacturer's catalogue with the bid)			
15.	Type/designation of HRC fuse			
16.	Country of origin of HRC fuse			
17.	Rated voltage of HRC fuse	kV		
18.	Rated current of HRC fuse	A		

G.	**EARTHING SWITCH**		**Proposed Data**	**Deviation from P-44:2018**
1.	Manufacturer's name and country of origin (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation			
3.	Type tests reports attached	YES/NO		
4.	Rated voltage	kV		
6.	Rated short time and peak withstand time current	kA		
7.	Rated short circuit making current	kA		
8.	Electrical Endurance class			
9.	Mechanical Endurance class			
H.	**PANEL ENCLOSURE**		**Proposed Data**	**Deviation from P-44:2018**
1.	Thickness of sheet			
2.	Material of sheet			
3.	Degree of protection			
4.	Dimensions of panel (Attach drawings)			
5.	Whether cable entry gland/clamp plates are removable?			
6.	Whether spring loaded type explosion vents provided on the top of panel?			
7.	Material of shutter			

I.	BUSBARS		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Material			
3.	Size of main bus-bars			
4.	Size of dropper bus-bars			
5.	Electrical conductivity of bus bar			
6.	Resistance of complete main circuit with CTs at 20 °C before temperature rise test (R/Y/B)	μΩ		
7.	Resistance of complete main circuit without CTs at 20 °C before temperature rise test (R/Y/B)	μΩ		
8.	Whether bus bars are tin plated?	YES/NO		
9.	Phase to phase clearance of main bus-bars			
10.	Phase to phase clearance of dropper bus-bars			
11	Distance of bus bar from front of the panel			

J.	BUS BAR INSULATION		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
4.	Type tests reports attached	YES/NO		
5.	Material of insulation sleeves			
6.	Does the insulation provided on bus bars have properties of non-corrosive, non-tracking and is flame retardant?	YES/NO		
7.	Whether bus bar at joints are provided with covers?			
8.	Material of insulation covers on joints			
9.	Color of insulation			
10.	Impulse withstand voltage			
12.	Continuous voltage withstand capability			

K.	BUSBAR SUPPORT INSULATOR		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of bus-bar support insulator			
3.	Type Tests (Copy of type test reports attached)	YES/NO		
4.	Material of insulator			
5.	Creepage distance	Mm		
6.	Rated lightening impulse withstand voltage	kV		
7.	Rated one-minute power frequency withstand voltage	kV		
8.	Failing load bending	KN		
9.	Dimensions (Attach drawing)			

L.	CAST RESIN SPOUTS		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation			
3.	Type tests reports attached	YES/NO		
4.	Material of spouts			
5.	Short time withstand current			
6.	Rated lightning impulse withstand voltage			
7.	Rated power frequency withstand voltage			
8.	Dimensions (Attach drawing)			

M.	EARTHING		Proposed Data	Deviation from P-44:2018 (If any)
1.	Dimensions of common earthing strip			
2.	Size of flexible earthing parts of hinged parts			
3.	Size of earthing terminal			
4.	Short time withstand current for earthing circuits			
5.	Peak withstand current			
6.	Whether earthing strip at joints is tin plated?	YES/NO		

N.	MINIATURE CIRCUIT BREAKER		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of MCBs			
3.	Type Tests (Copy of type test reports attached)	YES/NO		
4.	Rated voltage (AC/DC)			
5.	Rated normal current			
6.	Rated breaking current			
7.	Operating time at rated breaking current			
8.	Whether each MCB is provided with two auxiliary contacts.			

O.	INSTRUMENTS (Power Quality Analyzer Ammeter, Voltmeter & Power Factor meter)		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation/ordering code of Ammeter.			
3.	Type/designation/ordering code of Voltmeter.			
4.	Type/designation/ordering code of Power Factor meter.			
5.	Type/designation/ordering code of Power Quality Analyzer			
6.	Type Tests (Copy of type test reports attached)	YES/NO		
7.	Full scale range of Ammeter			
8.	Scale range of Voltmeter			
9.	Scale range of Power Factor Meter			
10.	Accuracy class of Ammeter			
11.	Accuracy class of Voltmeter			
12.	Accuracy class of Power Factor Meter			
13.	Accuracy class of Power Quality Analyzer			
14.	Dimensions of meters.			
15.	Whether separate scale plates for each CT ratio is provided?	YES/NO		
16.	Whether name plate data/marking & symbols is printed on the meters?	YES/NO		

P.	**OVERCURRENT & EARTH FAULT RELAY (with built-in two step capacitor unbalance detection protection for Capacitor protection, wherever applicable)**		**Proposed Data**	**Deviation from P-44:2018**
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of over current relay along with ordering code & detail ordering sheet)			
3.	Type Tests (copy of type test reports attached)	YES/NO		
4.	Type of characteristics for phase O/C & E/F element			
5.	Type of characteristics for Sensitive E/F element **(for applicable cases only)**			
6.	No. of elements			
7.	CT Inputs (1A/5A)			
8.	Setting range of over-current element			
9.	Setting range of earth Fault element			
10.	Setting range of Phase & E/F instantaneous element			
11.	Setting range of Sensitive Earth Fault Protection element **(for applicable cases only)**			
12	Setting range of instantaneous Sensitive Earth Fault Protection element **(for applicable cases only)**			
13.	Operating voltage	V		
14.	No. of Binary input/output contacts i.Binary Inputs ii Binary Outputs			
15.	Continuous contact rating.	VA		
16.	Make/break contact rating	VA		
17.	Front & Rear Ports			
18.	Dimensions (Attach drawings)			
19.	Whether the offered relay is approved by NTDC System protection department?	YES/NO		
20.	Detail of Fiber Optic Interface IEC61850 compliant for Remote Communication/SAS			

Q.	OVER/UNDER VOLTAGE RELAY		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of over current relay along with ordering code & detail ordering sheet)			
3.	Type Tests (copy of type test reports attached)	YES/NO		
4.	Type of characteristics			
5.	VT input			
6.	No. of elements			
7.	Setting range of Over voltage element			
8.	Setting range of Under Voltage element			
9.	Is VT Fuse Failure element available?	YES/NO		
10.	No. of Binary input/output contacts i.Binary Inputs ii.Binary Outputs			
11.	Continuous contact rating.	VA		
12.	Make/break contact rating	VA		
13.	Front & Rear Ports			
14.	Dimensions (Attach drawings)			
15.	Whether the offered relay is approved by NTDC System protection department?	YES/NO		
R.	DC TRIP CIRCUIT SUPERVISION RELAY		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid).			
2.	Type/designation of DC Supervision Relay			
3.	Type Tests (Copy of type test reports attached)	YES/NO		
4.	Monitors full trip circuit with CB open and close			
5.	Rated Voltage			
6.	Operating voltage range			
7.	a) Operating time.			
	b) Resetting time.			
	c) Time delayed drop off period.			
8.	No. of contacts.			

9.	Continuous contact rating	VA		
10.	Make/break contact rating	VA		
11.	Dimensions (Attach drawings)			
12.	Whether the offered relay is approved by NTDC System protection department.	YES/NO		

S.	TRIPPING RELAYS.		Proposed Data	Deviation from P-44:2018 (if any)
1.	a) Manufacturer.			
	b) Country of Manufacture.			
	a)Type			
2.	Ordering code along with ordering sheet			
3.	Nominal operating voltage.			
4.	Minimum Operating voltage.			
5.	Contact Mechanism Reset (Hand / Electrical).			
6.	Operation indicator (Hand Reset).			
7.	Operating time at nominal voltage.			
8.	No. of Contacts a)NO b)NC			
9.	Contact rating.			
	a)Make and carry continuously. •AC •DC			
	b)Make and carry for 3 secs. •AC •DC			
	c)Break •resistive watts. •Inductive (L/R=0.04sec) VA			
10.	Thermal withstand capacity.			
11.	Reset mechanism.			
12.	Dimensions (Attach drawings)			
13.	Whether the offered relay is approved by NTDC System protection department.	YES/NO		

T.	CURRENT TRANSFORMER		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of offered current transformer			
3.	Type Tests (copy of type test reports attached).	YES/NO		
4.	Rated voltage (Um), rms.	kV		
5.	Nominal voltage, rms.	kV		
6.	Rated Frequency.	Hz		
7.	Rated normal primary current.	A		
8.	Rated Secondary current.	A		
9.	Rated continuous Thermal current, Itch,	%		
10.	Lightning Impulse voltage (Primary winding).	kV		
11.	Power frequency Voltage (Primary winding).	kV		
12.	Power frequency Voltage (secondary winding).	kV		
13.	Insulation Class			
14.	Rated duration of short circuit.	Sec.		
15.	Temperature rise.	°C		
16.	Max. Temp. withstand capability	°C		
17.	Accuracy limit factor.			
18.	Instrument Security Factor.			
19.	Inter Turn Insulation level.	kV		
20.	Resistance of primary winding at 20°C ambient temp.			
21.	Resistance of secondary winding at 20°C ambient temp.:			
	a. Measuring Core 1.	mΩ		
	b. Protective Core 2.	mΩ		
22.	Rated Secondary Output, VA:			
	a. Measuring Core 1.	VA		
	b. Protective Core 2.	VA		
23.	Accuracy Class:			
	a. Measuring Core.	A		
	b. Protective Core.	A		
24.	Short time **Thermal (Ith)/dynamic(Idyn)** current rating.	kA		
25.	Partial Discharge at 1.2Um/ 1.2 Um/√3.	PC		

U.	VOLTAGE TRANSFORMER		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of offered voltage transformer.			
3.	Type Tests (Copy of type test reports attached).	YES/NO		
4.	Rated Primary Voltage, Um, kV, rms.	kV		
5.	Rated Secondary Voltage, Um, V, rms.	V		
6.	Nominal Primary Voltage, Un, kV,rms.	kV		
7.	Rated Secondary Voltage, Um, kV, rms.	V		
8.	Rated Frequency.	Hz		
9.	Rated Secondary Output:			
	- Measuring winding.	VA		
	- Protective winding.	VA		
10.	Accuracy Class:			
	- Measuring winding.			
	- Protective winding.			
11.	Rated Voltage Factor:			
	- Continuous duty.			
	- 30 second duty.			
12.	Temp. Rise at 1.2 times the rated primary voltage.	°C		
13.	Temperature Rise under short circuit condition.	°C		
14.	Lightning Impulse withstand voltage (Primary winding).	kV		
15.	Power freq. withstand Voltage (Primary winding).	kV		
16.	Power freq. withstand Voltage (secondary winding).	kV		
17.	Resistance of primary winding at 20°C ambient temp.			
20.	Resistance of secondary winding at 20°C ambient temp.			
21.	Partial Discharge at Um/1.2Um/1.2Um/√3.	pC		
22.	Short circuit withstand capability.	Sec.		
23.	Permissible secondary short circuit current.			
24.	Details of deviations of the offered CTs from NTDC specification amended to date (attach details if any).			

