Name of Work: "**Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi.**"
NIT No. – ITPO/CE(P)/Electrical/24-25/01

INDEX

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NIT contains from page no.1- 73 of amounting Rs. 3,82,76,743/- incl. GST @18% hereby approved.

SM(E) Chief Engineer (Projects)

Annexure: I

INDIA TRADE PROMOTION ORGANISATION

E-TENDER NOTICE

Online item rate bids are invited through two bid system for "**Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi."** from **"Specialized agencies** "for the following work-

S.N	Name of work	Time for Completion	Estimated Cost(Rs)	Earnest Money(Rs)	Cost of Tender (Rs)
1.	Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi.	120 days	3,82,76,743/-	7,65,535/-	1180/- including GST @18%

a. The tender documents are available on our website www.indiatradefair.com(for reference only**) & www.eprocure.gov.in** and same can be down loade**d.**

Eligibility Criteria:

1. The agency/CONTRACTOR should have **PAN, GST, ESI, EPF Registration and Electrical license.**
   The agency having experience in **"Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi."**
2. Completion certificate issued by the officer not below the rank of Executive Engineer or equivalent will have to be furnished for govt. works or **Agency work experience certificate from non government /non PSU organizations should submit copy of TDS certificate (tax deduction at source) along with completion certificate as applicable.**
3. The Agency should not have been blacklisted by any Government of India organization in the past. In all such cases, the tender would be rejected.
4. The agency/company should not have been blacklisted by any government or have any pending government investigation against them either directly or indirectly.
5. The bidder should have had average annual financial turnover @50% of the estimated cost, i.e. Rs. 1,91,38,372**/-** during immediate last three consecutive financial years ending 31stMarch. 2024. (Scanned copy of certificate from CA to be uploaded only).
6. They should have satisfactorily completed the work as mentioned below during the last seven years up to 31.05.2024.
   i) One similar work costing not less than 80% of estimated amount put to tender i.e (**Rs. 3,06,21,394/-)**
   OR
   ii) Two similar works each costing not less than 60% of estimated amount put to tender i.e (**Rs. 2,29,66,046/-)**
   OR
   iii) Three similar works each costing not less than 40% of estimated amount put to tender i.e (**Rs.1,53,10,697**/-)

Similar work shall mean works of **"Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi.."**

The bidder should also have successfully completed the work of minimum 1600 KVA oil type Transformer.

(The completion certificate issued by the officer in charge will have to be furnished along with all the details.
The completion certificate must clearly indicate:-

- The date of start ,date of completion and total work done amount
- Nature of work
- That the work has been completed satisfactorily.

(The copy of any other details related to the work if required may be asked from the contractor after opening of eligibility bids. There is no need to upload entire voluminous schedule and abstract of work.)

7. i) Gross Annual Turnover of last three years ending 31st March 2024 which should be at least 50% of Estimated cost i.e. Rs. 1,91,38,372/- Scanned copy of certificate from Chartered Accountant to be uploaded on portal at the time of submission of bid) contractor should upload only Certificate from CA, mentioning Financial Turnover of last 3 years as per the period as specified below in form –A (The Related further details if required may be asked from the contractor after opening of eligibility bids. There is no need to upload entire voluminous balance sheet.)

FORM-A

FINANCIAL INFORMATION

Financial Turnover of last 3 years

Description	**Financial year (2021-22) Rs.**	**Financial year (2022-23) Rs.**	**Financial year (2023-24) Rs.**
Gross Annual Turnover			

Signature of Chartered Accountant with Seal

Signature of Bidder(s).

ii. The agency/company Should have a Solvency equal to 40 % of the estimated cost put to tender, Certified by his bankers (on the format prescribed in form -B) or net worth certificate equal to 10% of the estimate cost put to tender (on the format prescribed in form- C) issued by the certified Chartered Accountant with UDIN. Certified copies of Solvency or net worth certificate should be uploaded on portal at the time of submission of bid. (The Related further details if required may be asked from the contractor after opening of eligibility bids. There is no need to upload entire voluminous balance sheet.)

FORM-B

SOLVENCY CERTIFICATE FROM A SCHEDULED BANK

This is to certify that to the best of our knowledge and information that M/s/Sh. …… ……having marginally noted address, ...Customer of our bank are/is respectable and can be treated as good for any engagement up to a limit of Rs…….. Rupees). This certificate is issued without any guarantee or responsibility on the bank or any of the officers.

(Signature) For the Bank

NOTE :

i. Bankers certificates should be on letter head of the Bank,
ii. In case of partnership firm, certificate should include names of all partners as recorded with the Bank.

FORM- C

NET WORTH FROM CHARTERED ACCOUNTANT

It is to certify that as per the audited balance sheet and profit and loss account during the financial year…… , the Net Worth of M/s ……(Name & Registered Address of Individual/firm/company), a s on ……(the relevant date) is Rs. …… after considering all liabilities. It is further certified that the Net worth of the company has not eroded by more than 30% in the last five years ending on (the relevant date)."

Signature of Chartered Accountant
Name of Chartered Accountant:

Membership No. of ICAI:
Date and Seal:

8. The bidder can submit shortfall documents in online system if required and permit by tender inviting officer, except the mandatory eligibility documents e.g Tender fee, EMD etc.

9. While selecting any of the cells in the BOQ, a warning appears that if any cell is left black the same shall be treated as "0". Therefore, if any cell is left blank and no rate is quoted by the bidder, rate of such item shall be treated as "0" (ZERO).

10. No Engineer of Gazetted Rank or other Gazetted Officer employed in Engineering or Administrative duties in an Engineering Department of ITPO is allowed to work as a contractor for a period of one year after his retirement from Government service, without the prior permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the bid or engagement in the contractor's service.

11. The contractor shall not be permitted to bid for works in ITPO, if the contractor or any of his/ her near relatives are posted in ITPO. He shall also intimate the names of persons who are working with him in any capacity or are subsequently employed by him/her and who are near relatives to any officer in ITPO or ministry of commerce and industries. Any breach of this condition by the contractor would render him liable to be removed from the contract and further works in ITPO.

12.**Tender documents may be downloaded from ITPO's web site www.indiatradefair.com (for reference only) and CPPP site https://eprocure.gov.in/eprocure/app as per the schedule as given in CRITICAL DATE SHEET as under.**

INDICATIVE CRITICAL DATE SHEET

Published Date	**23/08/2024**
Bid Document Download Start Date	**23/08/2024**
Pre bid meeting Date	**----**
Bid Submission Start Date	**23/08/2024**
Bid Submission End Date	**30/08/2024 at 3.00PM**
Bid Opening Date	**31/08/2024 at 3.00 PM**

13. Bids shall be submitted online only at CPPP website: https://eprocure.gov.in/eprocure/app. Tenderers /Contractors are advised to follow the instructions provided in the 'Instructions to the Contractors/Tenderer for the e-submission of the bids online through the Central Public Procurement Portal for e Procurement athttps://eprocure.gov.in/eprocure/app**'.** Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

14. Not more than one tender shall be submitted by one contactor or contractors having business relationship. Under no circumstance will father and his son(s) or other close relations who have

Business relationship with one another (i.e when one or more partner(s)/director(s) are common) be allowed to tender for the same contract as separate competitors. A breach of this condition will render the tenders of both parities liable to rejection.

15. Tenderer who has downloaded the tender from the **ITPO's web site** www.indiatradefair.com and Central Public Procurement Portal (CPPP) website https://eprocure.gov.in/eprocure/app, **shall not modify the tender form including downloaded price bid template in any manner**. In case if the same is found to be tempered/modified in any manner, tender will be completely rejected and tenderer is liable to be banned from doing business with ITPO.

16. Intending tenderers are advised to visit again ITPO websitewww.indiatradefair.comandCPPPwebsitehttps://eprocure.gov.in/eprocure/app at least 2 days prior to closing date of submission of tender for any corrigendum / addendum/ amendment.

List of Documents to be scanned and uploaded within the period of bid submission:

1. Copy of receipt for deposition of EMD and Tender fee to ITPO.
2. Copy of PAN Card.
3. Copy of GST registration.
4. Copy of ESIC and EPF registration.
5. Copy of Electrical License.
6. Certificates of Work Experience as per NIT.
7. Annual Financial Certificate certified by CA as per NIT (Form-A).
8. Solvency Certificate as per NIT (Form-B) or Net worth Certificate as per NIT (Form-C).
9. Any other documents as per NIT.

EMD Payment & Tender cost:

Earnest Money Deposit & Cost of tender is to be deposited electronically by NEFT/RTGS in the account of ITPO at the below mentioned details or DD in favour of ITPO payable at New Delhi. Bidders are required to submit the details of EMD payment at the time of Bid Preparation.

BANK Details for EMD Payment through NEFT/RTGS:

Name of the Beneficiary	:	India Trade Promotion Organisation
Name of the Bank	:	Central Bank of India
Branch Address	:	Pragati Maidan, New Delhi
Account No.	:	1167404133
Type of Account	:	Saving
RTGs Code	:	CBIN 0284078
MICR CODE	:	110016150
PAN NO.	:	AAATI2955C

a. Bids will be opened as per date/time as mentioned in the **Tender Critical Date Sheet.** After online opening of Technical-Bid the results of their qualification as well Price-Bid opening will be intimated latter.
Due consideration and relaxation in the norms for MSME/NSIC/Start up/MSE in Public procurement will be given as per the directions issued by Govt. of India and also preference would be given to SC/ST – MSME entrepreneurs up to 4% within the 20% ceiling earmarked for MSME entrepreneurs subject to the production of valid /relevant registration documents for the specific work i.e. **"Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with**

suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi." as required in NIT.

- **Submission of Tender**

The **tender shall be submitted online in Two part, viz., technical bid and Financial bid.**

All the pages of bid being submitted must be signed wherever required, and sequentially numbered by the bidder irrespective of nature of content of the documents before uploading. The offers submitted by Telegram/Fax/email shall not be considered. No correspondence will be entertained in this matter.

- **Technical Bid**

The following documents are to be furnished/ uploaded by the Contractor along with **Technical Bid within the period of bid submission** as per the tender document (As applicable):

i) Scanned copy of Demand Draft/ RTGS of any scheduled Bank for tender fee and EMD.
ii) Scanned copy of PAN, EPF, ESIC , GST registration and electrical license **.**
iii) Certificate of Work Experience /Completion certificate issued by an officer in charge/ Project manager executing the work **(TDS certificate is mandatory if work experience is from private sector**).
iv) Scanned copy of Tender Acceptance Letter & Price Bid undertaking.
v) Certificate of Gross annual turnover for last three financial years issued by Chartered Accountant.

Financial Bid

(a) Schedule of price bid in the form of BOQ_XXXX .xls. format

Annexure: II

Instructions for Online Bid Submission:

The bidders are required to submit soft copies of their bids electronically on the CPP Portal, using valid Digital Signature Certificates. The instructions given below are meant to assist the bidders in registering on the CPP Portal, prepare their bids in accordance with the requirements and submitting their bids online on the CPP Portal.

More information useful for submitting online bids on the CPP Portal may be obtained at: https://eprocure.gov.in/eprocure/app.

REGISTRATION

2) Bidders are required to enrol on the e-Procurement module of the Central Public Procurement Portal (URL: https://eprocure.gov.in/eprocure/app) by clicking on the link "**Online bidder Enrolment**" on the CPP Portal which is free of charge.

3) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.

4) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.

5) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / nCode / eMudhra etc.), with their profile.

6) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSC's to others which may lead to misuse.

7) Bidder then logs in to the site through the secured log-in by entering their user ID / password and the password of the DSC / e-Token.

SEARCHING FOR TENDER DOCUMENTS

1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, Organization Name, Location, Date, Value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as Organization Name, Form of Contract, Location, Date, Other keywords etc. to search for a tender published on the CPP Portal.

2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective 'My Tenders' folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.

3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.

2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF/JPG formats. Bid documents may be scanned with 100 dpi with black and white option which helps in reducing size of the scanned document.

4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" or ''Other Important Documents'' area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

1) Bidder should log into the site well in advance for bid submission so that they can upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.
2) The bidder has to digitally sign and upload the required bid documents one by one as indicated in the tender document.
3) Bidder has to select the payment option as "offline" to pay the tender fee / EMD as applicable and enter details of the instrument.
4) Bidder should prepare the EMD as per the instructions specified in the tender document. The original should be posted/couriered/given in person to the concerned official, latest by the last date of bid submission or as specified in the tender documents. The details of the DD/any other accepted instrument, physically sent, should tally with the details available in the scanned copy and the data entered during bid submission time. Otherwise the uploaded bid will be rejected.
5) Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. If the price bid has been given as a standard BoQ format with the tender document, then the same is to be downloaded and to be filled by all the bidders. Bidders are required to download the BoQ file, open it and complete the white coloured (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.
6) The server time (which is displayed on the bidders' dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.
8) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is
9) maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done.Any bid document that is uploaded to the server is subjected to symmetric encryption using a system generated symmetric key. Further this key is subjected to asymmetric encryption using buyers/bid openers public keys. Overall, the uploaded tender documents become readable only after the tender opening by the authorized bid openers.
7) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.
8) Upon the successful and timely submission of bids (ie after Clicking "Freeze Bid Submission" in the portal), the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.
9) The bid summary has to be printed and kept as an acknowledgement of the submission of the bid. This acknowledgement may be used as an entry pass for any bid opening meetings.

ASSISTANCE TO BIDDERS

1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.
2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk.

Annexure: III
TENDER ACCEPTANCE LETTER
(To be given on Company Letter Head)

Date:

To,

_____
_____

Sub: Acceptance of Terms & Conditions of Tender.

Tender Reference No: _____

Name of Tender / Work: - Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam, New Delhi.
Dear Sir,

1. I/ We have downloaded / obtained the tender document(s) for the above mentioned 'Tender/Work' from the web site(s) namely: _____
_____
as per your advertisement, given in the above mentioned website(s).

2. I / We hereby certify that I / we have read the entire terms and conditions of the tender documents from Page No. _____ to _____ (including all documents like annexure(s), schedule(s), etc .,), which form part of the contract agreement and I / we shall abide hereby by the terms / conditions / clauses contained therein.

3. The corrigendum(s) issued from time to time by your department/ organization too have also been taken into consideration, while submitting this acceptance letter.

4. I / We hereby unconditionally accept the tender conditions of above mentioned tender document(s) / corrigendum(s) in its totality / entirety.

5. I / We do hereby declare that our Firm has not been blacklisted/ debarred by any Govt. Department/Public sector undertaking.

6. I / We certify that all information furnished by the our Firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/ organisation shall without giving any notice or reason therefore or summarily reject the bid or terminate the contract , without prejudice to any other rights or remedy .

Yours Faithfully,

(Signature of the Bidder, with Official Seal)

Annexure: IV

.FINANCIAL BID UNDERTAKING

From: (Full name and address of the Bidder)_____

_____

_____

To,

_____

_____

Dear Sir/Madam,

I submit the Price Bid for **"Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi".**

1. I have thoroughly examined and understood all the terms and conditions as contained in the Bid document, and agree to abide by them.

2. I offer to work at the rates as indicated in the price Bid, Annexure IV inclusive **of all applicable taxes with GST@18%.**

Authorized Signatory
(Signature of the Authorized Person)

Annexure: V

PROFORMA OF AGREEMENT

This agreement (which shall include it's subsequent Amendment (s), if any), entered on DD/MM/YYYY into by and between M/s ITPO, a Government of India Company registered under the companies Act ,1956 having its registered office at Pragati Maidan , New Delhi-110001 (here in after shall be referred to as "the company". Which expression unless repugnant to its meaning or context thereof, shall include its execution, administrators, successors and permitted assignees) as ONE PART

AND,

M/s_____a firm having its office at (hereinafter shall be referred to as "the Contractor/successful bidder", which expression unless repugnant to its meaning or context thereof, shall include its executors, administrators, eight(8)years i.e. up to DD/MM/YYYY (Bidding Document; Tender Ref. No._____and extended contract period, if any, as per work order issued by the company. The Contractor, under this Agreement, shall execute the subject job/ provide services(s) in a professional manner as per the detailed scope of work as defined in the bidding document and the Company will pay the successful bidder for execution of the subject job/ services(s) provided s per the agreed payment terms and conditions of the bidding /contract document. The successful bidder shall also be liable for the Defect Liability Period / Warranty period, if specifically mentioned in the bidding document, for the job executed/ service provided by him/them. All the terms and conditions of the Detailed Letter of Acceptance and its enclosures including bidding document and if Addendum(s) shall be applicable and binding for this Agreement.

In witness whereof the parties have executed this Agreement on DD/MM/YYYY. Signed and Delivered signed and Delivered

For and on behalf of

India Trade Promotion Organisation

Name :

Designation

Date:

Place:

For and on behalf of

Other part

Name :

Designation

Date:

Place:

Annexure: VI

PERFORMANCE BANK GUARANTEE

<<On Rs. 500 Stamp Paper>>

To,

Senior Manager(Elect.),

India Trade Promotion Organisation, Pragati Maidan, New Delhi-110001

Witness, << name of the bidder/ prime bidder and address>> (hereinafter called "the bidder") has undertaken, in pursuance of contract no. <Insert Contract No.> dated.

<Date> to provide implementation services for <<name of the assignment>> to ITPO (hereinafter called "ITPO")

And whereas it has been stipulated by in the said contract that the bidder shall furnish you with a bank guarantee by a recognized bank for the sum specified therein as security for compliance with its obligations in accordance with the contract; And whereas we,<Address of Registered Office> and having one of its office at <Address of Local Office> have agreed to give the supplier such a bank guarantee.

Now, therefore, we hereby affirm that we are guarantors and responsible to you, on behalf of the bidder, up to a total of Rs. < insert value> (Rupees<insert Value in Words> only) and we undertake to pay yoy, 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 Rs. <Insert Value> (Rupees

<Insert Value in words > only) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the bidder before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the Bidder shall in any release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This Guarantee shall be valid until<< Insert Date>>) Notwithstanding anything contained herein:

a. Our liability under this Bank guarantee shall not exceed Rs. << Amount in figure>> (Rupees << Amount in words>> only)

b. This Bank guarantee shall up to <<Insert date>>)

c. It is condition of our liability for payment of the guarantee amount or any part thereof arising under this Bank guarantee that we receive a valid written claim or demand for payment under this Bank guarantee on or before<<Insert date>>) failing which our liability under the guarantee will automatically cease.

(Authorized Signatory of the Bank)

Seal:

Date:

INTEGRITY PACT

To,

Sub: NIT No. -

for the work : **Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi.**

Dear Sir,

It is hereby declared that ITPO is committed to follow the principle of transparency, equity and competitiveness in public procurement.

The subject Notice Inviting Tender (NIT) is an invitation to offer made on the condition that the bidder will sign the integrity Agreement, which is an integral part of tender/bid documents, failing which the renderer/bidder will stand disqualified from the tendering process and the bid of the bidder would be summarily rejected.

This declaration shall form part and parcel of the Integrity Agreement on behalf of the ITPO.

Yours faithfully,

(Senior Manager, Electrical))

GOVERNMENT OF INDIA
INDIA TRADE PROMOTION ORGANISATION
General Detail of Notice Inviting Tender

Item rate tenders through e-tendering are invited on behalf of the CMD, ITPO from the specialized agencies dealing in the field of "**Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi."**in two bid system up to **3.00 PM on 30.08.2024** which will be opened by him (or) his authorized representative at **3.00 PM on 31.08.2024** for the work of **"Supply, Installation, Testing and Commissioning of substation 11KV/ 433V substation with suitable rating transformers, switch gear complete at ITPO Pragati Maidan New Delhi".**

1. The work is estimated to cost **Rs. 3,82,76,743/-.** This estimate, however, is given merely as a rough guide.
2. Agreement shall be drawn with the successful tenderer on prescribed Form No. C.P.W.D. 7/8 which is available as a Govt. of India publication. Tenderer should quote his rates as per various terms and conditions of the said form which shall form part of the agreement.
3. **The time allowed for the completion of work is 120 days.**
4. The site for the work is available. OR The site for the work shall be made available in part as specified in scope of work .
5. Tenders shall be accompanied with Earnest money of **Rs. 7,65,535/- & Tender Fee of Rs. 1,180/-** (demand drafts of a scheduled bank issued in favor of India Trade Promotion Organisation, New Delhi or NEFT/RTGS).
6. The Contractor, whose tender is accepted, will be required to furnish performance guarantee of 5% (Three percent) of the tendered amount within the period specified in Schedule F. This guarantee shall be in the form of Demand Draft of any scheduled bank/Pay order of any scheduled bank (in case guarantee amount is less than Rs.1, 00,000/-) or Government Securities or Fixed Deposit Receipts in accordance with the prescribed from. In case the contractor fails to deposit the said performance guarantee within the period as indicated in Schedule 'F', including the extended period if any, the Earnest Money deposited by the contractor shall be forfeited automatically without any notice to the contractor. Copies of other drawings and documents pertaining to the works will be open for inspection by the tenderer at the office of the above mentioned officer. Tenderers are advised to inspect and examine the site and its surroundings and satisfy themselves before submitting their tenders as to the nature of the ground and sub-soil (so far as is practicable), the form and nature of the site, the means of access to the site, the accommodation they may require and in general shall themselves obtain all necessary information as to risks, contingencies and other circumstances which may influence or affect their tender. A tenderer shall be deemed to have full knowledge of the site whether he inspects it or not and no extra charges consequent on any misunderstanding or otherwise shall be allowed. The tenderer shall be responsible for arranging and maintaining at his own cost all materials, tools & plants, water, electricity access, facilities for workers and all other services required for executing the work unless otherwise specifically provided for in the contract documents. Submission of a tender by a tenderer implies that he has read this notice and all other contract documents and has made himself aware of the scope and specifications of the work to be done and of conditions and rates at which stores, tools and plant, etc. will be issued to him by the Government and local conditions and other factors having a bearing on the execution of the work.
7. The competent authority on behalf of the CMD, ITPO does not bind itself to accept the lowest or any other tender and reserves to itself the authority to reject any or all the tenders received without the assignment of any reason. All tenders in which any of the prescribed condition is not fulfilled or any condition including that of conditional rebate is put forth by the tenderer shall be summarily rejected.
8. Canvassing whether directly or indirectly, in connection with tenders if strictly prohibited and the tenders submitted by the contractors who resort to canvassing shall be liable to rejection.
9. The competent authority on behalf of CMD, ITPO reserve the right of accepting the whole or any part of the tender and the tenderer shall be bound to perform the same at the rate quoted.
10. No Engineer of Gazetted rank or other Gazetted officer employed in Engineering or Administrative duties in an Engineering Department of the Government of India is allowed to work as a contractor for a period of one year after his retirement from Government service, without the previous permission of the Government of India in writing. This contract is liable to be cancelled if either the contractor or any of his employees is found any time to be such a person who had not obtained the permission of the Government of India as aforesaid before submission of the tender or engagement in the contractor's service.
11. The tender for the works shall remain open for acceptance for a period of Seventy five **(75) days** from the date of opening of financial bid ,in case tenders are invited on 2/3 envelope system (strike out as the case may be) if any tenderer withdraws his tender before the said period or issue of letter of acceptance, whichever is earlier, or makes any modifications in the terms and conditions of the tender which are not acceptable to the department, then the Government , without prejudice to any other right

or remedy, be at liberty **to reject the tender** as aforesaid. Further the tenderer not be allowed to participate in the re-tendering process of the work.

12. This Notice Inviting Tender shall form a part of the contract document. The successful tenderer/ contractor on acceptance of his tender by the Accepting Authority, **within 7days** from the stipulated date of start of the work, sign the contract consisting of:-

(i) Non Judicial Stamp for **Rs. 100/-**

(ii) Schedule of Work with terms and conditions.

(iii) GCC-2023 for Construction work

(iv) And any other relevant documents

SCHEDULES

SCHEDULE 'A'

Schedule of quantities (enclosed) As per Schedule of work attached.

SCHEDULE 'B'

Schedule of materials to be issued to the contractor:

S.No.	Description of item	Qty.	Rates in figures & words at which the material will be charged to the contractor.	Place of issue
1	2	3	4	5
---------- NIL ----------				

SCHEDULE 'C'

Tools and plants to be hired to the contractor:

S. No.	Description	Hire charges per day	Place of issue
1	2	3	4
---------- NIL ----------			

SCHEDULE 'D'

Extra schedule for specific requirements / documents for the work, if any. : NIL

SCHEDULE 'E'

Reference to General Conditions of contract	**:**	General Conditions of Contract for Construction work– 2023 amended up to date.
Name of work	**:**	**Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi.**
Estimated cost of work	**:**	**Rs. 38276743.00/-**
(i) Earnest money	**:**	7,65,535.00
(ii) Performance Guarantee	**:**	5% of tendered Value.
(iii) Security deposit	**:**	2.5% of tendered value

SCHEDULE 'F':-

General Rules & Directions: -

Officer inviting tender:	:	Senior Manager(E)
Maximum percentage for quantity of items of work to be executed beyond which rates are to be determined in accordance with Clauses 12.2 & 12.3	:	No limit

Definitions:

2 (v) Engineer-in-Charge	:	Senior Manager(E)
2 (viii) Accepting Authority	:	CMD,ITPO.
2 (x) Percentage on cost of materials and labour to cover all overheads and profits.	:	**15%**
2 (xi) Standard schedule of Rates	:	Based on DSR and Market Rates
2 (xii) Department	:	ITPO
9 (ii) Standard CPWD contract form	:	CPWD form 6 (item rate) as modified and corrected up to date.

Clause 1

Time allowed for submission of Performance Guarantee, Programme Chart (Time and Progress) and applicable labour license, registration with EPFO, ESIC and BOCW Welfare Board or proof of applying thereof from the date of issue of letter of acceptance.	:	7 days
Maximum allowable extension with late fee 0.1% per day of Performance Guarantee amount beyond the period provided in (i) above.	:	3 days

Clause 2

Authority for fixing compensation under clause – 2	:	Chief Engineer (Projects)

Clause 2A

Whether Clause 2A shall be applicable **:** No

Clause 5

Number of days from the date of issue of letter of acceptance for reckoning date of start. **:** **10 Days**

MILE STONE (S) AS PER TABLE GIVEN BELOW

Table of Milestone (s)

S.No.	Description of Milestone (Physical)	Time allowed in days (from date of start)	% Amount of tendered cost to be with-held in case of non achievement of milestone
1)	Submission and approval of drawings.	15 days	1% of the tendered amount.
2)	Receipt of Transformer, HT Panel, LT Panel, APFC Panel, Riser main, and other electrical materials.	75 days	1% of the tendered amount.
3)	Installation of Transformer, HT Panel, LT Panel, APFC Panel, Riser main, and other electrical materials.	90days	1% of the tendered amount.
5)	Testing & commissioning Transformer, HT Panel, LT Panel, APFC Panel, Riser main, and other electrical materials.	105 days	1% of the tendered amount.
6)	Inspection by local authority & handing over to the Client	120 days	1% of the tendered amount.

Time allowed for execution of work	**:**	**04 Months**

Authority to decide:

1. Extension of time	**:**	Chief Engineer(Projects)
2. Rescheduling of mile stones	**:**	N.A
3. Shifting of date of start in case of delay in handing over of site	**:**	N.A

Clause 6 :-

Whether applicable –	**:**	**Yes**

Clause 7 :-

Gross work to be done together with net payment/adjustment of advances for material collected, if any, since the last such payment for being eligible to interim payment.	**:**	**2.5 Crore**
Clause 7 A:-*Whether Clause 7A shall be applicable.*	**:**	Yes.
i) No Running account Bill shall be paid for the work till the registration with Labour licence/ EPFO, whatever applicable are submitted by the contractor to the Engineer-in-Charge.		----Not Applicable----
ii) No Running account Bill shall be paid for the work till the applicable registration certificates with ESIC and BOCW Welfare Board, whatever		---- Not Applicable ----

applicable are submitted by the contractor to the Engineer-in-Charge.		

Clause 10A :-

List of testing equipment to be provided by the contractor at site lab. : **As per requirement at site & as per direction of Engineer-in-Charge.**

Clause 10 – B(ii) :-

Whether clause 10-B(ii) shall be applicable : **No**

Clause 10C – Payment on Account of increase in Price/Wages due to Statutory Order(s) : **N.A.**

Clause 10 CA	Materials covered under this clause	Nearest material (other than cement, reinforcement bars and structural steel) for which All India Wholesale price index to be followed	Base price of all the materials covered under clause 10CA
Not Applicable			

Clause 10CC :-

Clause 10CC to be applicable in contracts with stipulated period of completion exceeding the period shown in next column. : **-Not Applicable--**

Schedule of component of other Materials,

Labour, POL etc. for price escalation.

Component of civil (Except materials covered under clause 10 CA)/ Electrical construction materials expressed as percent of total value of work.	Xm	**Not Applicable**
Component of labour expressed as percent of total value of work.	Y	
Component of POL expressed as percent of total value of work.	Z	

Clause 11 :-

Specifications to be followed for execution of work : **C.P.W.D. General Specifications for EI works (Internal & External), Sub-Station, DG Set as amended upto date & as per Terms & conditions attached.**

Clause 12

Type of work
The completion cost of agreement should not exceed 2 (Two) times of Tendered — **Construction work**
Authority to decide Deviation:- — Chief Engineer(Projects)

Clause 16 :-

Competent Authority for deciding reduced rates. — Chief Engineer(Projects)

Clause 18 :-

1. Electrically operated chase cutting machine
2. Electrically operated core cutting machine
3. Megger
4. Tong tester
5. Any other machinery, tools and plants as per requirement at site

Clause 19 :- — Applicable

Clause 19L :- — Applicable

Clause: 32

(i) Requirement of Technical Representative(s) and Recovery

Sr. No.	Minimum Qualification of Technical Representative	No. of Major+Minor Component	Minimum experience (years)	Designation (Principal Technical/ Technical representative)	Rate at which recovery shall be made from the contractor in the event of not fulfilling provision of clause 32	
					Figures	Words.
1.	Graduate Engineer or Diploma Engineer	1+1	2 or 5 years Respectively	Project Manager Cum Planning /Quality/Site / Billing Engineer	Rs. 15,000/- per month per person	Rs. Fifteen Thousand per month per person
2.	Graduate Engineer or Diploma Engineer	1	2 or 5 Respectively	Project Manager Cum Planning/quality/Site/billing Engineer	Rs. 15,000/- per month per person	Rs. Fifteen Thousand per month per person

Assistant Engineers retired from Government Service that are holding Diploma will be treated at par with Graduate Engineers.
Diploma holder with minimum 10-year relevant experience with a reputed construction company can be treated at par with Graduate Engineers for the purpose of such deployment subject to condition that such diploma holders should not exceed 50% of requirement of degree engineers.

Clause 38 :-

(i) (a) Schedule/statement for determining theoretical quantity of cement & bitumen on the basis of N.A printed by CPWD with upto date correction slips.