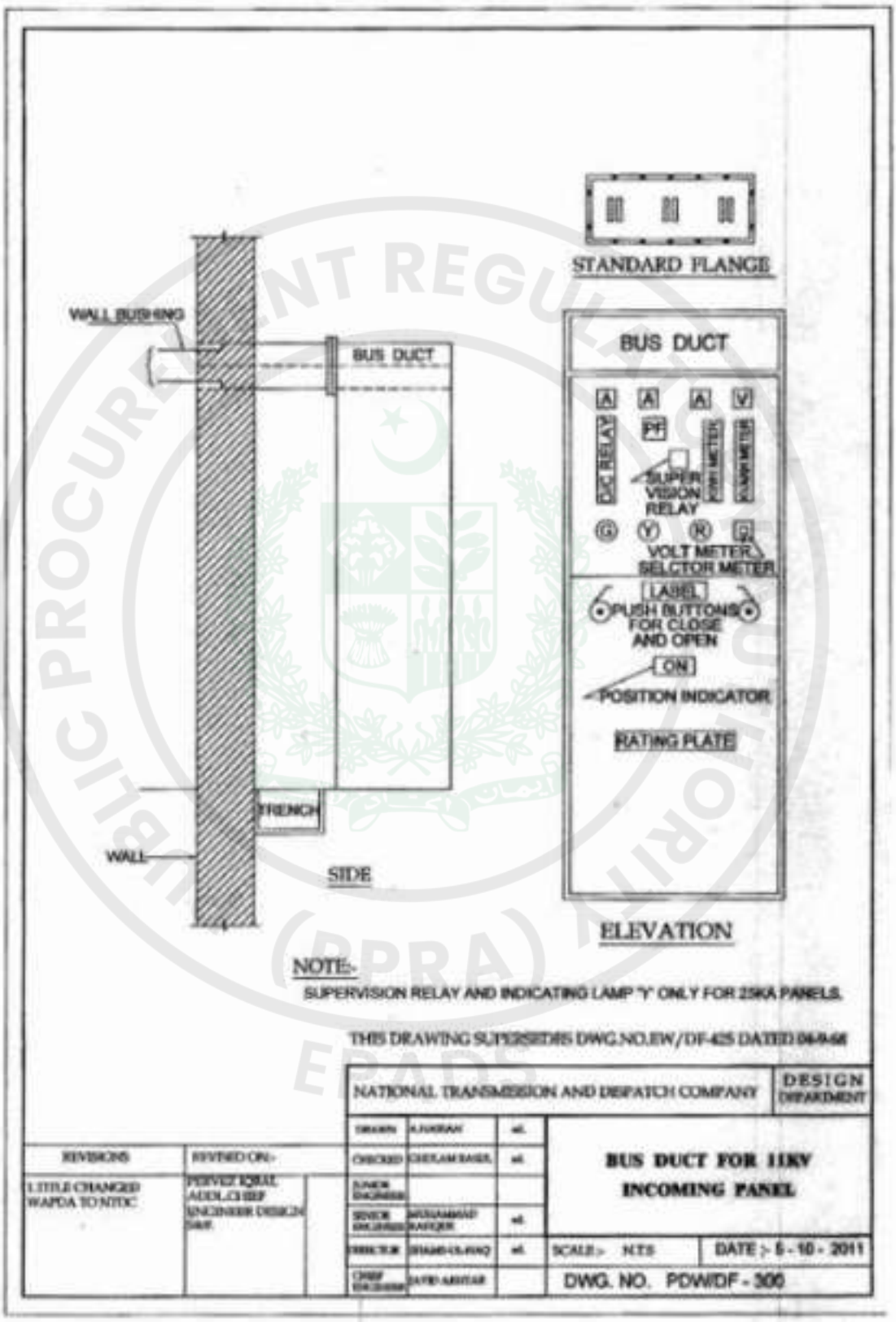
V.	SURGE ARRESTOR		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name & country of origin. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of surge arrester.			
3.	ZnO Block 's manufacturer name & address.			
4.	Type Tests (Copy of type test reports attached)	YES/NO		
5.	Highest System voltage, Um.	kV, rms		
6.	Nominal System voltage, Un.	kV, rms		
7.	Arrester min. Rated Voltage, Ur.	kV, rms		
8.	Rated Frequency	Hz		
9.	Nominal discharge current, In	kA, peak		
10.	Material of housing (Porcelain/Polymer)			
11.	Continuous operating voltage (Uc), kV.			
12.	Temporary over voltage (TOV), **1s /10 s.**	kVrms		
13.	Line discharge class			
14.	Short circuit withstand current, (0.2 s)	kAsym.		
15.	Pressure relief class			
16.	High Current 4/10 µs Impulse withstand	kApeak		
17.	Switching Current Impulse Withstand (Upper value).	A		
18.	Maximum Residual Voltage at 10kA Steep Impulse current wave of 1/20µs.	kV		
19.	1.2/50 µs Lightning Impulse Withstand Voltage	kVpeak		
20.	Power frequency withstand voltage for one minute	kV		
21.	Internal partial discharge at 1.05 times continuous operating voltage	pC		
22.	Maximum Residual voltage at lightning impulse current waves of 8/20 µs.			
	- 5 kA.	kVpeak.		
	- 10 kA.	kVpeak.		
	- 20 kA.	kVpeak.		
23.	Max. Residual Voltage at Switching Impulse current wave of 30/60 µs:			
	- 500 A.	kVpeak.		
	- 1000 A.	kVpeak.		
	- 2000 A.	kVpeak.		
24.	Energy discharge capability (2 impulses).			
	- Thermal	kJ/kV (Ur).		
	- Impulse	kJ/kV (Ur).		

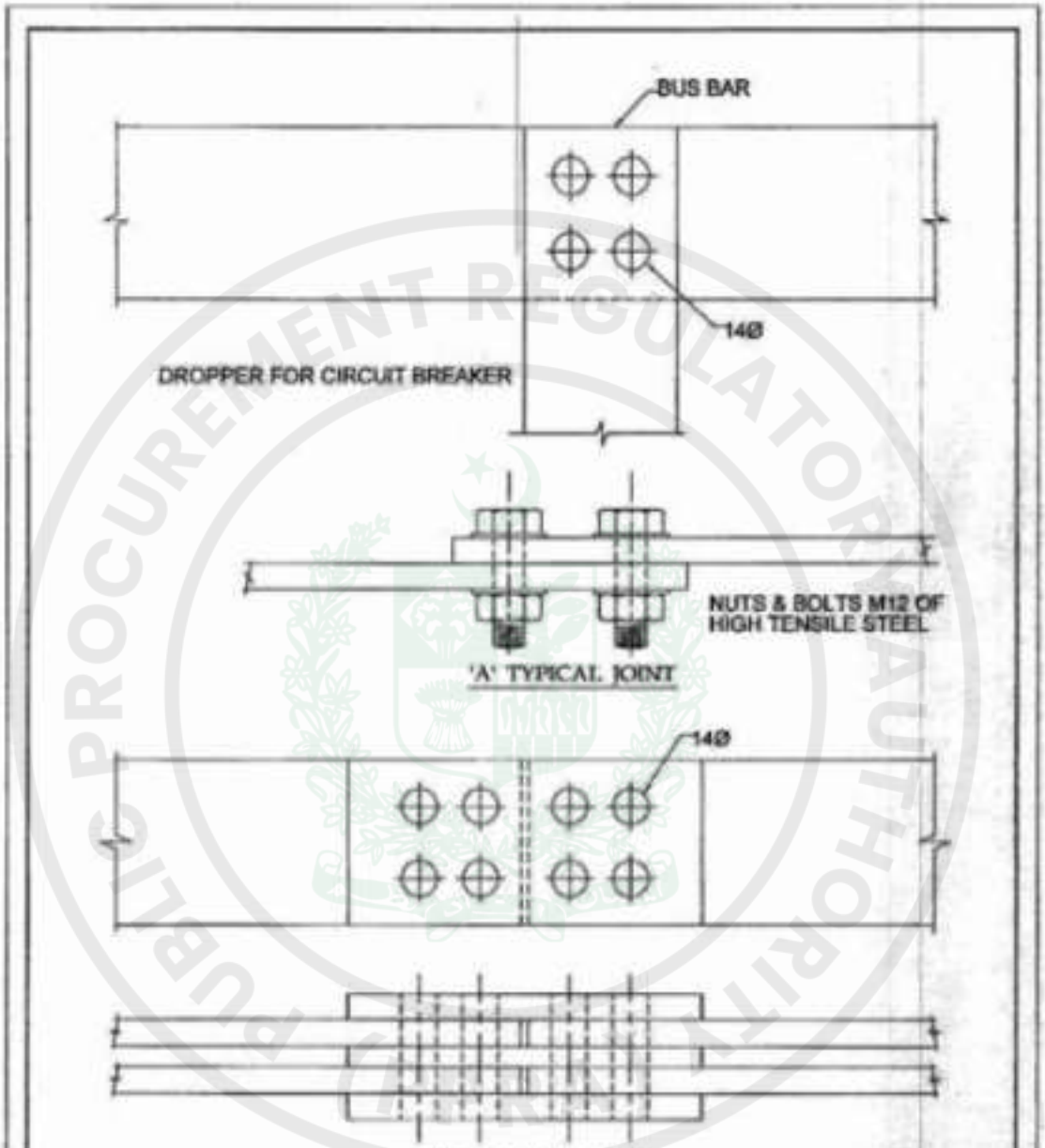
W.	ENERGY METER		Proposed Data	Deviation from P-44:2018 (If any)
1.	Manufacturer's name			
2.	Manufacturer's address. (Attach Manufacturer's catalogue with the bid)			
3.	Type/designation/Model No. of offered meter.			
4.	Country of origin.			
5.	Accuracy class (Active/Reactive) of Energy Meter on which type tests were performed.			
6.	Type/designation of Energy meter on which type tests were performed.			
7.	Capability of offered energy meter to record:			
	-	Active Energy Export	YES/NO	
	-	Reactive Energy Export	YES/NO	
	-	Active Energy Import	YES/NO	
	-	Reactive Energy Import	YES/NO	
	-	Apparent Energy	YES/NO	
	-	Maximum Demand of Active Energy	YES/NO	
	-	Maximum Demand of Reactive Energy	YES/NO	
	-	Maximum Demand of Apparent Energy	YES/NO	
	-	Active Energy	YES/NO	
	-	Reactive Energy	YES/NO	
	-	Apparent Energy	YES/NO	
8.	No. of phases/wires.		Nos.	
9.	Reference Voltage (U)		Volts	
10.	Reference Temperature.		°C	
11	Reference frequency (f)		Hz	
12.	Rated current, In.		Amp	
13.	Maximum current, Imax.		Amp	
14.	Whether meter operates continuously at 1.2 In?		YES/NO	
15.	Sampling rate			
16.	Whether the arrangements as required are available on the front cover?		YES/NO	
17.	Type of display.		LCD/LEDs	
18.	No. of digits of display.		Nos.	
19.	Size of digits of display (H x W)		mm	
20.	Minimum retention period of back up non-volatile memory.		Months	
21.	Type of Memory.			
22.	Memory storage capacity of display unit.		Bytes	

23.	Memory storage capacity of each register.		Bytes		
24.	Memory capacity for load profile.		Bytes		
25.	Total memory storage capacity of all register.		Bytes		
26.	Overall memory capacity for energy meter.		Bytes		
27.	Minimum retention period of display unit.				
28.	Minimum retention period of registers.				
29.	Battery life for display unit.				
30.	Whether facility for activating the display is provided on the front of the meter?		YES/NO		
31.	Whether display unit is reactivated in case failure of main/auxiliary supply?		YES/NO		
32.	Whether display unit is able to record & display data for a minimum period of 120 days corresponding to max. current at reference voltage and unity power factor?				
33.	Whether following data/information is displayed on with date & time stamped?				
	-	Date and time	YES/NO		
	-	CT & PT ratio	YES/NO		
	-	Phase/Line voltages	YES/NO		
	-	Phase/Line currents	YES/NO		
	-	Active energies import and export (present & preceding month), KWH.	YES/NO		
	-	Reactive energies import and export (present & preceding month), KVARH.	YES/NO		
	-	Apparent energies import and export (present & preceding month), KVAH.	YES/NO		
	-	Max. Demand of Active energies import and export (present & preceding month), KW.	YES/NO		
	-	Max. Demand of Reactive energies import and export (present & preceding month), KVAR.	YES/NO		
	-	Max. Demand Apparent energies import and export (present & preceding month), KVA.	YES/NO		
	-	Power factor, PF.	YES/NO		
	-	Frequency, Hz.	YES/NO		
	-	Last Max. Demand reset	YES/NO		
	-	Total No. of Max. Demands resets	YES/NO		
	-	Meter serial No.	YES/NO		
	-	Power Quadrant Indicator.	YES/NO		
	-	Pulse Output for field testing of meter	YES/NO		
	-	Error code	YES/NO		

34.	Pulse outputs for remote metering:-			
	- Type of outputs.			
	- VA burden of outputs.			
	- No. of output terminals.			
	- Number of pulse outputs			
35.	Whether flashing LED indicators are provided on the meter for accuracy measurement?	YES/NO		
36.	Whether optical probes along with software on CD shall be supplied as mentioned in NTDC Spec. P- 202?	YES/NO		
37.	Normal operating voltage range	Volts		
38.	Limit range of voltage operation	Volts		
39.	Minimum starting current	mA		
40.	Initial start-up time	ms.		
41.	No. of Tariffs	Nos.		
42.	Type of Tariffs			
43.	No. of registers	Nos.		
44.	Whether meter record the all events with Date and Time Stamped as mentioned in NTDC Specification P-202:2012?	YES/NO		
45.	Type of metrology indicator (visible light/IR)			
46.	Whether energy meter have security features with Date and Time Stamped as mentioned in NTDC Specification P-202:2012?	YES/NO		
47.	EMC Electrostatic discharge.	kV		
48.	VF magnetic field withstand level.	V/m		
49.	Whether meter have upgraded option.	YES/NO		
50.	Whether offered energy meter comply with DLMS/COSEM/SCADA protocols.	YES/NO		
51.	Dimensions of energy meter (attach drawing)			
52.	Weight of energy meter.	Kg.		
X.	**TERMINAL BLOCKS & CABLES**		**Proposed Data**	**Deviation from P-44:2018 (If any)**
1.	Manufacturer's name & address. (Attach Manufacturer's catalogue with the bid)			
2.	Type/designation of Terminal blocks			
3.	Country of origin			
4.	Type Tests (Copy of type test reports attached)	YES/NO		
5.	Current carrying capacity			
6.	Size of terminal block used in voltage circuit.			
7.	Size of terminal block used in current circuit.			
8.	No. of spare terminal blocks provided			

9.	Size of cable used in voltage circuit.			
10.	Size of cable used in current circuit.			
11.	Type of cable identification.			
12.	Color of cable used in red phase			
13.	Color of cable used in yellow phase			
14.	Color of cable used in blue phase			
15.	Color of cable used in neutral			
Y.	**DIMENSIONS AND WEIGHTS**		**Proposed Data**	**Deviation from P-44:2018 (if any)**
1.	Dimensions of circuit breaker (attach drawing).			
2.	Dimensions of complete panel (attach drawing).			
3.	Weight of circuit breaker.			
4.	Weight of complete panel.			





NATIONAL TRANSMISSION AND DISPATCH COMPANY

DESIGN DEPARTMENT

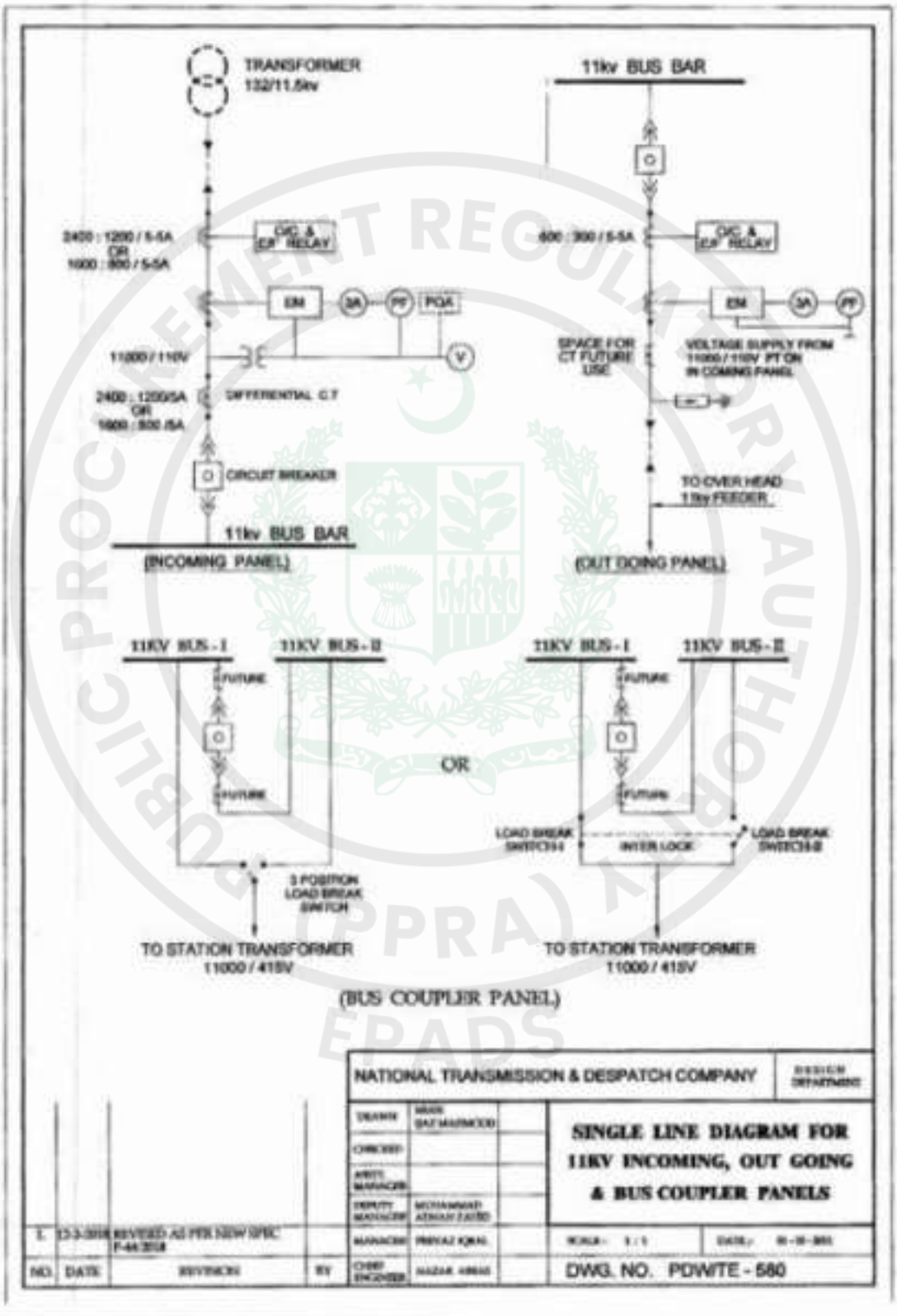
REVISIONS	REVISED ON:
UTTUE CHANGED WAPDA TO NTDC	PERVAIZ IQBAL ADDL.C.E.DESIGN N.T.D.C S&B