(ii) Variations permissible on theoretical quantities:

a) Cement for works with estimated cost put to tender not more than Rs. 5 lakhs		**N/A**
for works with estimated cost put to tender more than Rs 5 lakh		**N/A**
b) Bitumen for all works.		**N/A**
c) Steel Reinforcement and structural steel sections for each diameter, section and category.		**N/A**
d) All other materials.		**Nil**

RECOVERY RATES FOR QUANTITIES BEYOND PERMISSIBLE VARIATION

Sl. No	**Description of Item**	**Rates in figures and words at which recovery shall be made from the Contractor.**	
		Excess beyond permissible variation	**Less use beyond the permissible variation**
----------NIL----------			

INDIA TRADE PROMOTION ORGANISATION
(Engineering Division)

CORRIGENDUM TO FORM 7/8/9 (CPWD) MUST BE READ ALONGWITH THE PAMPHLET

S.No.	FOR	READ
1.	Govt. of India	India Trade Promotion Organisation (A Govt. of India Undertaking)
2.	CPWD of Government	India Trade Promotion Organisation
3.	CPWD – 7/8/9	ITPO – 7/8
4.	President/President of India	CMD, ITPO
5.	Chief – Engineer	Chief Engineer(Projects)
6.	Superintending Engineer	Deputy. General Manager (Elect.)
7.	Engineer-in-charge/ Divisional Engineer/ Executive Engineer/ Divisional Office	Sr.Manager (Elect.)
8.	Sub-Divisional Officer/Asstt. Engineer	Deputy Manager (Elect.)/Manager(Elect)
9.	C.T.E.	General Manager (Works)
10.	Admn. Head	C.M.D./General Manager
11.	Ministry of Works & Housing	ITPO/Ministry of Commerce
12.	CPWD Code, Paragraph'90	Shall be applicable to ITPO works.
13.	DSR-2022	Shall be applicable to ITPO works.
14.	CPWD specifications	Shall be applicable to ITPO works.
15.	DSR(Internal) 2022 for Electrical works.	Shall be applicable to ITPO works.
16.	CPWD specifications (Internal) 2005 Electrical works	Shall be applicable to ITPO works.
17.	DSR External 2022 for Electrical works and specification.	Shall be applicable to ITPO works.
18.	Provision of section 12 Subsection (i) of the works man compensation	Shall be applicable to ITPO works.
19.	Provision of contract labour (Regulation and abolition Act 1970 and contract labour (Regulation and abolition) control rules 1971 section 20 sub-section (A) of the contract labour (Regulation and abolition Act 1970).	Shall be applicable to ITPO works.
20.	Provision of the payment of wages Act, 1986 Minimum wages Act, 1986 1943 industrial disputes Act, 1947 Material benefits Act, 1961.	Shall be applicable to ITPO works.
21.	CPWD safety code framed from time to time.	Shall be applicable to ITPO works.
22.	CPWD maternity benefits to labour.	Shall be applicable to ITPO works.
23.	Provision of the Arbitration Act, 1972.	Shall be applicable to ITPO works.
24.	Section 74 of India Contract Act, 1973.	Shall be applicable to ITPO works.
25.	Model Rules of the protection health and sanitary appointment for workers employed by CPWD,	Shall be applicable to ITPO works.
26.	CPWD Contractor labour regulations.	Shall be applicable to ITPO works.

Senior Manager(Elect.)

INDIA TRADE PROMOTION ORGANISATION
Electrical Division

No. ITPO/CE(P)/Electrical/24-25/01 **Dated 23/08/.2024**

NOTICE INVITING TENDER

Senior Manager, Electrical India Trade Promotion Organisation, Pragati Maidan, New Delhi on behalf of CMD, ITPO invites **Item rate tender** for the following work from the Specialized agencies dealing in the field of **:** "**Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi.**"
in two bid system **through online e-tendering. Manual/offline bids shall not be accepted.** The details of which briefly described are hereunder:

S.N	Name of work	Time for Completion	Estimated Cost(Rs)	Earnest Money(Rs)	Cost of Tender (Rs)
1.	**Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi.**	120 days	3,82,76,743/-	7,65,535/-	1180/- i/c GST

The bids can be submitted on line up to 30/08/2024 up **to 03.00** PM with date of opening at **3.00 PM on 31/08/2024**. For further details including eligibility, downloadable form of tender documents etc. please refer website www.indiatradefair.com, www.gem.gov.in(For Reference) &www.eprocure.gov.in (for e-tendering)

Senior Manager(Elect.)
I.T.P.O.

India Trade Promotion Organisation
(Electrical Unit)
SCHEDULE OF WORK

Name of work: : "Supply, Installation, Testing and Commissioning of package type substation 11KV/ 433V with suitable rating transformers, switch gear complete at Bharat Mandapam,New Delhi."

Sl. No.	Description of Item	Qty.	Units	Rate (Rs.) (including @GST)	Amount (including @GST)
1.	Supply, installation, testing & commissioning of package type/unitized 11kV / 433 V Outdoor sub-station ,2000 KVA made from G. I. enclosure complete as required conforming to IEC 62271-202 only and relevant IS specifications as applicable for the rating, Internal Arc of 21 KA/1 Sec. IAC A &B on HT Compartment including Civil foundation 1:2:4 (1 cement :2 cores and : 4 Graded stone aggrregate of 40 mm nominal size) PCC foundation of suitable size extending 500 mm all around the outdoor enclosure and 1000 mm height (above ground level) complete with suitable sizes of GI Pipes for incoming/outgoing cables/earthing strips etc. and consisting of following complete as required. Angle iron frame of size 40x40x5mm NS all along the corner of the foundation CSS shall be from OEMs only . Licensed / Authorized System Integrators of approved OEM are not allowed to supply . Vacuum Interrupter,RMU,LT Switchgear, Meters and CSS Enclosure shall be of same make to ensure life cycle optimization. Note :- LT Side have to provision of connection of Sandwich Bustrunking of 3200A. Make : Siemens/Schneider Infrastructure/ABB. Package substation will have the following equipment :-				
	HT SWITCHGEAR				
3.	11kV 630Amps 21KA/3 sec. Non-Extensible Ring Main Unit Compact switchgear consisting of **2 Nos fixed motorized Load Break switch & 1 no fixed motorized VCB module** in SF6 insulated stainless steel enclosure and **with Bus PT metering module** . Interconnection between HT Switchgear and primary of transformer shall be done through 1C x 3R x 95 sq.mm Aluminum XLPE cable. - 1 No.				
	Microprocessor based IDMT Relay for Circuit Breakers - Self Powered along with series trip coil (Modbus RS485 complaint)				

	Capacitive voltage indication fixed type system with LED for all feeder and FPI in all load break switch feeder.				
	SF6 Gas pressure indicator.				
	Operating sequence of VCB must be O-0.3Sec-CO-3 Mins-CO				
	CT shall be minimum 60/1A ,2.5VA ,core 1 is 5P20 for protection- 3 nos.				
	CT shall be minimum 60/1A ,2.5VA ,core 2 is calss 0.5 fot metering - 3 nos.				
	All the Load Break switch will have Fault Passage indicator				
	2X12V, 26AH Battary with Dual Charger - 1 Set				
	11KV/1.732/110V/1.732 Cast resin Bus PT single phase- 03 set				
	Multifunction meter with Modbus RS485 port & class 0.5 accuracy for each VCB module				
	All modules of the RMU shall be suitable for cable termination of 3C x 300 sq.mm Al XLPE Cable, incoming cable termination is included within the scope of work - 1 Set				
	TRANSFORMER				
	2000 KVA 11KV/433V DYN-11 Oil type, hermetically sealed energy efficiency level-2 transformer (BEE Star Rated-2) with corrugated wall, without conservator, type of design & Top Bushings for HT & LT with Off load tap switch of rating +5% to -5% @2.5%. Temp Rise - Oil/Winding 40/45 Deg cel. Losses (As per IS-1180 amended up to date) Max Losses @ 50% Load 4790W and Max Losses @ 100% Load 14100 W and Impedance of 6.25% (Subject to IS Tolerance (as per IS1180-2014) The transformer shall be confirming to IS: 2026 and IS: 1180(part-I). amended up to date. - One No. Winding Temperature Indicator with Alarm and trip Contact				
	LT PANEL				
	LVS PANEL 3200 AMPS 4 pole Aluminum BUSBAR (100% FOR PHASES AND 100% FOR NEUTRAL) . ; LT panel made up of 1.5/2 mm thick CRCA sheet				
	Outgoing				
	3200 Amps 433V 4P 50Hz 50KA Draw out Manual Type Air Circuit Breaker (ACB)				

	Multifunction meter with Modbus RS485 port & class 0.5 accuracy with Suitable CT. - 1 set				
	Hard wiring from each equipment inside CSS for scada connectivity (monitoring & control) to be brought to one set of TBs and a space for FRTU to be given.				
	All Civil works such as PCC/RCC foundation, Platform, Filling trench and pedestal etc as per CSS manufacturer's recommendation are included in scope of work.				
	OUTDOOR ENCLOSURE				
	Outdoor type enclosure of 1.5 mm (For non load bearing members) & 2.0 mm (For load bearing members) thickness having modular construction of Galvanised Sheet Steel in suitable design for better heat dissipation and providing robustconstruction. The Enclosure shall have IP54 degree of protection for HT & LT switchgear compartment & IP 23 degree of protection for transformer compartment. The enclosure exterior shall be painted with epoxy based powder paint (colour RAL 7032). Each compartment will be provided with the door and pad locking arrangement. The design of the enclosure should be type tested for suitablly handling any arcing inside the compartment for providing better safety to the operator. The compartment illumination lamp with door operated switch shall be provided for each compartment.Vacuum Interrupter,RMU,LT Switchgear, Multifunction meter and CSS Enclosure shall be of same make to ensure life cycle optimization.Make : Siemens/Schneider Infrastructure/ABB.	2	set		
	MAIN LT PANEL OUT DOOR TYPE				
2	Supplying, installation, testing & commissioning cubical type outdoor (IP-55) double door with canophy feeder pillar type construction locking arrangement with go down locks in front & back with rain cap cover suitable for 3 phase, 4 wire 415 volt 50Hz dust and vermin proof made out of design from CRCA sheet steel of 2mm thick for frame work and covers with provision for connections of incoming cable and outgoing cables, i/c providing & fixing following switch gears i/c powder coated with simence gray paint after prepaint treatment, painting. Panel suitable for 415 Volt, 3				

	Phase, 4 wire, 50Hz AC supply system fabricated in compartmentalized , 3mm thick for gland plates i/c cleaning & finishing complete with 9 tank process for powder coating in approved shade, having 3200 Amps capacity extensible type FP Aluminum Alloy bus bars of high conductivity DMC/SMC bus bar supports, with short circuit with stand capacity of 31 MVA for 1 Sec., bottom base channel of MS section not less than 100mm x 50mm x 5mm thick, fabrication shall be done in transportable section, entire panel shall have a common copper earth bar of suitable size at the rear with 2 Nos. earth stud, solid connections from main bus bar to switch gears with required size of Al. bus bars and control wiring with 2.5 sq mm PVC insulated copper conductor single core cable, cable alleys, cable gland plates in two half, i/c providing and fixing following switch gears. old existing panel dismounting complete as per site requirement included				
	(i) Incomer (CSS 1 & 2)				
	2 Set. - 3200 Amps 4 pole horizontal draw out type air circuit breaker 433V AC, 50Hz AC operation of fault breaking capacity 50 kA (Ics = Icu = Icw =100%) for 1 sec. electrically operated (EDO), fitted with interlocked door, automatic safety shutters, mechanical ON/OFF and service/test/isolated position indicators, zone selective interlocking, ready to close, thermal memory and frame earthing contact, conforming to IEC 60947/IS-13947/Part-II/1993 latest version as amended up-to-date complete with following accessories for each ACB. (Make Schneider/ABB/Siemens)				
	a) Independent electrical and manual spring closing mechanism - 1 No.				
	b) Microprocessor releases based release for adjustable setting for over current, short circuit and Earth Fault (LSIG) protection with 4 line LCD (R,Y,B,N) display with bar graph display for % loading of phases. all RYBN current and Voltage, release should self powered requiring no external power supply. LED fault Indication on release. confirming to IEC:60947/ IS:13947, Part-II/1993. Make ABB/Schneider/Siemens . - 1 set.				
	c) Under voltage release for each				

	ACB's- 1 No				
	d) Digital type Multifunction Meter (IV,KW,KWH,KVA,PF,HZ), 96mm square flush pattern with one set of 4 nos. CT's of 3200/5A Class I accuracy and 15 VA burden - 1 Set. (Make Schneider/ABB/Siemens)				
	e) 3 Nos. Phase indication LED lamps and breaker ON,OFF,TRIP indicating light , test terminal block set, circuit wiring as per standard practice, auxiliary contacts for positive interlocking of the breaker as reqd.				
	f) Electrical Interlocking - 1 No.				
	h) Aux. Contactor + Add On Block 2no+2nc - 3 Nos.				
	i) 4P high protection 70kA, surge protectors with MPCB for incomer -1 Nos.				
	j) 2A SP Control MCB's for proection of control circuit -7 Nos.				
	k) A/M Selector Switch (1P, 2way With Off) -1 Nos.				
	l) 06A DP MCB 10kA -3 Nos.				
	m) 25A Breaker Control Switch -1 Nos.				
	n) 3 Nos. CT 3200/5A Class 1 accuracy for APFC relay sensing.				
	(ii) BUS COUPLERS :				
	1 Set. - 3200 Amps four pole horizontal draw out type air circuit breaker of fault breaking capacity 50 kA (Ics = Icu = Icw=100%) for 1 sec .electrically operated (EDO) without release, fitted with interlocked door, automatic safety shutters, mechanical ON/OFF and service/test/isolated position indicators and frame earthing contact, conforming to IEC 60947/IS-13947/Part-II/1993 latest version as amended up-to-date complete with following accessories for each ACB. (Make Schneider/ABB/Siemens)				
	a) Independent electrical and manual SPring closing mechanism - 1 No.				
	b) Breaker ON,OFF Indicating LED indicating light, test terminal block, circuit wiring as per standard practice, auxiliary contact for positive electrical interlocking of breakers, etc. as reqd.-1 set.				
	c) Under Voltage release-220 V AC - 1 No.				
	d) Electrical Interlocking - 1 No.				
	e) Aux. Contactor +Add On Block 2no+2nc-3 Nos.				
	f) 6A SP MCB -4 Nos.				

	g)25A Breaker Control Switch -1 Nos.				
	h) On Delay Timer (240VAC)-2 Nos.				
	i) A/M Selector Switch (1P, 2way with Of) -1 Nos.				
	(iii) BUS BARS:				
	TPN aluminum bus bars of minimum of 3200A capacity with heat shrinkable colored sleeves and i/c DMC/SMC bus bars supports at required intervals complete, for cross section, size supports & their SPacing etc. for withstanding fault level of 31 MVA for 1 Sec. (For this the current capacity/density shall not be the limiting factor).				
	(iv) OUTGOING:-				
	Section -1				
	a) 1 Set. 400A FP MCCB 50kA With Thermal Magnetic release with adjustable setting overload setting upto 70% of rated current and Extended Handle + 1 C/O Aux. Contact (ICS=ICU=100%) with Digital Meter VAF ,Metering CT-400/5Amp - CL-1.0 (3 Nos) , ON,OFF Indicating LED. (Make Schneider/ABB/Siemens)				
	b) 4 Set. 250A FP MCCB 50kA With Thermal Magnetic release with adjustable setting overload setting upto 70% of rated current and Extended Handle + 1 C/O Aux. Contact (ICS=ICU=100%) with Digital Meter VAF ,Metering CT-250/5Amp - CL-1.0 (3 Nos) , ON,OFF Indicating LED. (Make Schneider/ABB/Siemens)				
	APFC Section for CSS 1 -900KVAR				
	1600A TP Pole + N, horizontal draw out type air circuit breaker up to 433V AC, 50Hz AC operation of fault breaking capacity 50 kA (Ics = Icu =				