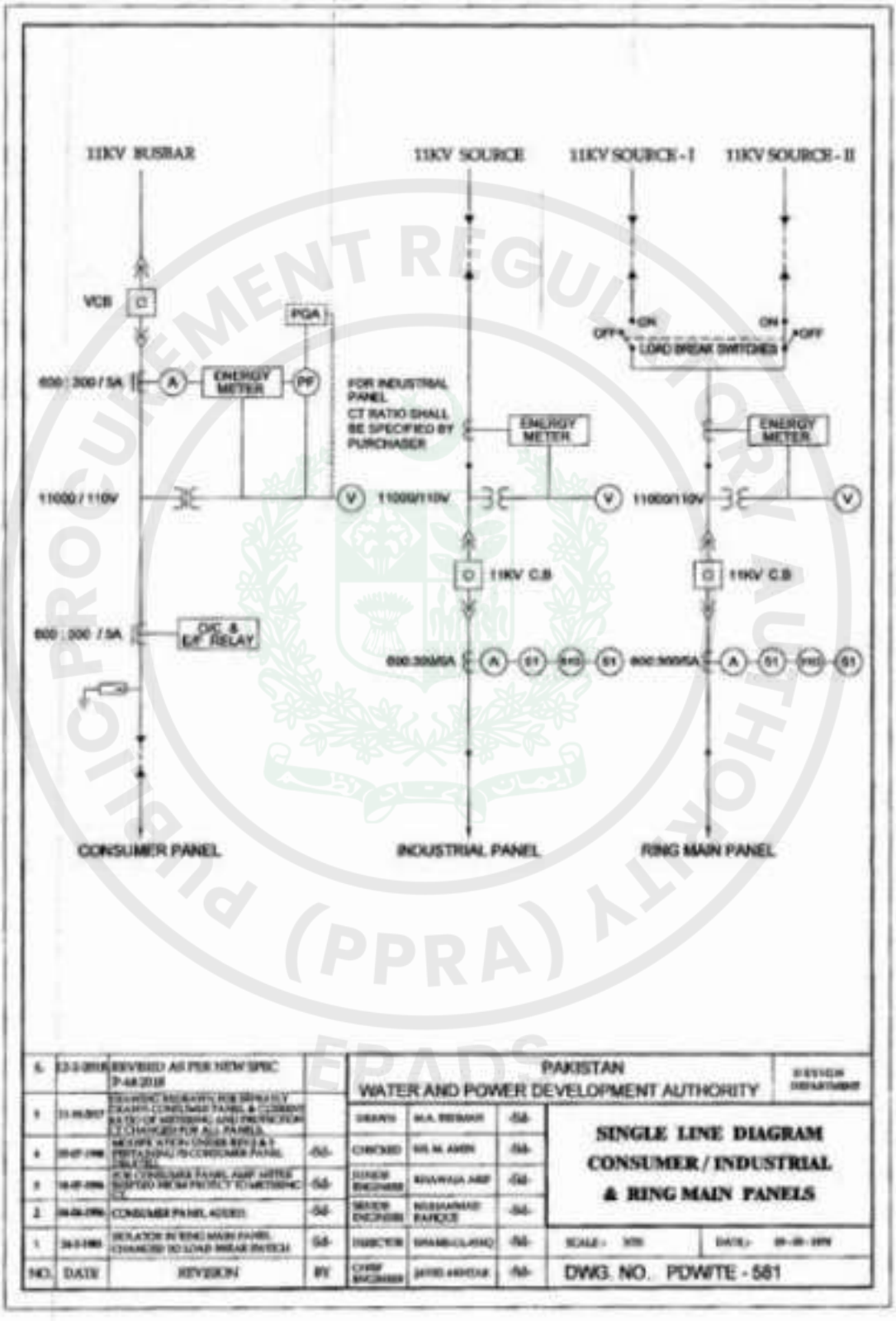
DRAWN	M.A.REHMAN	sd.
CHECKED	GHULAM RABBA	sd.
DESIGN ENGINEER	WAQAR-UL-HAQ	sd.
SENIOR ENGINEER	MUHAMMAD RAZQUE	sd.
DIRECTOR	SHAHID-UL-HAQ	sd.
CHIEF ENGINEER	JAVED ABBASI	

BUS BAR CONNECTIONS & JOINTING

DATE :- 24-3-1988

DWG. NO. PDW / DF - 297





NO.	DATE	REVISION	BY
6.	23-3-2018	REVISED AS PER NEW SPEC P-44:2018	
5	31-10-2017	[illegible]	
4	20-07-1998	[illegible]	-Sd-
3	16-07-1996	[illegible]	-Sd-
2.	04-04-1996	CONSUMER PANEL ADDED.	-Sd-
1.	26-3-1993	[illegible]	-Sd-

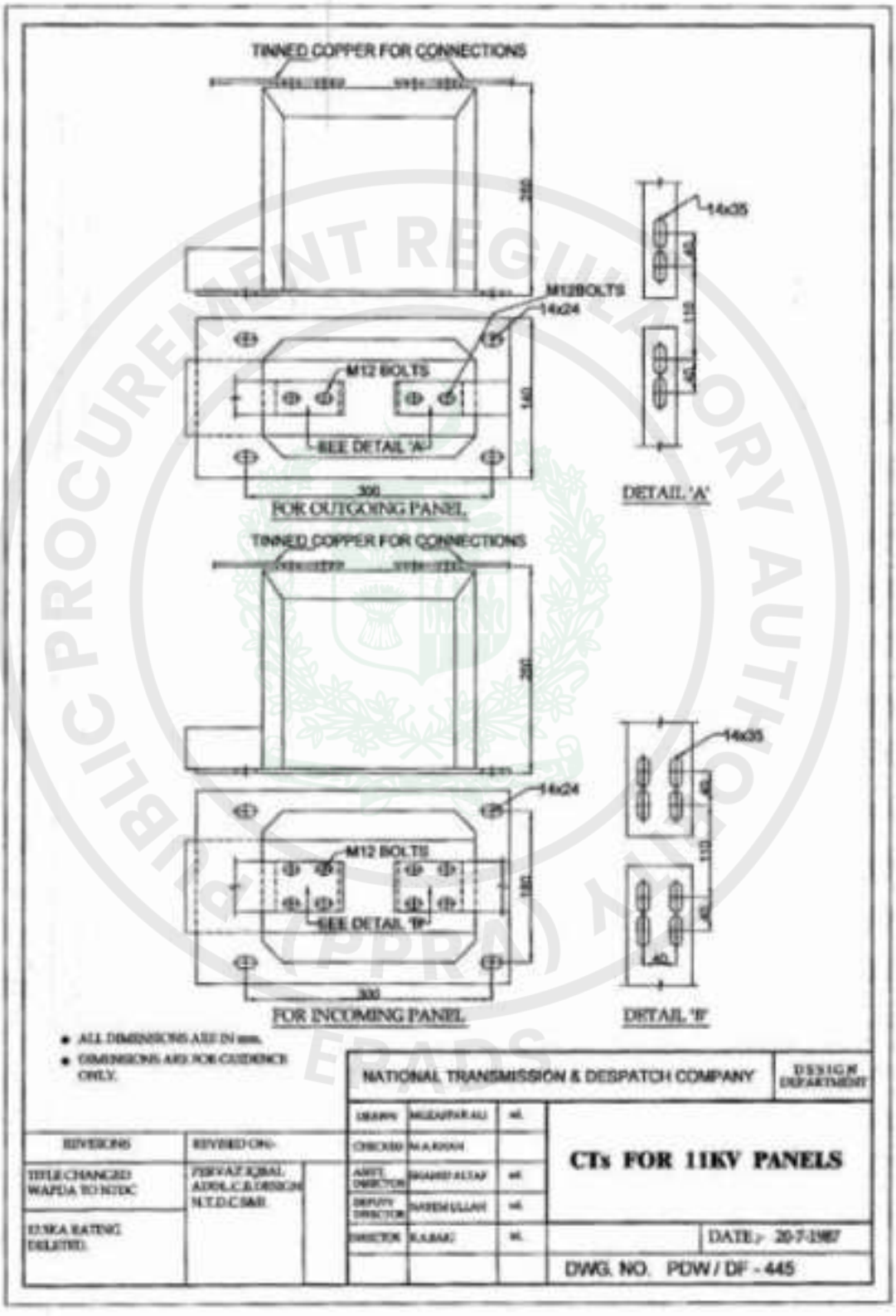
PAKISTAN
WATER AND POWER DEVELOPMENT AUTHORITY

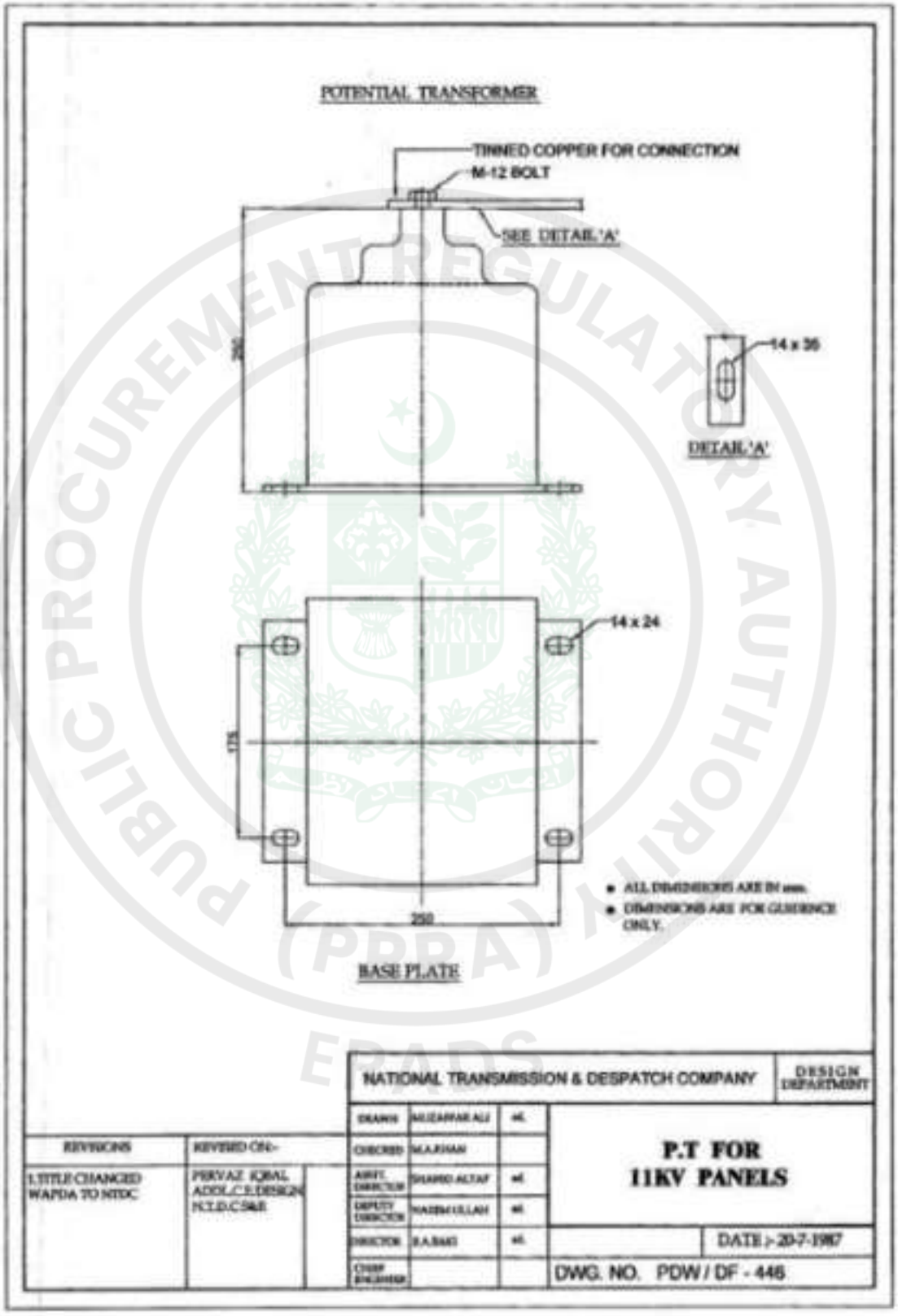
DRAWN	M.A. REHMAN	-Sd-
CHECKED	MS. M. AMIN	-Sd-
[illegible]	KHAWAJA ARIF	-Sd-
[illegible]	MUHAMMAD FAROOQ	-Sd-
[illegible]	SHAMS-UL-HAQ	-Sd-
[illegible]	[illegible]	-Sd-

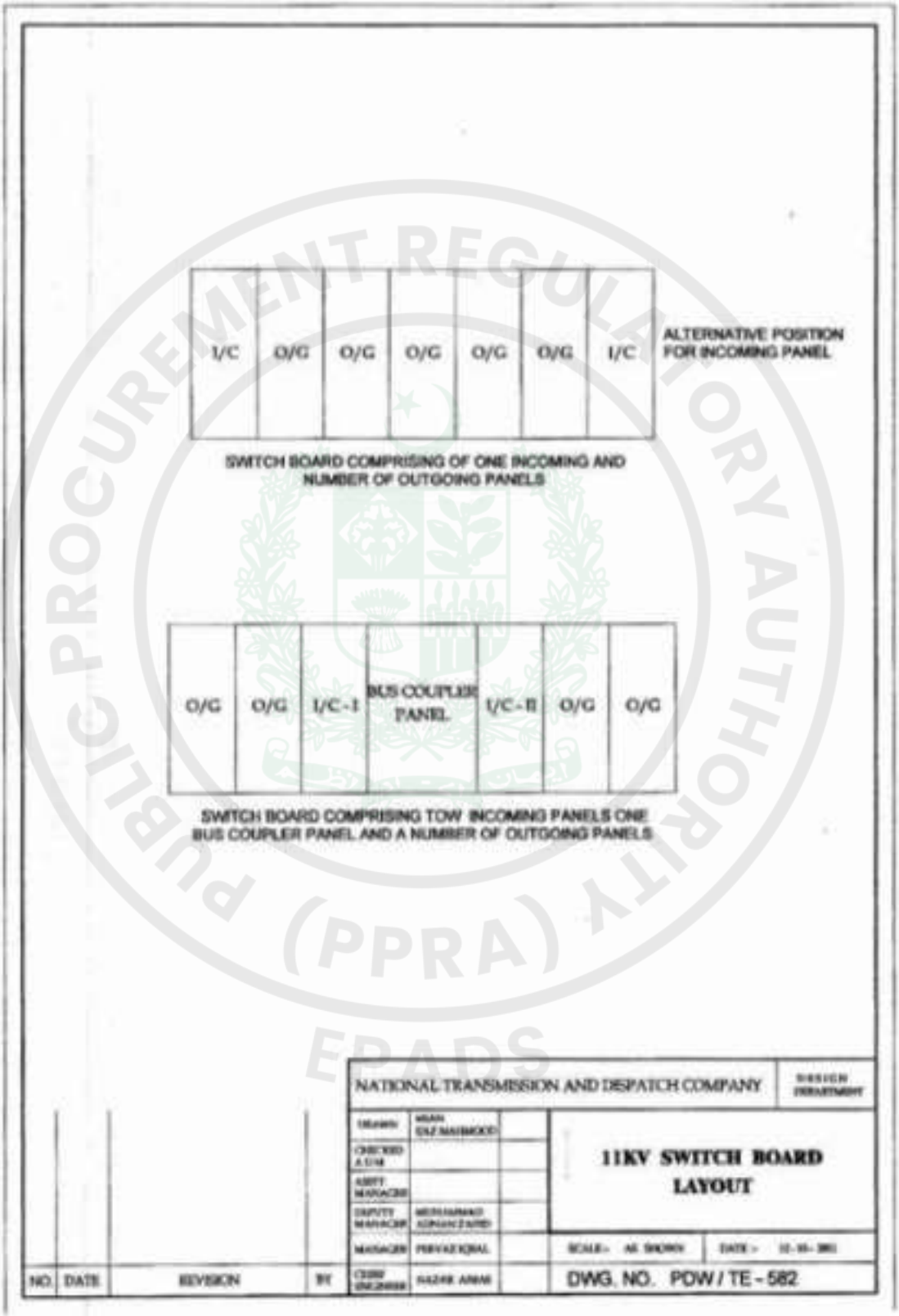
SINGLE LINE DIAGRAM CONSUMER / INDUSTRIAL & RING MAIN PANELS

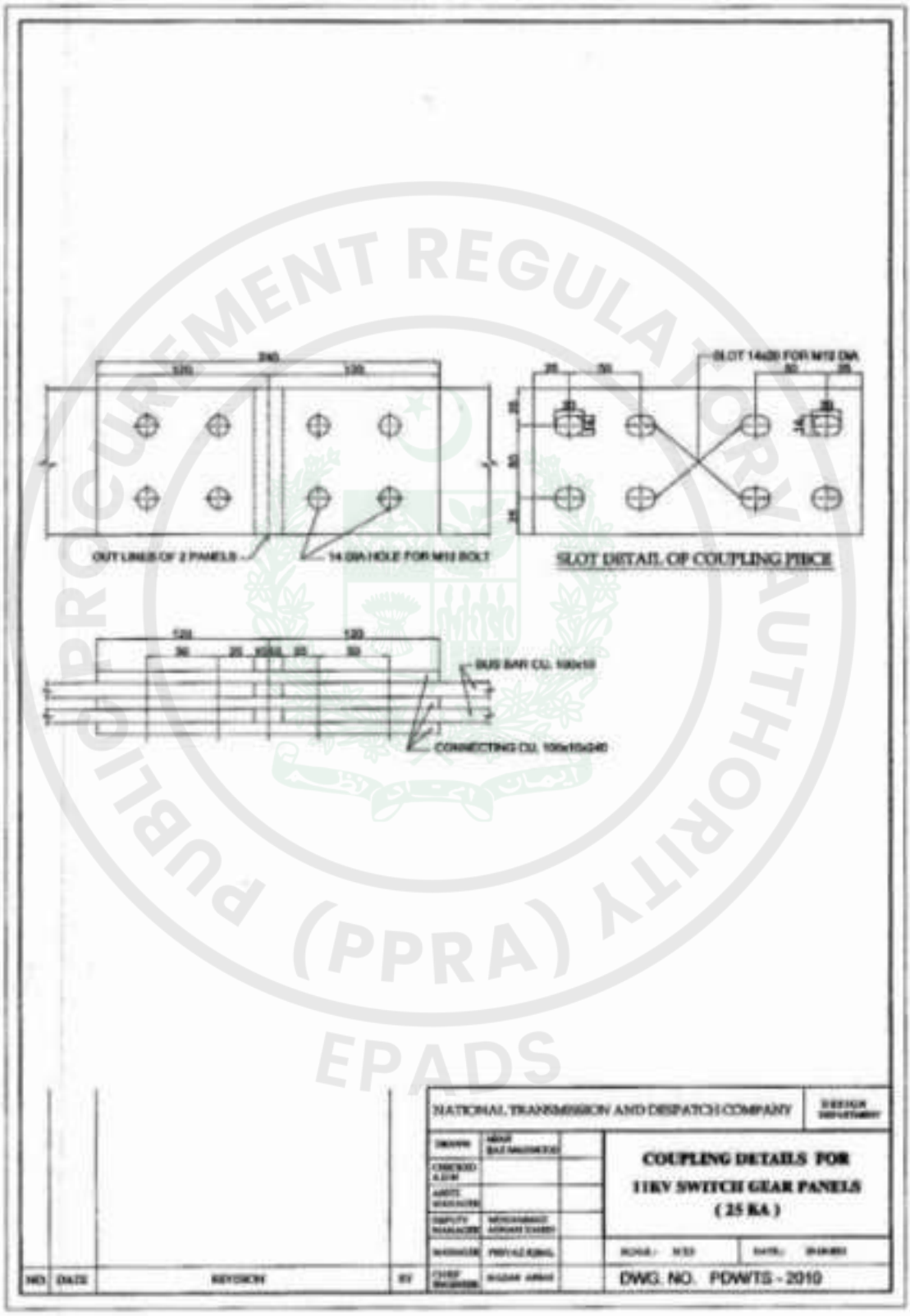
SCALE :- NTS | DATE :- 09-09-1999

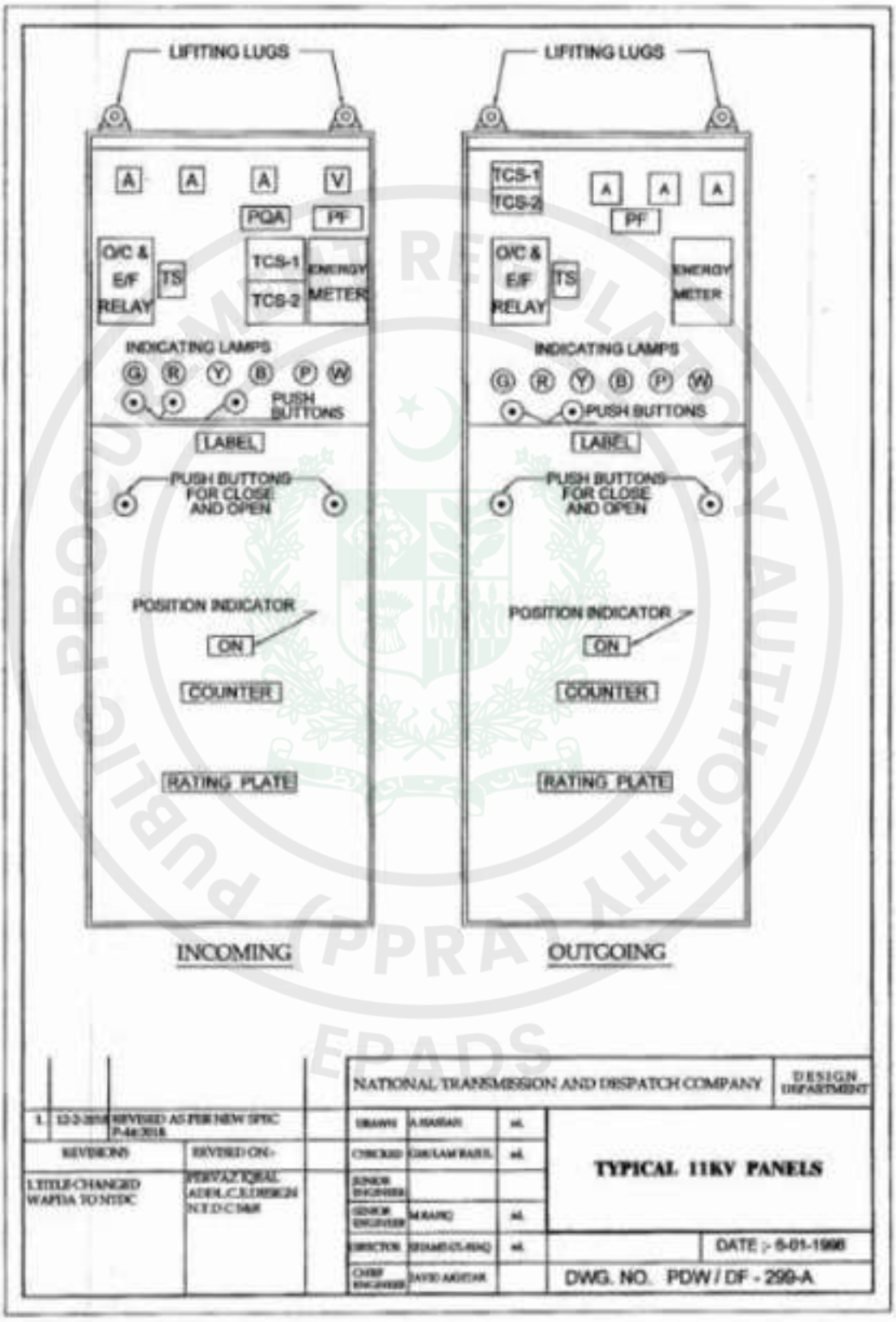
DWG. NO. PDW/TE - 581

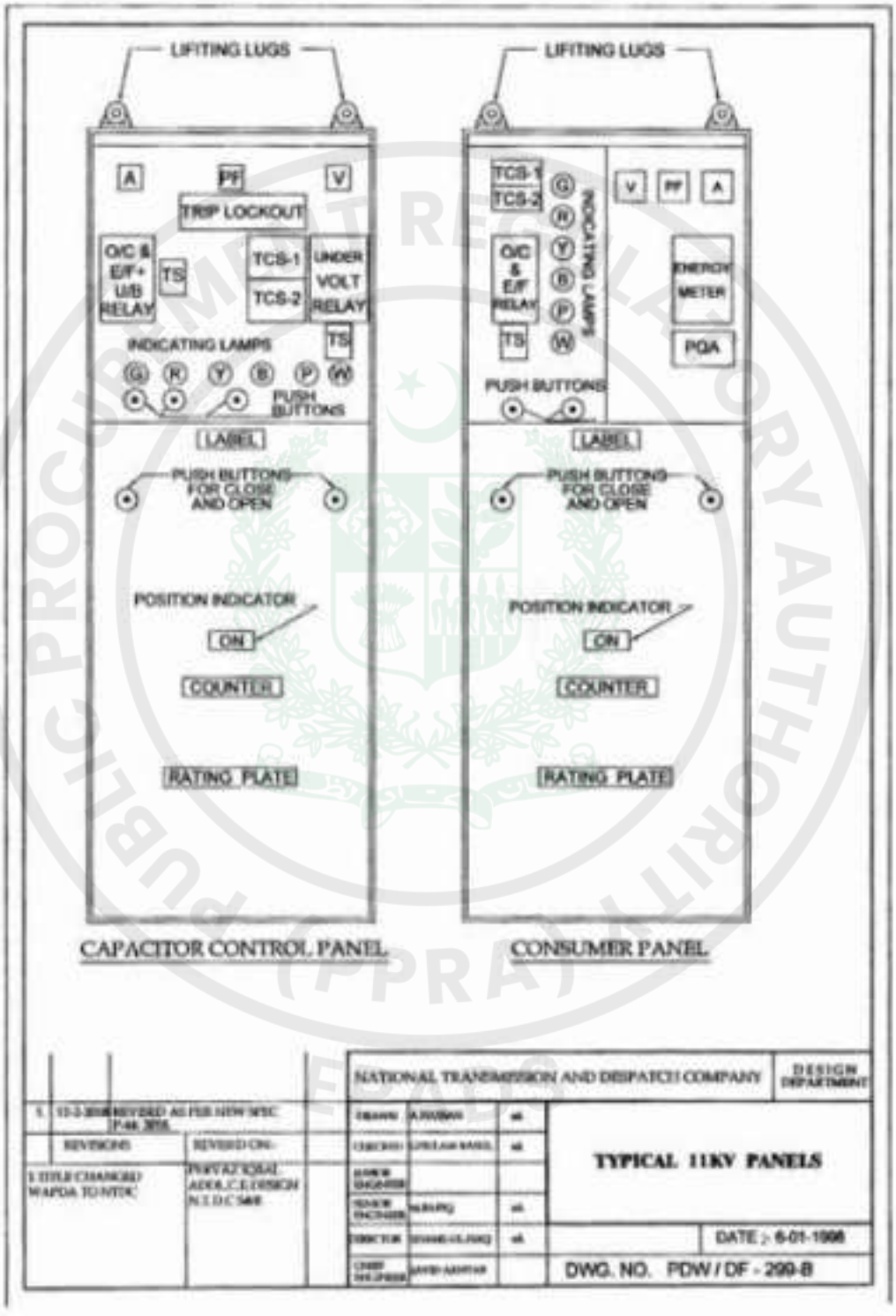


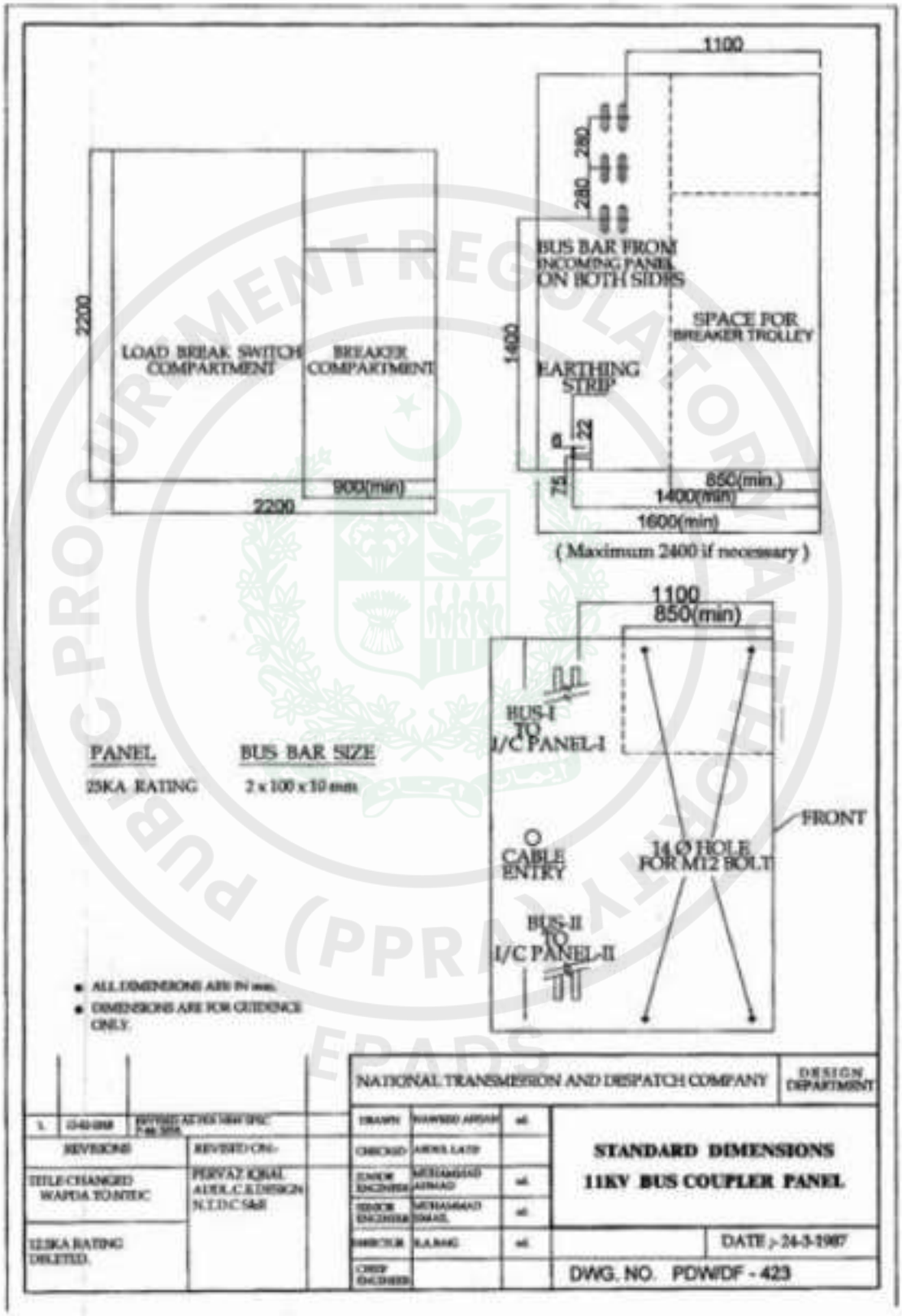


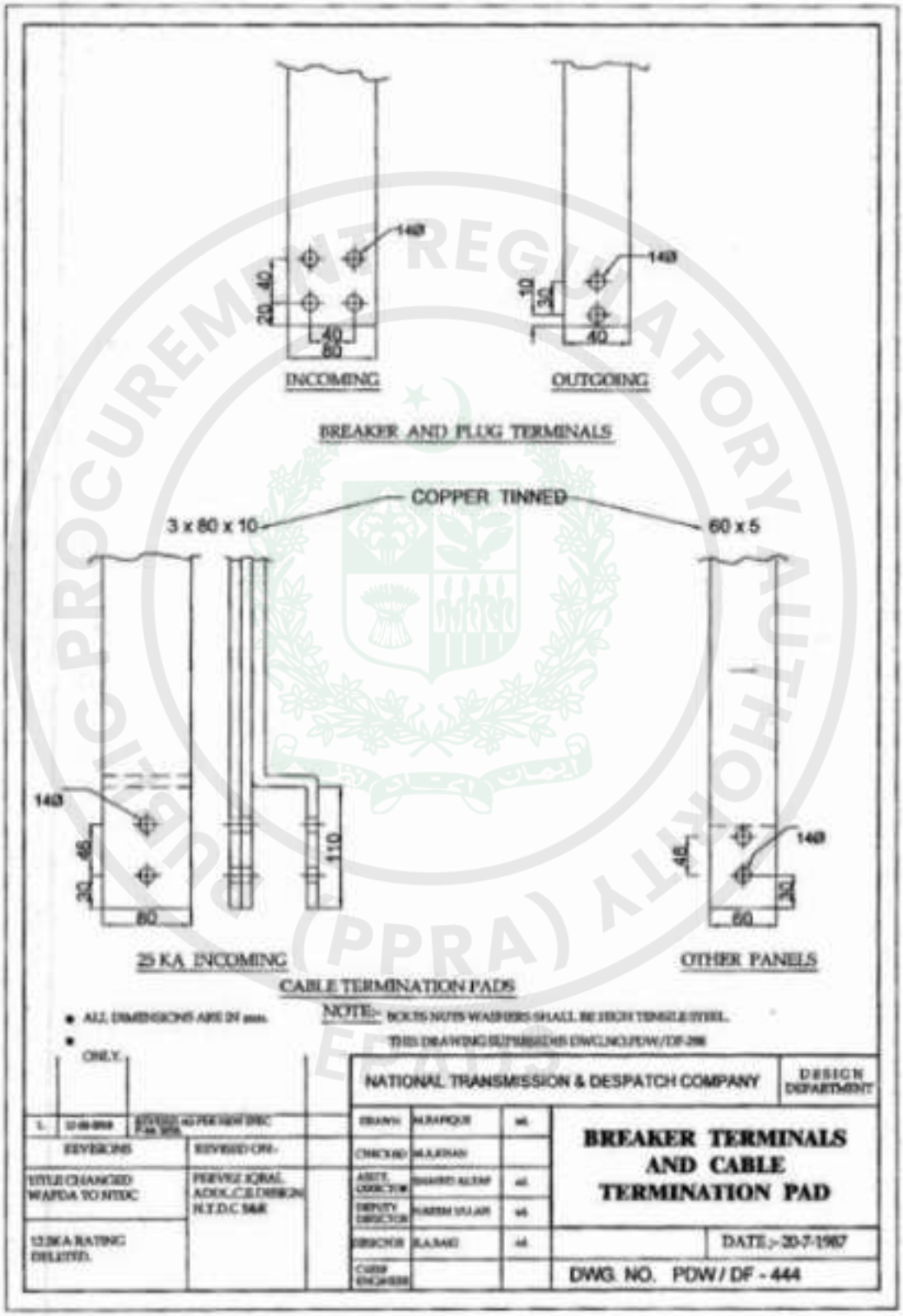


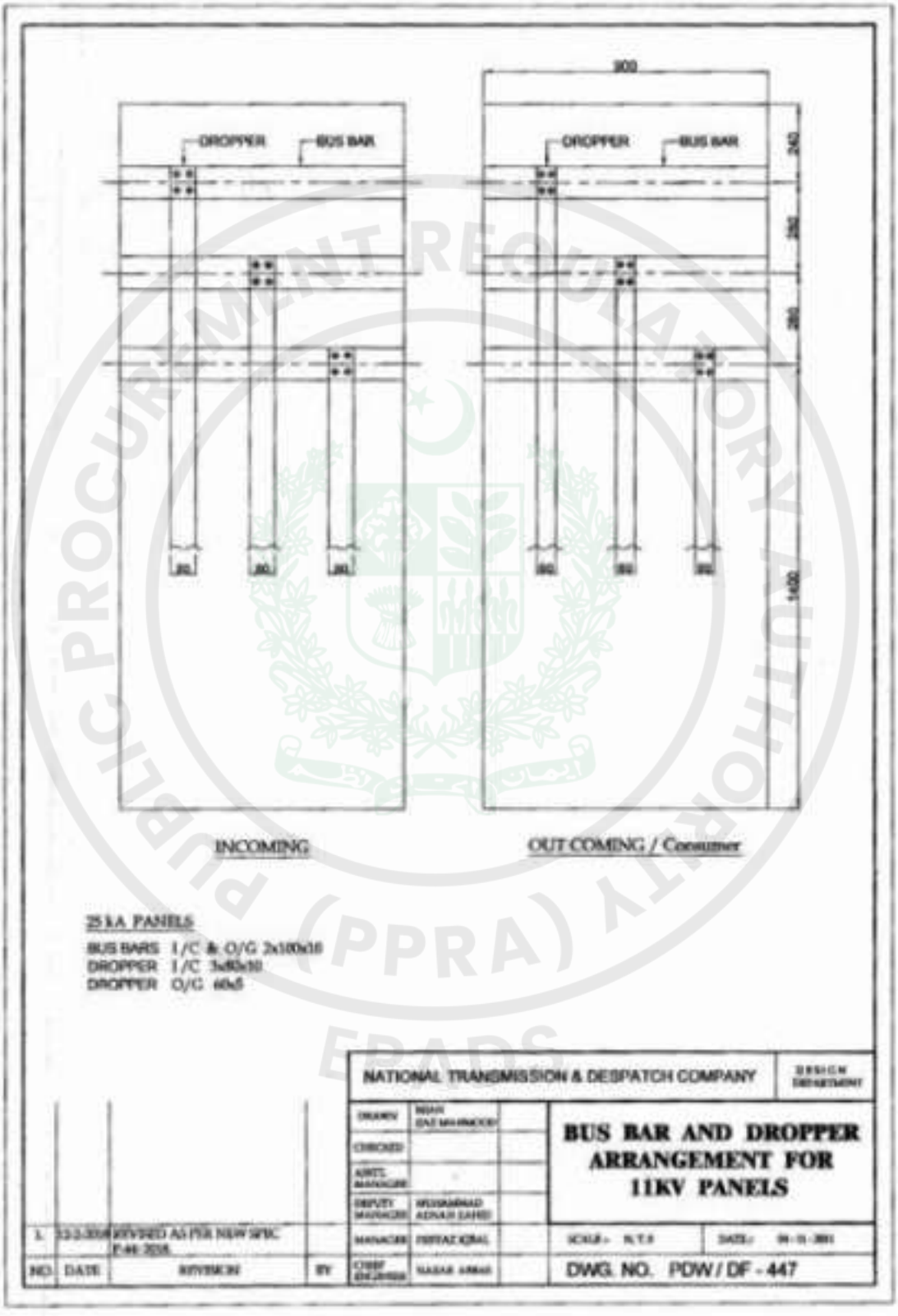