	Icw =100%) for 1 sec. electrically operated (EDO), fitted with interlocked door, automatic safety shutters, mechanical ON/OFF and service/test/isolated position indicators and frame earthing contact, Microprocessor releases based release for adjustable setting for over current & short circuit protection with 4 line LCD (R,Y,B,N) display with bar graph display for % loading of phases. all RYBN current and Voltage. release should self powered requiring no external power supply. LED faults Indication on release. confirming to IEC:60947/ IS:13947, Part-II/1993				
	a) 12 Stage APFCR Relay -1 Nos.				
	b) Louver With Fan -2 Nos.				
	c) Timer ON Delay -1 Nos.				
	d) Aux. Contactor +Add On Block 2no+2nc -5 Nos.				
	e) Digital VAF Meter -1 Nos.				
	f) C.T's 1600/5Amp , CL-1.0 -3 Nos.				
	g) C.T Shorting Link -4 Nos.				
	h) A/M Selector Switch -1 Nos.				
	i) R,Y,B, ON and OFF Phase Indicating LED -5 Nos.				
	j) 32A Neutral Link -2 Nos.				
	k) 6A SP MCB -7 Nos.				
	OUTGOINGS;-				
	STEP DETAILS 100 KVAR - 7 Nos.				
	1) 7 Set 250A TP MCCB 25kA Thermal Magnetic release with adjustable setting for overload and short circuit Protection & Rom with following accessories each capacitor bank (Feeder) :- ABB/Schneider/Siemens				

	a) 100KVAR 440V AC CAPACITOR duty Contactor -1 Nos. ABB/Schneider/Siemens				
	b) START/STOP Push Button -2 Nos.				
	c) ON/OFF Indicating Lamp -2 Nos.				
	d) 440V AC CAPACITOR MPP TYPE Heavy duty-100KVR -1 Nos. ABB/Schneider/Siemens				
	e) 32A Neutral Link -1 Nos.				
	f) 6A SP MCB -1 Nos.				
	STEP DETAILS 50 KVAR - 3 Nos.				
	1) 3 Set 100A TP MCCB 18kA Thermal Magnetic release with adjustable setting for overload and short circuit Protection & Rom with following accessories each capacitor bank (Feeder) :- Make ABB/Schneider/Siemens				
	a) 50KVAR 440V AC CAPACITOR duty Contactor -1 Nos.				
	b) START/STOP Push Button -2 Nos.				
	c) ON/OFF Indicating Lamp -2 Nos.				
	d) 440V AC CAPACITOR MPP TYPE Heavy duty -50KVR -1 Nos.				
	e) 32A Neutral Link -1 Nos.				
	f) 6A SP MCB -1 Nos.				
	STEP DETAILS 25 KVAR - 2 Nos.				
	1) 2 Set 63A TP MCCB 18kA Thermal Magnetic release with adjustable setting for overload and short circuit Protection & Rom with following accessories each capacitor bank (Feeder) :-				
	a) 25KVAR 440V AC CAPACITOR duty Contactor -1 Nos.				
	b) START/STOP Push Button -2 Nos,				
	c) ON/OFF Indicating Lamp -2 Nos.				

	d) 440V AC CAPACITOR MPP TYPE Heavy duty -25KVR -1 Nos.				
	e) 32A Neutral Link -1 Nos.				
	f) 6A SP MCB -1 Nos.				
	Section -2				
	a) 1 Set. 400A FP MCCB 50kA With Thermal Magnetic release with adjustable setting overload setting upto 70% of rated current and Extended Handle + 1 C/O Aux. Contact (ICS=ICU=100%) with Digital Meter VAF ,Metering CT-400/5Amp - CL-1.0 (3 Nos) , ON,OFF Indicating LED.				
	b) 4 Set. 250A FP MCCB 50kA With Thermal Magnetic release with adjustable setting overload setting upto 70% of rated current and Extended Handle + 1 C/O Aux. Contact (ICS=ICU=100%) with Digital Meter VAF ,Metering CT-250/5Amp - CL-1.0 (3 Nos) , ON,OFF Indicating LED.				
	APFC Section for CSS 2				
	1600A TP Pole + N, horizontal drawout type air circuit breaker upto 433V AC, 50Hz AC opeartion of fault breaking capacity 50 kA (Ics = Icu = Icw =100%) for 1 sec. electrically operated (EDO), fitted with interlocked door, automatic safety shutters, mechanical ON/OFF and service/test/isolated position indicators and frame earthing contact, Microprocessor releases based release for adjustable setting for over current & short circuit protection 4 line LCD (R,Y,B,N) display with bar graph display for % loading of phases. all RYBN current and Voltage. release should self powered requiring no external power supply. LED faults Indication on release. confirming to IEC:60947/ IS:13947, Part-II/1993				

	a) 12 Stage APFCR Relay -1 Nos.				
	b) Louver With Fan -2 Nos.				
	c) Timer ON Delay -1 Nos.				
	d) Aux. Contactor +Add On Block 2no+2nc -5 Nos.				
	e) Digital VAF Meter -1 Nos.				
	f) C.T's 1600/5Amp , CL-1.0 -3 Nos.				
	g) C.T Shorting Link -4 Nos.				
	h) A/M Selector Switch -1 Nos.				
	i) R,Y,B, ON and OFF Phase Indicating LED -5 Nos.				
	j) 32A Neutral Link -2 Nos.				
	k) 6A SP MCB -7 Nos.				
	OUTGOINGS:-				
	STEP DETAILS 100 KVAR-7 Nos.				
	1) 7 Set 250A TP MCCB 25kA Thermal Magnetic release with adjustable setting for overload and short circuit Protection & Rom with following accessories each capacitor bank (Feeder) :-				
	a) 100KVAR 440V AC CAPACITOR duty Contactor -1 Nos.				
	b) START/STOP Push Button -2 Nos.				
	c) ON/OFF Indicating Lamp -2 Nos.				
	d) 440V AC CAPACITOR MPP TYPE Heavy duty-100KVR -1 Nos.				
	e) 32A Neutral Link -1 Nos.				
	f) 6A SP MCB -1 Nos.				
	STEP DETAILS 50 KVAR - 3 Nos.				
	1) 3 Set 100A TP MCCB 18kA Thermal Magnetic release with adjustable setting for overload and short circuit Protection & Rom with following accessories each capacitor				

	bank (Feeder) :-				
	a) 50KVAR 440V AC CAPACITOR duty Contactor -1 Nos.				
	b) START/STOP Push Button -2 Nos				
	c) ON/OFF Indicating Lamp -2 Nos.				
	d) 440V AC CAPACITOR MPP TYPE Heavy duty -50KVR -1 Nos.				
	e) 32A Neutral Link -1 Nos.				
	f) 6A SP MCB -1 Nos.				
	STEP DETAILS 25 KVAR - 2 Nos.				
	1) 2 Set 63A TP MCCB 18kA Thermal Magnetic release with adjustable setting for overload and short circuit Protection & Rom with following accessories each capacitor bank (Feeder) :-				
	a) 25KVAR 440V AC CAPACITOR duty Contactor -1 Nos.				
	b) START/STOP Push Button -2 Nos.				
	c) ON/OFF Indicating Lamp -2 Nos.				
	d) 440V AC CAPACITOR MPP TYPE Heavy duty -25KVR -1 Nos.				
	e) 32A Neutral Link -1 Nos.				
	f) 6A SP MCB -1 Nos.	1	Set		
3	Supplying of following sizes of XLPE insulated PVC sheathed armoured Al. cond. Power Cable of 11 KV grade as required.				
3a	3C x 300 sq mm	1500	Meter		
4	Laying of one number PVC insulated and PVC sheathed / XLPE power cable of 11 KV grade of following size in the existing masonry open duct as required.				
4a	Above 120 sq. mm and upto 400 sq. mm	1200	Meter		

5	Supplying and making indoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminum conductor cable of 11 KV grade as required :				
5a	300 sq. mm	4	Each		
6	Supplying and making outdoor cable end termination with heat shrinkable jointing kit complete with all accessories including lugs suitable for following size of 3 core, XLPE aluminum conductor cable of 11 KV grade as required :				
6a	300 sq. mm	4	Each		
7	Supplying and installing following size of perforated painted with powder coating M.S. cable trays with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with M.S. suspenders including bolts & nuts, painting suspenders etc as required.				
7a	200 mm width X 50 mm depth X 1.6 mm thickness	1500	Meter		
8	Earthing with copper earth plate 600 mm X 600 mm X 3 mm thick including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe of 2.7 metre long etc. with charcoal/ coke and salt as required.	6	Set		
9	Providing and fixing earth bus of 50 mm X 5 mm copper strip on	30	Meter		

	surface for connections etc. as required.				
10	Earthing with G.I. earth pipe 4.5 metre long, 40 mm dia including accessories, and providing masonry enclosure with cover plate having locking arrangement and watering pipe etc. with charcoal/ coke and salt as required.	2	Each		
11	Providing and fixing 25 mm X 5 mm G.I. strip in 40 mm dia G.I. pipe from earth electrode including connection with G.I. nut, bolt, spring, washer excavation and re-filling etc. as required.	20	Meter		
12	Supplying, installing by suspension on ceiling, testing and commissioning of following capacity Sandwich Type Rising Mains for use on 3 phase 4 wire 415 volts, 50Hz A.C. supply with metal clad enclosure having IP-66 rating, Glass Re inforced Polyester material is used, made of minmium 1.5mm thick steel sheet duly powder coated in convenient sections complete with 4 Nos aluminium Rectangular bus bars having current density of 130 A/ sq cm at nominal current rating, necessary joints, elbow joints & expansion joints and bends, fire barrier at each floor, provision of tapping at every metre, adopter box and copper flexible for joints, continuous earthing with intergral earthing including, G.I. clamping brackets, suspenders, angle iron bracket, steel fasteners, connecting to earthing system				

	etc. as required. OEM has to produce IP66 certification while drawing approval/TDS. Make -Schneider/Siemens /GE/ABB				
12 a	3200 A, Isc= 50kA for 1 sec	30	Meter		

SA (Elect.) M (Electrical) Senior Manager (Electrical.)

Technical Specification for Package Substation with breaker as protection on HT side

1.0.0 **CODE & STANDARDS**:

1.1.0 All equipment and material shall be designed manufactured and tested in accordance with the latest applicable IEC standards. The 12KV Package Substation Design must be as per **IEC62271-202 only**.

1.2.0 The Package Sub-station offered shall in general comply with the latest issues including amendments of the following standards.

Title	Standards
High Voltage Low Voltage Pre-Fabricated Substation	IEC:62271-202
High Voltage Switches	**IEC 60265**
Metal Enclosed High Voltage Switchgear	**IEC 60298/ IEC62271-200**
High Voltage Switchgear	**IEC 60694**
Low Voltage Switchgear and Control gear	**IEC 60439**
Power Transformers	**IEC 60076**

2.0.0 DESIGN CRITERIA

2.1.0 Package Sub-station consisting of **11KV Non-Extensible SF6 Ring Main Unit with breaker as protection + Transformer + Low Voltage Switchgear(as required)** with all connection accessories, fitting & auxiliary equipment in an Enclosure to supply Low-voltage energy from high-voltage system as detailed in this specification. The complete unit shall be installed on a substation plinth (base) as **Outdoor substation** located at very congested places. 11KV Isolators controls incoming-outgoing feeder cables of the 11KV distribution system. The Vacuum Circuit Breaker shall be used to control and isolate the 11kV/433V Distribution transformer. The transformer Low Voltage side shall be connected to Low Voltage switchgear. The connection cables to consumer shall be taken out from the Low Voltage switchgear.

2.2.0 The prefabricated-package substation shall be designed for a) Compactness, b) fast installation, c) maintenance free operation, d) safety for worker/operator & public.

2.3.0 The Switchgear and component thereof shall be capable of withstanding the mechanical and thermal stresses of short circuit listed in ratings and requirements clause without any damage or deterioration of the materials.

2.4.0 For continues operation at specified ratings temperature rise of the various switchgear components shall be limited to permissible values stipulated in the relevant standard and / or this specification.

2.5.0 **Service Conditions**:

The Package substation shall be suitable for continuous operation under the basic service conditions indicated below

Ambient Temperature: 40 Deg C

Relative Humidity upto 95%

Altitude of Installation upto 1000m

The Enclosure of High Voltage switchgear-control gear, Low Voltage switchgear-control gear & Transformer of the package substation shall be designed to be used under **normal outdoor service condition** as mentioned. The enclosure should take minimum space for the installation including the space required for approaching various doors & equipment inside.

3.0.0 SPECIFIC REQUIREMENT

3.1.0 The main components of a prefabricated- package substation are Transformer, High-voltage switchgear-control gear, Low-voltage switchgear-control gear and corresponding interconnections (cable, flexible , bus bars) & auxiliary equipment. The components shall be enclosed, by either common enclosure or by an assembly of enclosure. All the components shall comply with their relevant IEC standards.
Also, the Vacuum Interrupter, HT RMU, LT panel ,ACB,MCCB and CSS shall be of same make to ensure life cycle optimization and single point design and type tests responsibility.

3.1.1 **Ratings**:

Description	**Unit**	**Value**
Rated Voltage / Operating Voltage	kV rms	11

Rated frequency & Number of phases	Hz & nos.	50 & 3
Rated maximum power of substation	kVA	2000kVA ONAN
Rated Ingress protection class of Enclosure	IP:	IP-23 for Transformer Compartment and IP:54 for LT & HT Switchgear Compartment.
Rated temp Class of Transformer Compartment		K10
HV Insulation Level		
Rated withstand voltage at power frequency of 50 Hz	kV rms	28
Rated Impulse withstand Voltage	kV peak	75
HV Network & Busbar		
Rated current	Amp	630A
Rated short time withstand current	kA rms / 3 sec	21
Making capacity for switch-disconnector & earthing switches	kA peak	50kA
Breaking capacity of Isolators (rated full load)	A	630A
LV Network		As per requirement.

OUTDOOR ENCLOSURE

3.2.0 **Outdoor enclosure**:

3.2.1 The outdoor enclosure shall be made of galvanized Sheet Steel tropicalised to local whether conditions.

3.2.2 The CSS shall be made up of 1.5 mm thick non load bearing members and 2 mm thick load bearing members with a base frame made up of 4 mm HRCA.

3.2.3 The CSS shall have a 6 degrees slope to avoid water logging in case of rains or any other such issue.

3.2.4 The metal base shall ensure rigidity for easy transport & installation.

3.2.5 Substation will be used in outdoor application hence to prevent enclosure from rusting/corrosion, welding should be avoided.

3.2.6 The protection degree of the Enclosure shall be IP54 for LT & HT switchgear compartment & IP23D for Transformer compartment. Proper / adequate ventilation aperture shall be provided for natural ventilation by way of Louvers etc. Transformer compartment has to be designed in such away that, it meets IP class without any forced cooling arrangements.

3.2.7 Considering the outdoor application of the substation the doors shall be provided with proper interlocking arrangement for safety of operator and to avoid corrosion door should have stainless steel hinges.