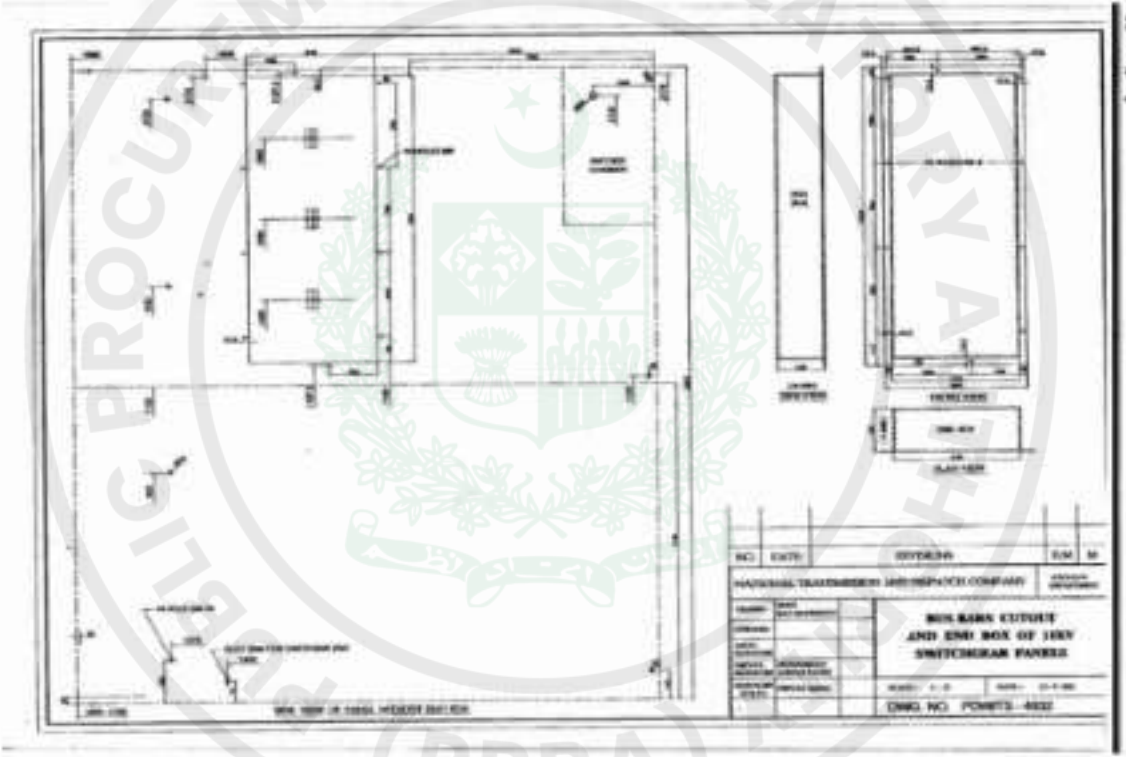


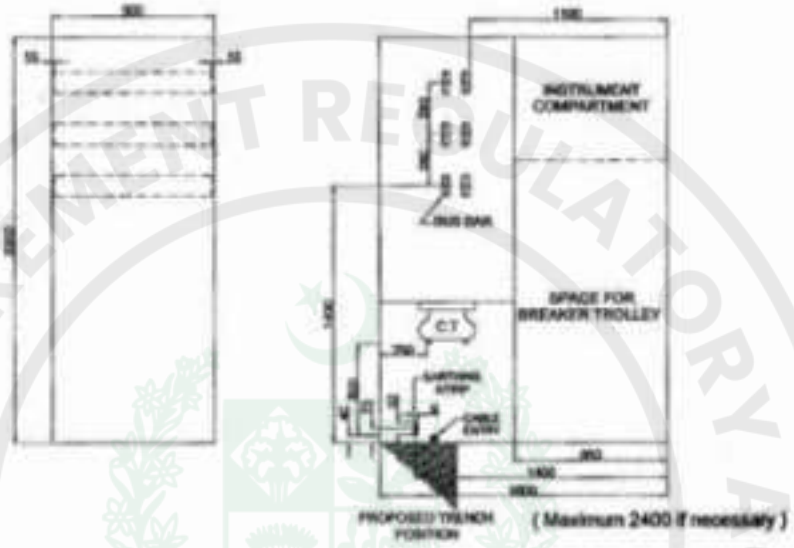

LIFTING LUGS
A
PF
V
TRIP LOCKOUT
O/C & E/F+ U/B RELAY
TS
TCS-1
TCS-2
UNDER VOLT RELAY
TS
INDICATING LAMPS
G R Y B P W
PUSH BUTTONS
LABEL
PUSH BUTTONS FOR CLOSE AND OPEN
POSITION INDICATOR
ON
COUNTER
RATING PLATE
CAPACITOR CONTROL PANEL
LIFTING LUGS
TCS-1
TCS-2
G R Y B P W
INDICATING LAMPS
V
PF
A
O/C & E/F RELAY
TS
ENERGY METER
PQA
PUSH BUTTONS
LABEL
PUSH BUTTONS FOR CLOSE AND OPEN
POSITION INDICATOR
ON
COUNTER
RATING PLATE
CONSUMER PANEL
NATIONAL TRANSMISSION AND DISPATCH COMPANY
DESIGN DEPARTMENT
TYPICAL 11KV PANELS
DATE :- 6-01-1998
DWG. NO. PDW / DF - 299-B








BUS BARS CUTOUT
AND END BOX OF 132KV
SWITCHGEAR PANELS



PANEL	BUS BAR SIZE
25KA RATING	2 x 100 x 10 mm

NO	DATE	REVISION	BY
1.	23-3-2018	REVISED AS PER NEW SPEC 2-44, 2018.	

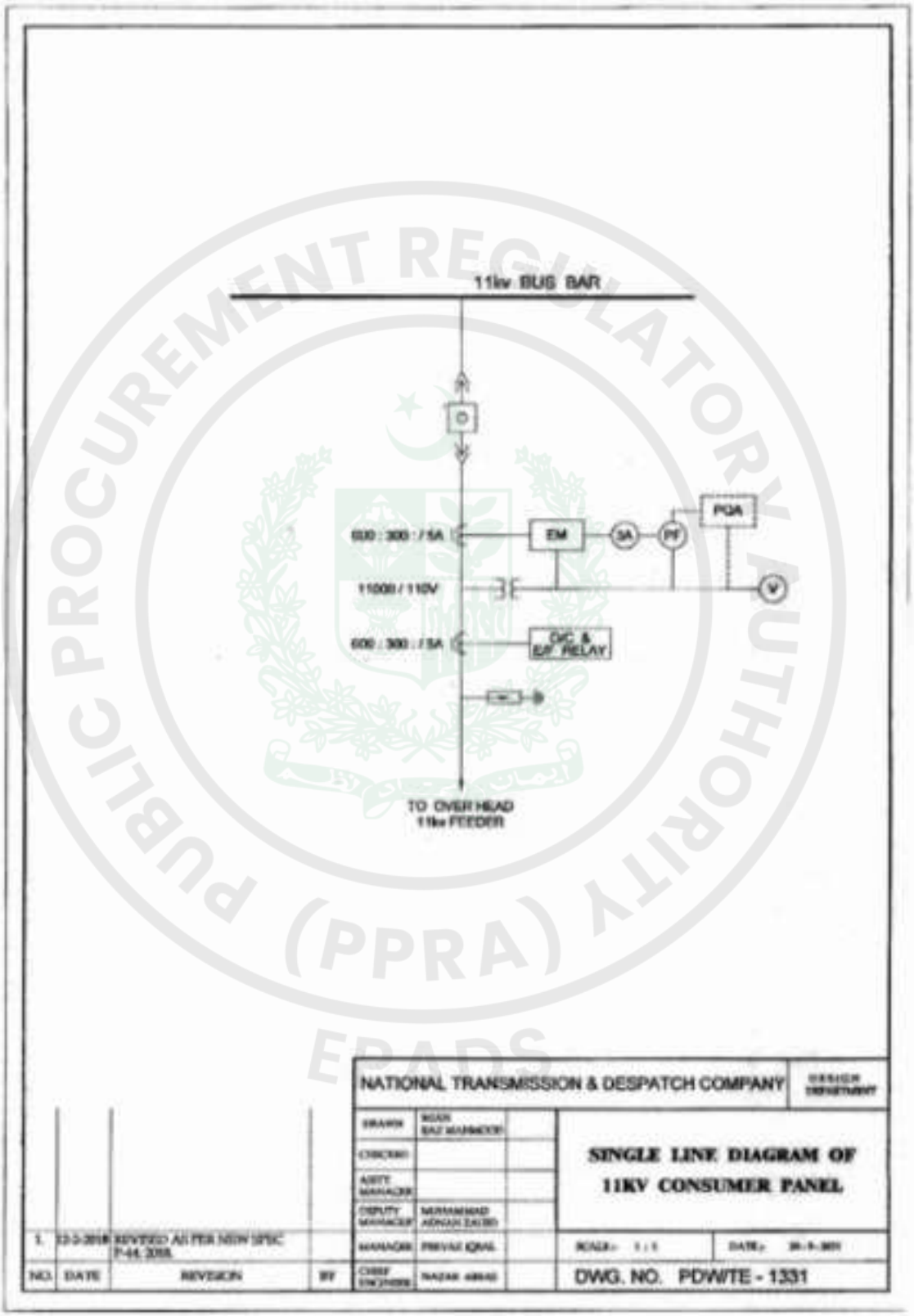
NATIONAL TRANSMISSION AND DISPATCH COMPANY

DRAWN	MIAN BAZ MAHMOOD	
CHECKED AZAM		
ASSTT. MANAGER		
DEPUTY MANAGER	MUHAMMAD ADNAN ZAHID	
MANAGER	PERVAIZ IQBAL	
CHIEF ENGINEER	NAZAR ABBAS	

STANDARD DIMENSIONS 11KV PANEL - CONSUMER / INCOMING / OUTGOING

SCALE:- AS SHOWN | DATE:- 16-11-18

DWG. NO. PDW / TS - 1630


11kv BUS BAR
600 : 300 / 5A
11000 / 110V
600 : 300 / 5A
EM
3A
PF
PQA
V
OIC &
E/F RELAY
TO OVER HEAD
11kv FEEDER
NATIONAL TRANSMISSION & DESPATCH COMPANY
SINGLE LINE DIAGRAM OF
11KV CONSUMER PANEL
DWG. NO. PDWTE - 1331
1. REVISED AS PER NEW SPEC P-44 2018
NO. DATE REVISION BY

Past Experience / Contracts

Contracts over *[insert amount]* during the last three years:				
Procuring Agency	Value	Year	Goods/Services Supplied	Country of Destination

Historical Contract Non-Performance, and Pending Litigation and Litigation History

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member Name: *[insert full name]*
IFP No. and title: *[insert IFP number and title]*
Page *[insert page number]* of *[insert total number]* pages

☐ Not debarred due to deviation from commitment of Bid Securing Declaration-☐ Not debarred due to non-performance			
Year	**Non-performed portion of contract**	**Contract Identification**	**Total Contract Amount (current value, currency, exchange rate and PKR equivalent)**
[insert year]	*[insert amount and percentage]*	Contract Identification: *[indicate complete contract name/ number, and any other identification]* Name of Procuring Agency: *[insert full name]* Address of Procuring Agency: *[insert street/city/country]* Reason(s) for nonperformance: *[indicate main reason(s)]*	*[insert amount]*
Pending Litigation, in accordance with Section III, Qualification Criteria and Requirements			
☐ Pending litigation in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.3 as indicated below.			

Year of dispute	**Amount in dispute (currency)**	**Contract Identification**	**Total Contract Amount (currency), ~~US$~~ PKR Equivalent (exchange rate)**

[insert year]	*[insert amount]*	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Procuring Agency: *[insert full name]* Address of Procuring Agency: *[insert street/city/country]* Matter in dispute: *[indicate main issues in dispute]* Party who initiated the dispute: *[indicate "Procuring Agency" or "Supplier"]* Status of dispute: *[Indicate if it is being treated by the Adjudicator, under Arbitration or being dealt with by the Judiciary]*	*[insert amount]*

☐ No consistent history of court/arbitral award decisions in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.4.

☐ Consistent history of court/arbitral award decisions in accordance with Section III, Qualification Criteria and Requirements, Sub-Factor 2.4 as indicated below.

Year of award	**Outcome as percentage of Net Worth**	**Contract Identification**	**Total Contract Amount (currency), PKR Equivalent (exchange rate)**
[insert year]	*[insert percentage]*	Contract Identification: [indicate complete contract name, number, and any other identification] Name of Procuring Agency: *[insert full name]* Address of Procuring Agency: *[insert street/city/country]* Matter in dispute: *[indicate main issues in dispute]* Party who initiated the dispute: *[indicate "Procuring Agency" or "Supplier"]* Court/ arbitral award decision: *[Indicate if the award decision was against the Applicant or any member of a joint venture.]y]*	*[insert amount]*

Current Contract Commitments / Contracts in Progress Form

1. Name of Contract(s)
2. Procuring Agency Contact Information [insert address, telephone, fax, e-mail address]
3. Value of outstanding contracts [current PKR equivalent]
4. Estimated Delivery Date
5. Average monthly invoices over the last six months (PKR/mon.)

Financial Situation and Performance

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member Name: *[insert full name]*
IFP No. and title: *[insert IFP number and title]*
Page *[insert page number]* of *[insert total number]* pages

1. Financial data

Type of Financial information in (currency)	**Historic information for previous _[insert number] years, [insert in words] (amount in currency, currency, exchange rate*, PKR equivalent)**				
	Year 1	Year 2	Year 3		
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

* Refer ITA 14 for the exchange rate

3. Financial documents

The Applicant and in case of JV, members of JV shall provide copies of financial statements for *[number]* years pursuant Section III, Qualifications Criteria and Requirements. The financial statements shall:

(a) reflect the financial situation of the Applicant or in case of JV member, and not an affiliated entity (such as parent company or group member).

(b) be independently audited or certified in accordance with local legislation.

(c) be complete, including all notes to the financial statements.

(d) correspond to accounting periods already completed and audited.

☐ Attached are copies of financial statements[1] for the *[number]* years required above; and complying with the requirements.

[1] If the most recent set of financial statements is for a period earlier than 12 months from the date of Application, the reason for this should be justified.

Average Annual Turnover (Annual Sales Value)

[The following table shall be filled in for the Applicant and for each member of a Joint Venture]

Applicant's Name: *[insert full name]*
Date: *[insert day, month, year]*
Joint Venture Member Name: *[insert full name]*
IFP No. and title: *[insert IFP number and title]*
Page *[insert page number]* of *[insert total number]* pages

Annual Turnover Data			
Year	**Amount** **Currency**	**Exchange rate*** **(If applicable)**	**PKR equivalent**
[indicate calendar year]	*[insert amount and indicate currency]*		
		Average Annual Turnover **	

* Refer ITA for date and source of exchange rate.

** Total PKR equivalent for all years divided by the total number of years. See Section III, Qualification Criteria and Requirements, ITA.