3.2.8 Interconnection between HT switchgear and transformer shall be using 40 x 10 sleeved Copper bus bars / 1Cx3Rx95 sq.mm Aluminum un armoured XLPE cable and between transformer and LT switchgear shall be using **Aluminum/Copper** busbar(as required)

3.2.9 Internal Fault : Failure within the package substation due either to a defect, an exceptional service condition or mal-operation may initiate an internal arc. Such an event may lead to the risk of injury, if persons are present. It is desirable that the highest practicable degree of protection to persons shall be provided. The Design shall be tested for *IAC AB as per IEC 62271-202. Type test report of arcing due to internal fault should submitted with offer.*

3.2.10 **Covers & Doors** : Covers & doors are part of the enclosure. When they are closed, they shall provide the degree of protection specified for the enclosure. Ventilation openings shall be so arranged or shielded that same degree of protection as specified for enclosure is obtained. All covers, doors or roof shall be provided with locking facility or it shall not be possible to open or remove them before doors used for normal operation have been opened. The doors shall open outward at an angle of at least 90^0 & be equipped with a device able to maintain them in an open position.

3.2.11 **Earthing** : All metallic components shall be earthed to a common earthing point. It shall be terminated by an adequate terminal intended for connection to the earth system of the installation, by way of flexible jumpers/strips & Lug arrangement. The continuity of the earth system shall be ensured taking into account the thermal & mechanical stresses caused by the current it may have to carry. The components to be connected to the earth system shall include :

a) The enclosure of Package substation,
b) The enclosure of High voltage switchgear & control gear from the terminal provided for the purpose,
c) The metal screen & the high voltage cable earth conductor,
d) The transformer tank or metal frame of transformer,
e) The frame &/or enclosure of low voltage switchgear,

3.2.12 There shall be an arrangement for internal lighting activated by associated switch for HV , Transformer & LV compartments separately.

3.2.13 **Labels**: Labels for warning, manufacturer's operating instructions etc. shall be durable & clearly legible.

3.2.14 **Cleaning & Painting :**

The enclosure shall be Powder coated with colour specific to Light and Dark Gray combination.

TECHNICAL SPECIFICATION OF 11KV SF6 METAL ENCLOSED, INDOOR RING MAIN UNIT (RMU).

This RMU should be complete with all components necessary for its effective and trouble-free operation along with associated equipment etc. such components should be deemed to be within the scope of supplier's supply.

The RMU should be fixed type SF-6 insulated, Vacuum circuit breakers with O/C & E/F relay for the protection of the transformer. It should be maintenance free equipment, having stainless steel robotically welded IP67 enclosure.

4.0 STANDARDS AND REFERENCE DOCUMENTS

4.1 Codes and Standards

The **RING MAIN UNIT (RMU)** should be designed, manufactured and tested according to the latest version of:

IEC 60694 Common specifications for high-voltage switchgear and control gear standards.

IEC 60298/ IEC 62271-200 : A.C metal-enclosed switchgear and control gear for rated voltages above 1KV and up to and including 72KV and the IEC Codes herein referred.

IEC 60129/ IEC 62271-102: Alternating current disconnections (isolators) and earthing switches

IEC 60529 : Classification of degrees of protection provided by enclosures

IEC 60265 High-voltage switches-Part 1: Switches for rated voltages above 1kV and less than 52 kV

IEC 60056 : Circuit breakers

IEC 60420 High-voltage alternating current switch-fuse combinations

IEC 60185 Current transformers

IEC 60186 Voltage transformers

IEC 60255 Electrical relays

☐☐Any other codes recognized in the country of origin of equipment might be considered provided that they fully comply with **IEC standard**s.

The design of the switchgear should be based on safety to personnel and equipment during operation and maintenance, reliability of service, ease of maintenance, mechanical protection of equipment, interchangeability of equipment and ready addition of future loads.

Compact Substation shall be supplied by OEM only. License Integrators are not allowed to quote for the same.

4.2 Salient Technical feature of "SF-6 RMU."

11KV SF6 INDOOR, NON-EXTENSIBLE, Ring Main Unit (RMU), comprising of 2 Nos. 630A Load break Switches, 1No. 630 A Vacuum "T"OFF Circuit Breaker with (3 O/C & 1E/F) Relays.

(A)Load break switch (630A)

Load break switch should have the following

- Manually operated 12 KV, 630A Load Break switch and Earthing Switch with making

capacity

- "Live Cable" LED Indicators through Capacitor Voltage Dividers mounted on the

bushings.

- Mechanical ON/OFF/EARTH Indication

- Anti-reflex operating handle

- Cable testing possible without disconnection of cables.

- Cable boxes suitable for 1R X 3C x 300 sq mm XLPE Cable with right angle Cable

terminal Protectors.

- Cable boxes should be Arc Proof and interlocked with respective Earthing Switches. For

safety of operator it should not be possible to open the cable box unless the earth

switch is ON.

(B) Circuit Breaker. (630A)

Circuit Breaker should have the following:

- Manually operated 630 A Vacuum circuit breaker and Earthing Switch with making capacity

- Mechanical tripped on fault indicator

- Auxiliary contacts 1NO and 1NC

- Anti-reflex operating handle

- "Live Cable" LED Indicators thru Capacitor Voltage Dividers mounted on the bushings.

- 3O/C + 1E/F self powered relay with Low and High set for Over current and Earth Fault. Relay should have facility to display the maximum loaded phase current also. Relay should have facility to trip the breaker from remote commands without shunt trip coil.

- Mechanical ON/OFF/EARTH Indication

- Vacuum Interrupter, RMU & CSS shall be of same make.

INDOOR RMU

1. Modular design, panel type with front cable access.

2. **RMU must be made of robotically welded stainless steel, Grade 304 with all live parts inside stainless steel tank, manually welded RMU shall not be acceptable.**

3. Offered RMU must be Non extensible.

4. Maximum Modules can be accommodated in a single Stainless-steel Tank so as to make it more compact and reliable.

5. Cable covers must be interlocked with Earth switch to have complete safety of operating person.

4.3 DIELECTRIC MEDIUM

SF6 GAS shall be used for the dielectric medium for 11KV RMU's in accordance with IEC376. It is preferable to fit an absorption material in the tank to absorb the moisture from the SF6 gas and to regenerate the SF6 gas following arc interruption. The SF6 insulating medium shall be constantly monitored via a temperature compensating gas pressure indicator offering a simple go, no-go indication.

The RMU should have provision of Gas filling at site , in case there is some leakage of the gas.

4.4 GENERAL TECHNICAL REQUIREMENTS

4.4.1 Fixed type Vacuum breakers insulated in SF6 gas. It should be maintenance free,

having stainless steel robotically welded enclosure for INDOOR RMU application.

4.4.2 Low gas pressure devices- 1.4 Bar pressure. RMU should have full rating with 1.2 Bar

gas pressure.

4.4.3 Live cable indicators- High operator safety.

4.4.4 Fully Rated integral earthing switch for Switches and Breakers.

4.4.5 Self powered Microprocessor Based 3O/C + 1E/F self powered relay with Low and High

set for Over current and Earth Fault - Does not require any external source of power.

4.4.6 Units fully SCADA Compatible. Retrofitting at site possible at a later date. Line

switches (Load break switches) as well as T- OFF circuit Breaker can be operated by

remote.

4.4.7 Cable boxes should be front/Side access and interlocked with earth switch.

required.

4.4.8 Cable testing possible without disconnection of cables.

4.4.9 Compact in dimension.

4.4.10 Low pressure, sealed for life equipment,

4.4.11 Cable earthing switch on all switching device-standard, for operator safety.

4.4.12 All live parts should be inside a hermetically sealed Stainless Steel

enclosure for indoor RMU.

4.4.13 Indoor unit should be classified as sealed pressure system with gas leak rate of

less that 0.1% per year requiring no gas filling for 20+ years of functional life.

4.5 TECHNICAL AND GUARANTEED PARTICULARS.

The bidders shall furnish all guaranteed technical particulars as called for this specification.

5.0 DESIGN CRITERIA

5.1 *Service conditions*

The offered switchgear and control gear should be suitable for continuous operation under the basic service conditions indicated below. Installation should be in normal indoor conditions in accordance with IEC 60694.

Ambient temperature -1°C to +45°C

Relative humidity up to 95%

Altitude of installation up to 1000m, IEC 60120

5.2 General structural and mechanical construction

The offered RMU should be of the fully arc proof metal enclosed, free standing, floor mounting, flush fronted type, consisting of modules assembled into one or more units. Each unit is made of a cubicle sealed-for life with SF6 and contains all high voltage components sealed off from the environment. The overall design of the switchgear should be such that front access only is required. It should be possible to erect the switchboard against a substation wall, with HV and LV cables being terminated and accessible from the front.

The units should be constructed from stainless steel sheets. The design of the units should be such that no permanent or harmful distortion occurs either when being lifted by eyebolts or when moved into position by rollers.

The cubicle should be have a pressure relief device. In the rare case of an internal arc, the high pressure caused by the arc will release it, and the hot gases is allowed to be exhausted out at the bottom of the cubicle. A controlled direction of flow of the hot gas should be achieved.

The switchgear should have the minimum degree of protection (in accordance with IEC 60529)

- IP 67 for the tank with high voltage components

- IP 2X for the front covers of the mechanism

- IP 3X for the cable connection covers

6.0 TECHNICAL DATA

6.1 *Ring Main Unit, Electrical data*

Electrical data and service conditions

No	***Rated voltage***	KV	***12KV***

1 Power frequency withstand voltage	KV		28
2 Impuls withstand voltage	KV	75	
3 Rated frequency	Hz	50	
4 Rated current bus bars	A		630
5 Rated current (cable switch)	A		630
6 Rated current (T-off)	A		630
Breaking capacities:			
7 active load	A	630	
8 closed loop (cable switch)	A	630	
9 off load cable charging (cables switch)	A		135
10 earth fault (cable switch)	A	200	
11 earth fault cable charging (cable switch)	A		115
12 short circuit breaking current (T-off circuit breaker)	kA		21
13 Rated making capacity	kA	50	
14 Rated short time current 3 sec.	kA	20	
Ambient temperature:			
15 Maximum value	°C + 45		
16 Maximum value of 24 hour mean	°C + 35		
17 Minimum value	°C 0		
18 Altitude for erection above sea level 4m	...1000		
19 Relative humidity	Max 95%		

6.2 Ring Main Unit Technical data(11KV) INDOOR

General data, enclosure and dimensions

1 Standard to which Switchgear complies	IEC
2 Type of Ring Main Unit	Metal Enclosed, Panel type, Compact Module.
3 Number of phases	3
4 Whether RMU is type tested	Yes
5 Whether facility is provided with pressure relief	Yes
6 Insulating gas	SF6

7 Nominal operating gas pressure	1.4 bar abs. 20° C
8 Gas leakage rate / annum %	0.1% per annum
9 Expected operating lifetime	30 years
10 Whether facilities provided for gas manometer	Yes, temperature compensated
monitoring can be delivered	
11 Material used in tank construction	Stainless steel sheet

No Operations, degree of protection and colours

1 Means of switch operation	separate handle
2 Means circuit breaker operation	separate handle and push buttons
3 Rated operating sequence of Circuit Breaker	O –3min-CO-3min-CO
4 Total opening time of Circuit Breaker	approx. 40-50ms
5 Closing time of Circuit Breaker	approx.. 30-45ms
6 Mechanical operations of switch	CO 1000
7 Mechanical operations of CO earthing switch	1000
8 Mechanical operations of circuit breaker	CO 2000
9 Principle switch / earth switch	3position combined switch

Degree of protection:

10 High Voltage live parts,	SF6 tank IP 67
11 Front cover mechanism	IP 2X for Indoor
12 Cable covers	IP 3X for Indoor

Colours:

14 Front cover	7035
15 cable cover	7035

7 .0 PANEL(MODULE) DESCRIPTION

7.1.1 Incoming cable module

It should be consist of an SF6 cubicle housing a switch disconnector and an earthing switch. Bus bars and all electrical connections are located inside the tank. The operating shafts for the switches should be have rotary seals where they enter the SF6 cubicle. The operating mechanisms should be located outside on the front of the SF6 tank. Cable bushings should be located on the Front / Side of the SF6 cubicle in a separate cable compartment. Front covers containing the mimic diagram and having a degree of protection IP2XC close the fronts.

7.1.2 The T-off circuit breaker module (630 A)

The T-off circuit breaker module should be consisting of an SF6 cubicle housing a Vacuum circuit breaker unit and a dis connector- ear thing switch. An integrated relay and related CTs is used for tripping of the circuit breaker. Bus bars and all electrical connections should be located inside the tank. The operating shafts for the switches should be have rotary seals where they enter the SF6 cubicle. The operating mechanisms are located outside on the front of the SF6 tank. Cable bushings should be located on the front/Side of the SF6 cubicle in a separate cable compartment. Front covers containing the mimic diagram having a degree of protection IP2X seal off the fronts.

Off load isolator shall be provided after the Vacuum circuit breaker for maintenance purpose.

7.2 CIRCUIT BREAKERS

Vacuum bottles should be use as interrupters of the currents. The circuit breaker main circuit should be connected in series with a three-position disconnector –ear thing switch. The operation between circuit breaker and disconnector ear thing must be interlocked.

1.VCB must self tripping and has a self powered relay

2.The RMU must be non-extensible type

8 OTHER MAIN FEATURES

8.*1* *Bus bars*

Comprising the 3 single phases **copper** bus bars and the connections to the switch or vaccum circuit breaker. The bus bar should be integrated in the cubicle Bus bars should be rated to withstand all dynamic and thermal stresses for the full length of the switchgear.

8.2 The cable switch

It should be a switch-disconnector and ear thing switch using SF6 gas as an arc-quenching medium. The switch positions are closed – open – earthed. In the open position the switch satisfies the disconnector requirements.

8.3 Earthing Switch

Earthing switches should be rated equal to the switchgear rating.

Earthing switches should be quick make type capable of making Rated Fault Current. Ear thing switch should be operated from the front of the cubicle by means of a removable handle.

8.4 The mechanisms

All mechanisms should be situated in the mechanism compartment behind the front covers outside the SF6-tank. The mechanism for the switch and the earthing switch is operating both switches via one common shaft. The mechanism provide independent manual operation for closing and opening of the switch, independent closing of the

earthing switch and dependent opening of the earthing switch.

The mechanism for the T-off switch and earthing switch is operating both switches via one common shaft. The mechanism has stored spring energy and provide independent manual operation for closing and opening of the switch, independent closing of the ear thing switch and dependent opening of the ear thing switch. The mechanism for the vacuum circuit breaker (VCB) and disconnector- earthing switch is operating the VCB and the disconnector earthing switch via to separate shafts. The mechanism for the VCB has stored spring energy and provides independent manual operation for closing and opening of the VCB. The mechanism has a relay with related CT's and/or remote tripping device. The mechanism for the disconnector earthing switch provide independent manual operation for closing and opening of the disconnector, independent closing of the earthing switch and dependent opening of the earthing switch.

8.5

Front covers

The front cover contains the mimic diagram of the main circuit with the position indicators for the switching devices. The voltage indicators are situated on the front panels. Access to the cable bushings is in the lower part of each module.

8.6 Position indicators

The position indicators are visible through the front cover and are directly linked to the operating shaft of the switching devices

8.7 Voltage indicator

The voltage indicators are situated on the front cover, one for each module, and indicate the voltage condition of each incoming cable. Identification of the phases is achieved with labels L1, L2 and L3 on the front of the voltage indicators. The voltage indicator satisfies the requirements of IEC61243.

8.8 Cable compartment

It should be possible to terminate up to a 1x 3c x300sqmm core HV cables in each cable compartment. The access to the compartment will be possible by removing the cable cover, Hinged to the main frame only when earth switch is ON. Cable Compartments of Indoor RMU should be

Arc Proof and interlocked with respective Earth Switches.. Each module has a separate cable compartment that is segregated from each other by means of a partition wall. A partition wall should be fitted to divide the cable compartment from the rear side of the switchgear. In case of an arc inside the tank, followed by the opening of the pressure relief, the partition wall prevents the hot gases flowing out from the pressure relief to enter the cable compartments. All covers are removable. The ground continuity is achieved when the covers are in place by means of Hinged connections.
Interconnection between HT switchgear and transformer shall be using 1Cx3x95 sq.mm Al. unarmoured XLPE Cable.

8.9. Power connection.

The cables are installed in the dedicated compartment below the mimic front cover. At the bottom of the cable compartment, an earthing bar system made of copper/GI with a minimum cross section of 120 mm^2 should be fitted. In each compartment the earthing bar should be fitted with 4 screws M10. The earthing system is connected to the tank by a copper/GI bar, which rises up to the connecting point of the tank behind the rear partition wall on the middle of the switchgear.

8.10 INTERLOCKING.

The mechanism for the cable switch should be provide a built in interlocking system to prevent operation of the switch when the earthing switch is closed, and to prevent operation of the earthing switch when the switch is in the closed position.
The mechanism for the T-off switch should be provide a built in interlocking system to prevent operation of the switch when the earthing switch is closed, and to prevent operation of the earthing switch when the switch is in the closed position. The mechanism for the VCB and the disconnector-earthing switch should be has a built in interlocking system to prevent operation of the disconnector-earthing switch when the VCB is in the closed position.

Further is should not be possible to Open the Cable doors unless the Earthing Switch is Turned ON. In case the Cable door is accidentally left open a positive interlock shall prevent operation of Load Break Switch and Isolators / Breaker from any operation.

8.11 Current Transformers

All current transformers should be complying with IEC 60185.
Current transformers should be of dry type, with ratings and ratios as required.

Cable current transformers used in circuit breaker modules should be maximum 100mm wide. Current transformers used in metering cubicles should be having dimensions according to DIN 42600, Narrow type.
Current transformer shall be placed in the cable covers / Bushing Mounted so that it can be easily replaced at site without removing the bushings.

8.12 Auxiliaries.

The switchgear should be prepared for options like motor operation, auxiliary contacts and short-circuit indicators. Necessary terminal blocks and wiring etc. should be placed behind the front cover of each module.

8.13 Fault Passage Indicators.

These shall facilitate quick detection of faulty section of line. The fault indication may be on the basis of monitoring fault current flow through the device. The unit should be self-contained requiring no auxiliary power supply. The FPI shall be integral part of RMU to avoid thefts. The FPI shall have clear display, automatic reset facility and shall be SCADA compatible. 1 No. FPI shall be provided on 1 No. Incoming Load Break switch.

9 TESTING AND CERTIFICATION.

9.1 TYPE TESTS.

Units should be type tested in accordance with IEC standards 60056, 60129, 60265,

60298,60420,60529 and 60694. The following type tests should perform on the HT Switchgear and report should submit with offer.

- Short time and peak withstand current test
- Temperature rise tests
- Dielectric tests
- Test of apparatus i.e. circuit breaker and earthing switch
- Arc fault test
- Measurement of resistance of main circuit.
- Mechanical endurance test.
- Duty cycle test.
- Internal arc test for HT chamber for IAC AB 21kA/1s.

- Type test reports for above type shall be submitted with the offer.

9.2 ROUTINE TESTS.

Routine tests should be carried out in accordance with IEC 60298 standards. These tests should be ensure the reliability of the unit.

Below listed test should be performed as routine tests before the delivery of units;

- Withstand voltage at power frequency
- Measurement of the resistance of the main circuit
- Withstand voltage on the auxiliary circuits

- Operation of functional locks, interlocks, signalling devices and auxiliary devices

- Suitability and correct operation of protections, control instruments and electrical

connections of the circuit breaker operating mechanism

- Verification of wiring

- Visual inspection

- Time travel characteristics measurement facility for Breaker should be available with the manufacturer to asses the quality of RMU.

Distribution Transformer

10.0 **Oil filled Transformer :**

10.1.1 Requirement: 11000/433 Volt Oil immersed hermetically sealed, corrugated tank and

without conservator type design ONAN cooled suitable for installation at outdoor in

Enclosure for ground mounting.

10.1.2 Voltage Ratio: No load voltage 11000/433 volts within tolerance as stipulated in IEC 76.

10.1.3 Rating: The transformer shall have a continuous rating as specified at any of the specified tapping position and with the maximum temperature rise specified.

10.1.4 Temperature Rise: The maximum temperature rise at the specified maximum continuous output shall not exceed 40°C by thermometer in the hottest portion of the oil or 45°C measured by resistance of winding above ambient temperature, not exceeding 40°C daily average or 50°C maximum.

10.1.5 Connections: H.V. Delta and L.V Star connected with neutral brought out on the secondary side for connection to earth; Vector group DYn11.

10.1.6 Tapping :

Each transformer shall be provided with **sliding/rotary type tap switch** so as to provided for a voltage adjustment on H.V. from +5% to –10% of rated voltage of 11000 volts to obtain rated voltage of 433 volts on LV side

10.2.1 Cleaning & Painting :

a) All steel surfaces shall be thoroughly cleaned by sand blasting or chemical agents, as required to produce a smooth surface free of scales, grease and rust.
b) The internal surfaces in contact with insulating oil shall be painted with heat resistant insulation paint which shall not react & be soluble in the insulating liquid used.
c) The external Surfaces, after cleaning, shall be given two coats of high quality epoxy based rust resisting primer followed by filler coats.
d) The transformer shall be furnished with coats of weather resisting battleship gray epoxy based enamel paint specially recommended for transformer use.

e) **The paints shall be carefully selected to withstand tropical heat rain, effect of proximity to the sea etc. The paint shall not scale off or crinkle or be removed by abrasion due to normal handling.**

f) **Special care shall be taken by the manufacturer to ensure against rusting of nuts, bolts and fittings during operation. All bushings and current carrying parts shall be cleaned properly after final painting.**

10.2.2 Both H.V. and L.V. bushings shall have creepage corresponding to very heavily
Polluted atmosphere**.**

10.2.3 Oil: N**ew transformer oil used shall be according to relevant IEC standards**

10.2.4 Phase Marking & Danger Plate: **Phase markings in fluorescent paint on small non-corrodible metallic tags shall be permanently fixed for H.V. and L.V sides. Phase markings tags shall be properly fixed with proper alignment. Danger plates shall be provided on the H.V & LV sides, mentioning the Corresponding Voltages.**

10.3 Core and Coil**:**

10.3.1 Core **: The core shall be constructed from high grade, cold rolled, non-ageing, low loss, high permeability, grain oriented, cold-rolled grain oriented silicon steel laminations. The transformer shall be so designed as to have minimum humming noise. The percentage harmonic potentials with the maximum flux density under any conditions shall be such that capacitors connected in the system shall not be overloaded.**

10.3.2 The core and coil assembly shall be securely fixed in position so that no shifting or deformation occurs during movement of transformer. The core and coil assembly shall be capable of withstanding without injury, the thermal and mechanical effects of short circuit at the terminals of any winding.

10.3.3 Noise: **The Contractor shall take special precautions to ensure that the noise and vibration level does not exceed which is obtained in good modern practice.**

10.3.4 Impedance Volts: **The Percentage impedance value at 75 Deg. C at any tap shall be as per IS/ IEC subject to tolerance as specified in relevant IEC standards. i.e. 4.5% upto 630kVA and 5% upto 1250kVA The value of the impedance volts at each tapping over the specified range shall be specified in the bid.**

10.3.5 Regulation: **The regulation at 75° C at full load at unity and 0.8 power factor subject to the usual tolerance as per IEC standards shall be specified in the bid.**

10.3.6 Power Freq. High Voltage & Insulation Level (Impulse voltage): **The distribution transformer shall be designed so that they are capable of withstanding high voltage & impulse voltages as given below:**

a) **Impulse Voltage for 11kV winding: 75 kV (1.2/50 Microsecond wave shape).**

b) **High Voltage : 28kV rms.**

10.5.0 Fittings & Accessories For Corrugated Tank Transformer**:**

10.5.1 The following accessories shall be provided for 11 kV/0.433 kV, distribution transformer.

10.5.2 Two earthing terminals. The lugs shall be provided in such a way that they shall not obstruct the movements of rollers. The earthing continuity for all the connected equipments shall be properly done.

10.5.3 Two lifting lugs for complete transformer as well as enclosure.

10.5.4 Rating plate and diagram plate **of durable non-corroding metal giving information as required under IEC 76. Rating plate shall also include Transformer** Actual %Z, No-Load Loss & Full-Load Loss at 75°C **along with details like Purchase Order Number, date. The name plate marking shall be done with fluorescent colour. Each equipment shall carry individual name-plate with proper instructions & affixed with screws.**

10.5.5 Four plain rollers fitting so that the transformer can suitably moved in any direction along
With roller direction changing and locking facility shall be provided.

10.5.6 Skid with Haulage lugs.

10.5.7 Instructions & affixed with screws.

10.5.8 Skid with Haulage lugs.

OR

10.0 Cast Resin Dry Type Transformer

This specification covers the requirements of design, manufacture, testing and supply of cast resin dry type transformers complete with all the accessories and fittings for efficient and trouble-free operation.

10.1 CODES & STANDARD

The equipment covered by this specification shall, unless Other wise stated to be designed, constructed and tested in accordance with latest revisions of relevant Indian standards / IEC publications.

IS 1271	-	Classification of Insulating Materials.
IS 2026	-	Power transformers (part I - V)
IS 2099	-	Bushing for alternating voltages above 1000 V
IS 2705	-	Current transformers
IS 3202	-	Code of practice for climate proofing
IS 3639	-	Power transformer fittings and accessories
IS 4257	-	Porcelain bushings for transformers
IS 11171	-	Dry type Transformer
IS 8478	-	Application guide for tap-changers
IS 10028	-	Code of practice for selection, installation and Maintenance of transformers.

10.2 GENERAL DESIGN FEATURES

10.2.1 All transformers shall be of the latest design, dry type Cast Resin only.

10.2.2 The type of cooling shall be Natural Air cooled (AN) and the corresponding ratings for each transformer shall be as indicated in the specific requirements.

10.2.3 Each transformer shall be suitable for operation at full rated power on all tapings without Exceeding the applicable temperature rise.

10.2.4 It shall be possible to operate the transformer satisfactorily, with the loading guide

Specified in IS-6600. There shall be no limitations imposed by bushings, tap changers,

Auxiliary equipment to meet this requirement.

10.2.5 The transformers shall be designed to be capable of with-standing, without injury, the thermal and mechanical effects of short-circuits between phases or between phase and earth at the terminals of any winding with full voltage applied across the other winding for periods given in relevant standards. There shall be no limitations imposed by any part/component of the transformer/off load tap links to meet the short circuit level Specified.

10.2.6 Each transformer shall be designed for minimum no-load and load losses within the Economic limit and shall be able to have minimum loss at the rated load condition.

10.2.7 All electrical connections and contacts shall be of ample cross sections for carrying the rated current without excessive heating.

10.2.8 The transformer shall be capable of continuous operation at full load rating under the following conditions.

a) Voltage variation = ± 10%

b) Frequency variation = ± 5%

c) Combined voltage and frequency variation (Absolute sum) = 10%

10.3 CONSTRUCTION

10.3.1 The transformer shall be dry type, AN cooled suitable for Compact substation application.

10.3.2 The core-clamping frame shall be provided with lifting eyes having ample strength to lift the complete core and winding assembly.

10.3.3Off circuit tapings shall be provided on the HV windings. Tap changing is done by means of off-circuit links accessible through openings provided.

10.3.4The lifting lugs and rollers shall be provided. A winding temp. Scanner shall be provided and is actuated by means of resistance temperature detectors embedded in LV windings of all three phases. It should have alarm and trip contacts at a specified temperature.

10.3.5The transformer shall be of IP00 protection class and will be installed in the transformer compartment of compact substation having IP23 protection class.

10.4 WINDINGS

10.4.1 The winding insulation shall be of Class 'H" and temperature rise limit to Class F. i.e. 115

deg. C

10.4.2 Windings shall be of electrolytic copper conductors (circular in shape) of high conductivity and 99.9% purity.

10.4.3 Windings shall be designed to withstand the specified thermal and dynamic short circuit stresses.

10.4.4 The windings shall be duly sectionalized. Accessible joints brazed or welded and finished smooth shall connect similar sections. No corona discharge shall result on the winding upon testing the transformer for induced voltage test as specified in IS.

10.4.5 The end turns of the high voltage windings shall have reinforced insulation to take care of

the voltage surges likely to occur during switching or any other abnormal condition.

10.4.6 The high voltage and low voltage winding are shall be made of copper Conductors. HV winding will be always be resin casted under vacuum while LV winding can either be casted or pre-impregnated with resin.

10.5. CORE

10.5.1 The double wound Core shall be constructed from non-ageing cold rolled Grain oriented steel sheets. The built core shall be painted with high temperature resistant paint to prevent corrosion at the edges of core plates and to withstand high temperatures. By using different core material optimization of core losses shall be achieved. The yokes shall be firmly clamped between yoke channels or plates. The top & bottom yoke frames shall be secured to each other by means of tie-rods, which help in securing the winding in place.

10.5.2 The design of the magnetic circuit shall be such as to avoid static discharges, development of short circuit paths within itself or to the earthed clamping structure and the production of flux component at right angles to the planes of laminations which may cause local heating.

10.6 OFF-CIRCUIT TAP CHANGING LINKS

10.6.1 Off circuit tapings are provided on HV windings. Tap changing is done by means off circuit links. Use of tap changing links eliminates any moving parts as against a manually operated tap changer.

10.7 Terminal Arrangement

HV side and LV side of transformer will have the top busbar arrangement for connection of HT side by means of cable and LT side by means of busbar.

10.8 PAINTING

10.8.1 All steel surfaces shall be thoroughly cleaned by sand blasting or chemical agents as required to produce a smooth surface free of scale, grease and rust

10.8.2 The external surface, after cleaning, shall be given a cost of high quality red oxide or yellow quoted primer, followed by filler coats.

10.9 Routine Test

All Routine Tests in accordance with IEC 60076 / IS 2026 shall be carried out on each transformer.

L.T. Panel

11.1 System:-

a) **Declared voltage** :– 3 Phase,400V (±6%) 50 Hz,
b) **Neutral** :– Solidly earthed at substation.
c) **Busbar** – Aluminum/Copper

11.2 General finish:- Tropical, totally enclosed, metal-clad, weather-proof, vermin and dust proof.

11.3 LT Circuit Ways:

Incomer - 3P/4P MCCB/ACB

OUTGOINGS:

As per BOQ .

As per BOM requirement

The design of the LT panel should be type tested for the short circuit, temperature & Ingress protection test and type test report should submit with offer**. LT panel shall be of same make as the CSS & RMU OEM.**

11.5 GENERAL CHARACTERISTICS OF ACB

11.5.1) Conformity with Standards

The air circuit-breakers used in low voltage installations are constructed and tested in accordance with the IEC 947/IS 947 Standards and respect the following EC directives:

– "Low voltage Directive" (LVD) No. 73/23 EEC
– "Electromagnetic compatibility Directive" (EMC) No.89/336 EEC

11.5.2) Functional characteristics

- The circuit-breakers must have a rated service voltage of 690 V AC and a rated insulation voltage of 1000 V.
- The circuit-breakers must have a rated impulse withstand voltage of 12 kV.
- The rated uninterrupted current must be between 800 and 6300 A with the possibility of selection of ratings from 400 A.
- Different versions shall be available with rated ultimate short circuit breaking capacity(Icu) from 50kA at 415V and shall have rated short circuit service breaking capacity(Ics) equals to Icu.
- Different versions of circuit-breakers shall be available with rated short-time withstand current (Icw -1 sec) for 50kA for 1sec in category B.

- It must be possible to supply the circuit-breakers both from the top and bottom terminals without derating their performances and without jeopardising their functionality.
- The mechanical life must be at least 12000 operations, without the need for maintenance of the contacts and arcing chambers.
- The electrical life at a voltage of 440 V AC must be and without the need for maintenance of the contacts and arcing chambers:
  - at least 9000 operations up to 2000 A
  - at least 6000 operations up to 3200 A

  these values are intended to bevalid only for CAT B circuit-breakers.

11.5.3) Environmental characteristics

- Operating temperature: -25 °C...+70 °C (-13 °F...158 °F)
- Storage temperature: -40 °C...+70 °C (-40 °F...158 °F)
- Altitude: operation without derating up to 2000 m a.s.l. (6600 ft), and with derating up to 5000 m a.s.l. (16500 ft)
- Suitability for use in a hot-humid environment. With regard to this, the circuit-breakers must undergo a tropicalisation process which makes them suitable for use in a hot-humid environment, as established by the prescriptions of the main shipping registers and in accordance with the international IEC 60068-2-30 Standards.

11.5.4) Construction characteristics

- The circuit-breaker structure must be made of steel sheet.
- There must be total segregation between power and front shield, using double insulation where suitable so as to guarantee maximum operator safety.
- Total segregation between the phases must be guaranteed for safety reasons.
- The main contacts must be separate from the arcing contacts in cat. B circuit-breakers only.
- It must be possible to inspect easily the arcing chambers easily and to check main contact wear with the circuit-breaker racked-out, by removing the arcing chambers.
- All the circuit-breakers in the range have the same height and depth with the aim of standardising the supporting structures of the switchgear and the switchgear itself as far as possible.
- The circuit-breakers must indicate the precise position of the main contacts and the condition of springs charged/discharged on the front, by means of certain and reliable signals.
- The operating mechanism must be of the stored energy type with operation by means of precharged springs fitted with antipumping device. The springs are charged manually by activating the front lever, or by means of a geared motor, supplied on request.
- The whole range of air circuit-breakers must be fitted with electronic protection releases. It must be allowed the interchangeability of protection releases from skilled personnel.
- ACBs shall have minimum watt losses in order to restrict temperature rise inside the breaker.

11.5.5) RELEASES

1) Release (Protection functions)

- The release must not require auxiliary power supplies since the power is taken from the current transformers.
- The signals supplied by the release must not operate with power supply supplied by internal batteries.The basic version of the release must provide:
- protection against overload with trip with inverse long time delay (L)
- protection against instantaneous short-circuit (I)
- Selective short-circuit (S)
- Earth fault (G)

The setting ranges shall be:

- Protection against overload (L)
  Characteristic t=k/I2
  Trip threshold I1=(0.4...1)xIn with timing adjustable from 3 to 144 sec. (value referred to a current equal to 3xI1)
- Protection against selective short-circuit (S)
  Characteristics t=k and t=k/I2
  Trip threshold I2=(1...10) xIn with timing adjustable from 0.1 to 0.8 sec.
  (value referred to a current equal to 10xIn for curves at t=k/I2 and referred to currents >I2 for curves at t=K)
- Protection against instantaneous short-circuit (I)
  Trip threshold I3=(1,5...15) xIn
- Protection against earth fault (G)
  Characteristics t=k and t=k/I2
  Trip threshold I4=(0.2...1) xIn with timing adjustable from 0.1 to 0.8 sec. (value referred to a current equal to 4xI4)
- Neutral protection level:
  50% - 100% - 200% - excluded

All the protection functions except protection against overload must be excludable

User interface and signalling LEDs

- The release shall allow parameterisation of the trip thresholds and timing by means of dipswitches.
- alarm and trip signalling for all the protection functions by means of LEDs located on the release shall be available. No batteries or external power supplies shall be necessary for powering these indicators. The indication shall be available for not less than 48 hours after the trip, even with the circuit-breaker open
- An alarm shall indicate by means of LEDs located on the release the disconnection of opening solenoid and current transformers. A trip shall also occur, after a short time delay, when the disconnection is detected.
- It shall be possible, with the aid of external devices, to read currents, and information on last 10 trips (currents, protection tripped) occoured to the unit.

11.6 General aspects of MCCB with Thermal Base release

Standards conformity

Molded case circuit-breakers (MCCB) installed in the low voltage plant must be designed,

manufactured and tested according with the international standards IEC 60947-1, IEC 60947-2,

IEC 60947-3, IEC 60947-4-1, IEC 61000 or with the corresponding harmonized national standards, the CE "Low Voltage Directives" (LVD) n° 73/23 EEC and "Electromagnetic

Compatibility Directive" (EMC) n° 89/336 EEC.

11.6.1 Molded case circuit breakers functional features

- Rated insulation voltage (Ui) for MCCB shall be 800 V AC or more.
- Rated Impulse withstand voltage (Uimp) for mccb's shall be 8kV.
- Rated service voltage(Ue) for the moulded case circuit breaker shall be standard as 690V, however performance on short circuit level shall be consider based on system operating voltage.
- Rated uninterrupted current between varying from 160 and 800 A with trip units settings starting from 1 A
- Rated short circuit breaking capacity shall be considered as per bill of material and the rated service short circuit breaking capacity (Ics) shall be in 50-100% of rated ultimate short circuit breaking capacity (Icu).
- According to IEC 60947-2 (§ 4.4) starting from 400 A the circuit breakers must be category B, however other small rating category A shall be confirmed.
- MCCBs must be available with different ultimate short breaking capacities between 16kA and 200kA @ 380/415 V AC.
- Both line up and line down supplying must be possible without decreasing MCCBs performances or functionality
- MCCB shall confirm to current limiting type and this feature shall ensure less amount of let through energy at the time of opening on fault. The mccb shall have opening time less then 10msec for current rating upto 800A
- A test bottom for the correct functionality checking (moving contacts opening) must be place in front of the breaker.

11.6.2 Ambient characteristics

- Operating temperature: -25 °C .. +70 °C (ambient temperature)
- Storage temperature: -40 °C .. +70 °C (ambient temperature)
- Reference temperature for setting the thermal element of the thermo magnetic trip unit: +40 °C
- Maximum relative humidity: 98%

- Maximum altitude: 2000 m above sea level, 5000 m above sea level with derating
- Suitability for being used in hot-humid places.

11.6.3 Construction characteristics

- The range of moulded case circuit-breakers must cover a range of rated uninterrupted currents from 160 to 800 A.

- By means of the double insulation technique, moulded case circuit-breakers must guarantee complete separation between the power circuits and the auxiliary circuits.

- Moulded case circuit-breakers must have an operating lever which always indicates the exact position of the circuit-breaker contacts (positive operation), by means of safe and reliable signals (I= closed, O= open, yellow-green line= open due to trip unit).

- Moulded case circuit-breakers must be suitable for isolation in compliance with § 7.2.7 of the IEC 60947-2 Standard. This indication must be clearly and indelibly marked on the circuit-breaker (in accordance with § 5.2 of IEC 60947-2) and in a position where it is visible with the circuit-breaker installed.

- Moulded case circuit-breakers with rated uninterrupted current up to 250 A shall have a 45 mm high face which makes them suitable for installation on modular panels.

- For the front parts of the circuit-breakers the degree of protection of at least IP20 (excluding the terminals) must be guaranteed.

11.6.4 Protection trip units

10.6.4.1 Thermomagnetic overcurrent trip units

- Thermomagnetic trip units shall be fitted with protection threshold against overload (whose thermal element must consist of a bimetal) and with protection threshold against short circuit.

- The protection threshold against overload must be continuously adjustable starting from 0.7 times the rated current of the trip unit and up to its rated value.

- The reference temperature for setting the thermal element of the protection trip unit is 40°C. The temperature performance of the trip unit must be indicated as the temperature varies.

– The protection threshold against short-circuit can be either the fixed or adjustable type with continuity from 5 and up to 10 times the rated current of the trip unit. For current rating upto 250Amps, magnetic threshold be minimum of 10 times of rated current.

11.6.4.2 Magnetic only over current trip units

– The overcurrent trip units with magnetic only threshold shall be suitable for protection against short-circuit.

– The adjustable magnetic only trip units (suitable for motor protection) shall only be available in the three-pole version, whereas those with fixed threshold shall also be available in the four-pole version.

– The adjustable magnetic only trip units must be available for circuit-breakers up to 250 A with an upper magnetic threshold equal to Im =3200

OR

11.6 General aspects of MCCB with microprocessor-based release

Standards conformity

Molded case circuit-breakers (MCCB) installed in the low voltage plant must be designed,

manufactured and tested according with the international standards IEC 60947-1, IEC 60947-2,

IEC 60947-3, IEC 60947-4-1, IEC 61000 or with the corresponding harmonized national standards, the CE "Low Voltage Directives" (LVD) n° 73/23 EEC and "Electromagnetic

Compatibility Directive" (EMC) n° 89/336 EEC.

11.6.1 Molded case circuit breakers functional features

– Rated insulation voltage (Ui) for MCCB shall be 800 VAC or more.

– Rated Impulse withstand voltage (Uimp) for mccb's shall be 8kV.

– Rated service voltage(Ue) for the moulded case circuit breaker shall be standard as 690V, however performance on short circuit level shall be consider based on system operating voltage.

– Rated uninterrupted current between varying from 160 and 3200 A with trip units settings starting from 10A

- Rated short circuit breaking capacity shall be considered as per bill of material and the rated service short circuit breaking capacity (Ics) shall be in 100% of rated ultimate short circuit breaking capacity (Icu). (Ics=Icu)

- According to IEC 60947-2 (§ 4.4) starting from 400 A the circuit breakers must be category B, however other small rating category A shall be confirmed.

- MCCBs must be available with different ultimate short breaking capacities between 16kA and 200kA @ 380/415 V AC.

- Both line up and line down supplying must be possible without decreasing MCCBs performances or functionality

- MCCB shall confirms to current limiting type and this feature shall ensure less amount of let through energy at the time of opening on fault. The mccb shall have opening time less then 10msec for current rating upto 630A, and less them 15msec for current rating upto 1600Amps.

- A test bottom for the correct functionality checking (moving contacts opening) must be place in front of the breaker.

11.6.2 Ambient characteristics

- Operating temperature: -25 °C .. +70 °C (ambient temperature)
- Storage temperature: -40 °C .. +70 °C (ambient temperature)
- Maximum relative humidity: 98%
- Maximum altitude: 2000 m above sea level, 5000 m above sea level with derating
- Suitability for being used in hot-humid places.
- Circuit-breakers fitted with electronic trip units must comply with the prescriptions of the International Standards on electromagnetic compatibility.

11.6.3 Construction characteristics

- The range of moulded case circuit-breakers must cover a range of rated uninterrupted currents from 160 to 3200 A.

- By means of the double insulation technique, moulded case circuit-breakers must guarantee complete separation between the power circuits and the auxiliary circuits.

- Moulded case circuit-breakers must have an operating lever which always indicates the exact position of the circuit-breaker contacts (positive operation), by means of safe and reliable signals (I= closed, O= open, yellow-green line= open due to trip unit).

- Moulded case circuit-breakers must be suitable for isolation in compliance with § 7.2.7 of the IEC 60947-2 Standard. This indication must be clearly and indelibly marked on the circuit-breaker (in accordance with § 5.2 of IEC 60947-2) and in a position where it is visible with the circuit-breaker installed.

- Moulded case circuit-breakers with rated uninterrupted current up to 250 A shall have a 45 mm high face which makes them suitable for installation on modular panels.

- The same depth must be guaranteed from 320 A up to 1000 A, in order to standardize both switchboards and their supports.

- All the installation positions must be possible without jeopardizing the function of the apparatus. Starting from 630 A up to 1600 A the withdrawable version shall be mounted and operated horizontally.

- For the front parts of the circuit-breakers the degree of protection of at least IP20 (excluding the terminals) must be guaranteed.

11.6.4 Protection trip units

- From the 250 A size circuit-breakers, the trip unit must be interchangeable.

Electronic over current releases

- The electronic over current trip units must be self-supplied and must be able to guarantee correct operation of the protection functions even in the presence of a single phase supplied with a current value equal to 20% of the phase current.

- They must be unaffected by electromagnetic interference in compliance with the EMC directive on the matter.

- The basic version shall be fitted with protection functions against overload (function L) and against short-circuit. The latter function can either be of the instantaneous type (function I) or, alternatively, with intentional delay (function S). The function of protection against short circuit must be excludable. A basic version shall also be provided with only the protection threshold against instantaneous short-circuit which cannot be excluded.

- The minimum performances of the protection functions of the electronic protection trip unit for distribution, where present, must be:

    1. Function **L**:adjustable trip threshold I1= (0.4...1) x In, trip curves for the basic version with times from 3 to 12 seconds – 2 different trip curves - (at 6 times the set threshold). Cannot be excluded.

    2. Function **S**: adjustable trip threshold I2= (1...10) x In, trip curves for the basic version with times from 0.1 to 0.25 seconds – 2 different trip curves – (at 8 times the rated current of the trip unit.Can be excluded.

3. Function **I**: adjustable trip threshold I3= (1...10) x In for the basic version (instantaneous trip). Can be excluded.

– All the protection functions must be characterized by threshold and time tolerances according to the International Standards.

– The size of the current sensors must be a minimum of 10 A to a maximum of 3200 A so as to cover the widest possible current range.

12.0 TECHNICAL REQUIREMENTS OF CAPACITOR BANK

12.1 The Capacitor units shall comply with IS 13340 / IEC 831 for self healing type and other components such as Contactors, MCCB's, MCB's HRC Fuses etc., shall comply with the latest versions of relevant Indian Standards.

12.2 The Capacitor units shall be CPRI / ERDA tested.

12.3 RATINGS:

The rating of the Power Factor Correction equipment shall be 3 phase, 50Hz, 440volts :

APFC kVAr = (As per Cusrtomer requirement)

12.4 OPERATING LIMITS / OVERLOADS

12.4.1 Each capacitor shall meet the following requirements:

a) Maximum permissible over-voltage: Each capacitor shall be capable of operating continuously at 110% of the rated voltage (3 phase, 440V, 50 Hz).

b) Maximum permissible over current: The permissible increase in current loading due to any or all of the following shall not exceed 30% of the rated current:

1.Increased voltage
2.Increased frequency
3.Non-sinusoidal voltage.

c) Test voltage: All routine tests shall be conducted at 2.15 Un for each element as well as the assembled capacitor unit.

d) The capacitors shall be suitable for operating in temperature category:- **25/D** (Category: Max.Temp. 55 ^{0}C) as per relevant IS / IEC temperature catelgoy.

12**.5.0 CAPACITOR CELLS (MANUFACTURE & CONSTRUCTION):**

12.5.1 Individual Capacitors shall be made-up of single phase elements internally delta connected

to form a 3-phase capacitor Heavy Duty Metalized Polypropylene as a dielectric with electrodes of special material.

12.5.2 The capacitor shall be provided with safety device in the form on INTERNAL FUSE .

12.5.3 Capacitors shall be contained in heavy duty metallic enclosure. The capacitors shall be provided with Thermal equalizers & the Heat Dissipation shall be through conduction via metal enclosure.

12.5.4 Dielectric material shall have loss less than 0.5 watts per KVAR. This shall enable longer life and lower capitalization of losses in the long run.

12.5.5 The capacitors shall have current carrying capability of **200 x In** and there shall be no need for providing inrush current limiting inductor coil.

12.5.6 The encapsulation medium shall be a thermo-plastic material.

12.5.7 Nominal design life of individual capacitor cells shall be 15 years.

12.5.8 The capacitor shall have threaded terminals for wire connection OR cables brought out for direct termination on contactors.

12.6 DISCHARGE RESISTORS

12.6.1 Capacitor cells shall be provided with discharge resistors to reduce residual voltage to less than 50 volts within one minute of disconnection

12.6.2 Resistors shall be chosen to ensure a 20 year minimum life.

12.7 **CONTROLS:**

All controls shall be mounted on enclosure door for easy inspection and service.

12.8 Automatic POWER FACTOR CONTROLLER / Relay :

12.8.1 The APFC RELAY shall be microprocessor based VAR Sensing type and not PF or current sensing type. Controller shall be able to sense the reactive current requirement and switch on the required VAR providing intelligent switching based on actual value of KVAR and Bank Sizes

12.8.2 The relay shall have LCD display

12.8.3 The relay shall be easily programmable from front panel itself.

12.8.4 It shall have provision of both Auto and manual operation.

12.8.5 A built in settable time delay function shall be provided and the controller shall have provision to automatically set itself for a time delay of 40 – 60 secs in the event of Power Outage.

12.8.6 C/K ratio shall be automatically settable

12.8.7 The switching sequence shall be so chosen as to minimize the wear and tear of contactors. The equal step of capacitors shall be switched in rotation to achieve this feature.

12.8.8 The relay shall be able to recognize the connection of CT and Voltage and be able to automatically adjust itself to the phase angle difference.

12.8.9 The relay shall be 144 x 144 mm dimensions

12.8.10 It shall be single phase sensing type

12.8.11 The target PF setting range shall be 0.8 lead to 0.8 lag.

12.8.12 The operating temperature shall be upto 70 deg C.

12.9 **SWITCHGEAR COMPONENTS:**

12.9.1 **CAPACITOR DUTY CONTACTORS:** Heavy Duty Contactors shall be used. These shall be suitable for capacitor switching of 25 / 50 KVAR capacity. The contactors shall be able to withstand 200 In inrush currents. The contactors shall be provided with damping resistors.

12.9.2 **INCOMER MCCB:** Each panel shall be provided win the an incomer MCCB of adequate rating and shall be provided with overload and short circuit release. The short circuit breaking capacity of the MCCB shall be 36/50 KA.

12.9.3 STEP PROTECTION: Each step of capacitor panel shall be provided with adequately rated Fuses.

13.0 Earthing:

Earthing arrangement shall be provided for earthing each cable, PVC cable gland, neutral busbar, chassis and frame work of the cubicle with separate earthing terminals at two ends. The main earthing terminals shall be suitably marked .The earthing terminals shall be of adequate size, protected against corrosion, and readily accessible. These shall be identified by means of sign marked in a legible manner on or adjacent to terminals.

Neutral bus bar strip shall be connected to Earthing terminal with help of GI strip of suitable capacity & nut-bolt arrangement.

TYPE / ROUTINE TEST ON PACKAGE SUBSTATION

14.0. TYPE TESTS FOR THE PACKAGE SUBSTATION:

14.1 The Package Substations offered must be type tested as per latest **IEC 62271-202** only. The copy of type test summary should be submitted along with the tender. CSS manufactured at in JV consortium shall not be accepted.

14.2 Routine Tests: The routine tests shall be made on each complete prefabricated substation.

a) Voltage tests on auxiliary circuit.

b) Functional test.

c) Verification of complete wiring.

14.3 Test Witness: Routine test shall be performed in presence of Owner's representative if so desired by the Owner. The Contractor shall give at least fifteen (15) days advance notice of the date when the tests are to be carried out.

14.4 Test Certificates:

Certified reports of all the tests carried out at the works shall be furnished in three (3) copies for approval of the Owner.

14.5 Type Test Reports to Qualify Technical Bid:

Type tests shall be on the name of OEM only. Using supporting licensee partner's test reports and supplying own CSS design shall not be acceptable.

Packaged Substation Enclosure:

- **Tests to verify the degree of protection.**
- **Arcing due to internal fault 20KA/1 Sec. for IAC-AB as per latest IEC 62271-202**
- **Test to prove enclosure class - Temperature rise of the transformer inside the enclosure(K10).**
- **Short circuit test to prove the capability of the earthing circuits to be subjected to the rated peak and the rated short time withstand currents.**
- **Tests to verify the withstand of the enclosure of the prefabricated substation against mechanical stress.**

LIST OF ACCEPTABLE MAKES FOR SUB-STATION EQUIPMENTS

	Compact/Package type 11KV/433 V outdoor substation.	**SIEMENS/SCHNEIDER INFRASTRUCTURE/ABB**
	ACB	**ABB(ABB EMAX2)/SIEMENS(3WA)/SCHNEIDER(MTZ)**
	MCCB/MCB	**ABB/SIEMENS/SCHNEIDER**
	END TERMINATION MATERIAL	**COMET/DOWELL (DOUBLE COMPRESSION)/ GRIPWEL/HMI/HEX**
	LUGS	**DOWELL/JAINSON/HEX/ACTION**
	TERMINAL BLOCK	**ELEMAC/NEMA/SIEMENS/ABB**
	CONTRACTOR	**SIEMENS/ABB/SCHNEIDER/HAGER**
	LT CUBICAL PANEL/CAPACITOR PANEL	**ABB/R.P.CONTROLS/SIEMENS/ SCHNEIDER**
	SINGLE PHASE PREVENTOR	**MINILEC/VSP/L&T/LEGRAND**
	AMMETER/VOLTMETER/ MULTIFUCTION METER (DIGITAL TYPE	**CONZERV/SECURE/CROMPTON GREAVES/SCHNEIDER/ABB/SIEMENS**
	SELECTOR SWITCH	**AE/L&T/BCH**
	LED INDICATING LAMP & PUSH BUTTON	**SIEMENS/ABB/L&T/SCHNEIDER ELECTRIC**
	BUS BAR TRUNKING	**C&S/L&T/LEGRAND/SCHNEIDER/GODREJ/ABB**
	DIGITAL/MULTI FUNCTIONAL METER	**CONZERV/SECURE/CROMPTON GREAVES/SCHNEIDER/ABB/SIEMENS**
	OIL TYPE TRANSFORMER	**BHEL/CROMPTON/KIRLOSKAR/SIEMENS/ABB/ SCHNEIDER**
	CURRENT TRANSFORMER (CAST RESIN)	**AE/KAPPA /AREVA/INDCOIL/GILBERT&MAXWELL/ MATRIX**
	CAPACITOR/APFC RELAY/ THYRISTOR SWITCH/REACTOR	**EPCOS/L&T/SCHNEIDER/GE/ABB**
	POTENTIAL TRANSFORMER & CT FOR CURRENT TRANSFORMER 11 KV PANEL	**AS PER 11 KV PANEL MANUFACTURER PRACTICE**
	HT PANEL WITH VCB	**SIEMENS/SCHNEIDER INFRASTRUCTURE/ABB**
	INDICATING LAMP	**ESBEE/SIEMENS/L&T/ABB**
	CT's/PT'S	**KAPPA/AE/SIEMENS/LEGRAND/ABB/L&T**
	GAS BASED FIRE SUPPRESSION SYSTEM	**NOVEC/SEVO/SIEMENS/FIRE TREX/TYCO**
	HEAT/SMOKE DETECTORS	**AGNI INSTRUMENT/HONEYWELL/SIEMENS**
	SANDWITCH TYPE RISING MAINS	**C&S/L&T/LEGRAND/SCHNEIDER/GODREJ**
	POWER CABLE	**POLYCAB/BATRA HANLEY/FINOLEX/R R KABEL/KEI**
	CABLE GLAND	**COMET/GRIPWEL/DOWELL/HMI/HEX**
	ALL OTHER ITEMS NOT COVERED ABOVE	**AS PER SAMPLES APPROVED BY ENGINEER - IN-CHARGE**

GENERAL TERMS & CONDITIONS

1.0 GENERAL This work covers supplying, testing as may be necessary before dispatch, delivery at site, all preparatory work assembly and installation, commissioning putting into operation of substation & final testing & commissioning.

1.1 Location: The work shall be carried out at Bharat Mandapam complex, New Delhi.

1.2 The work shall be executed as per CPWD General Specifications for Electrical Works part-I Internal 2023, Part-II (Ext.) 2023, Part-IV Sub-Stationetc. as amended up to date, relevant I.E. Rules, BIS/IEC and as per directions of Engineer-in-Charge. These additional specifications/ conditions are to be read in conjunction with above and in case of variations; specifications given in these additional conditions shall apply. However, nothing extra shall be paid on account of these additional specifications and conditions, as the same are to be read along with schedule of quantities for the work. In case of discrepancy between the BOQ, List of Makes, Tech. Specifications, Drawings etc the following order of preference shall be observed,:-

1. Schedule of work/ BOQ
2. List of approved make of material
3. Technical Specifications
4. Drawings
5. Terms & condition for particular E&M installation
6. CPWD General Specifications
7. BIS/IEC/International Codes

1.3 At the time of submission of Performance Guarantee toward bidder, following shall submit along with performance guarantee after acceptance of Tender an undertaking from the major OEM of all equipments regarding:-

(i) Authorization Certificate.

(ii) The OEM shall unconditionally support the lowest tenderer technically throughout the execution of contract as well as for Maintenance/Comprehensive Maintenance Contract for the useful life of the system, and

(iii) OEM shall provide all the spares required for the healthy functioning of the equipment for at least Ten years from the date of supply of equipment.

1.4 The tenderer should in his own interest visit the site and get familiarized with the site conditions before tendering.

1.5 No T&P shall be issued by the Department and nothing extra shall be paid on account of this.

1.6 The makes/models and Cat. No. etc mentioned in NIT are indicative only. The firms shall be responsible for providing the system fulfilling the specifications capacity and all other related requirement of system ensuring compatibility between different items of work.

1.7 The firm shall be required to supply all the items of same make (among the list of approved makes) to ensure compatibility, proper matching and ease of maintenance.

1.8 Department reserves the right to accept the upgraded version of various items, if there is technological advancement with reference to these makes/models. The decision of department in this reference shall be final and binding on the firms.

1.9 The contractor shall discuss with Senior Manager(E) or his authorized representative / visit the site before placing the supply order / delivery of materials at site as per actual requirement as the actual quantity of materials required may deviate (+/-) from the quantity taken in the schedule of work/inventory of the agreement

1.10 Before executing any extra item, approval for the same is required to be taken from the competent authority.

1.11 The LT panel billing and manufacturing from OEM only as per approved makes given in NIT. Channel partners are not entertained.

2.0 Commercial Conditions:

2.1 Type of Contract: The work to be awarded by this tender shall be treated as indivisible works contract. 2.2 Submission and opening of tenders:

2.2.1 The tenderers are advised not to deviate from the technical specifications/ items, commercial terms and conditions of NIT like terms of payment, guarantee, arbitration clause, escalation etc.

2.2.2 Tenders (Price Bid) only shall be opened on the due date and time in the presence of tenderers or their authorized representatives who wish to remain present.
2.2.3 Scrutiny/ evaluation of the Tenders (Price Bid) shall be done by the department. In case it is found that the Tenders (Price Bid) of a tenderer is not in line with NIT specifications/ requirements and/ or contains too many deviations, the department reserves the right to reject the price bid of such firm(s) without making any reference to the tenderer(s).
2.2.4 The department reserves the right to reject any or all the price bids and call for fresh prices/ tenders as the case may be without assigning any reason.
2.2.5 Necessary clarifications required by the department shall have to be furnished by the tenderer within the time given by the department for the same. The tenderer will have to depute his representative to discuss with officer(s) of the department as and when so desired. In case, in the opinion of the department a tenderer is taking undue long time in furnishing the desired clarifications, his price bid/tender will be rejected without making any reference.
3.0 Terms of Payments
3.1 The following percentage of contract rates for the various items included in the contract shall be payable against the stage of work shown herein.

Stage of Work	Payment
Supplying	70.00%
Installation	20.00%
Testing & Commissioning	10.00%

4.0 GUARANTEE
4.1 All equipments shall be guaranteed for a period of 12 months, from the date of taking over the installation by the department, against unsatisfactory performance and/ or break down due to defective design, workmanship or material. The equipments or components, or any part thereof, so found defective during guarantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of the Engineer-In-charge. In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor. The decision of the Engineer-In-charge in this regard shall be final & binding on the contractor.
4.2 The tenderer shall guarantee among other things, the following : (a) Quality, strength and performance of the material used as per manufacturers' standards. (b) Safe mechanical and electrical stress on all parts under all specified conditions of operation. (c) Satisfactory operation during the maintenance period.
5.0 Rates:
5.1 The rates quoted by the tenderer, shall be firm and inclusive of all taxes (including GST & labour cess), duties levied, octroi etc. and all charges for packing forwarding, insurance, freight and delivery, installation, testing, etc. at site including temporary construction of storage, risks, over head charges, general liabilities/obligations.
5.2 The department will not issue octroi exemption certificate.
6.0 COMPLETENESS OF TENDER: All sundry equipment, fittings, unit assemblies, accessories, hardware items, foundation bolts, minor painting, termination lugs for electrical connections, and all other items which are useful and necessary for efficient assembly and installation of equipment and components of the work shall be deemed to have been included in the tender irrespective of the fact whether such items are specially mentioned in the tender documents or not.
7.0 STORAGE AND CUSTODY OF MATERIAL: The agency has to make his own arrangements for storage. No separate storage accommodation shall be provided by the department. Watch and ward of the stores and their safe custody shall be the responsibility of the contractor till the final taking over of the installation by the department /Client.
8.0 CARE OF THE BUILDING: Care shall be taken by the contractor while handling and installing the various equipment and components of the work to avoid damage to the building. He shall be responsible for repairing all damages and restoring the same to their original finish at his cost. He shall also remove at his cost all unwanted and waste material arising out of the installation from the site of work.
9.0 COMPLETION PERIOD:
9.1 The completion period mentioned in the tender documents is for the entire work of planning, designing, approval of drawings etc., arrangement of materials & equipments, delivery at site including transportation, installation, testing, commissioning and handing over of the entire system to the satisfaction of the Engineer-in-Charge.
9.2 The Contractor shall be responsible for handing over the Inventory of entire system in operational to the Client to the satisfaction of the Engineer-in-Charge before recording of completion Certificate & making the final payment.

10.0 ACCEPTABLE MAKES OF VARIOUS EQUIPMENTS:

The acceptable makes of various equipments / components / accessories have been indicated in item itself or as per approve make list. The tenderer shall work out the cost of the offer on this basis. Makes of the items which are not covered in the list of acceptable makes shall be got approved from the Engineer-in-Charge and shall conform to relevant Indian Standard as applicable.

11.0 EXTENT OF WORK

11.1 The work shall comprise of entire labour including supervision and all materials necessary to make a complete installation and such tests and adjustments and commissioning as may be required by the department. The term complete installation shall not only mean major items of the plant and equipments covered by specifications but also all incidental sundry components necessary for complete execution and satisfactory performance of installation with all layout charts whether or not those have been mentioned in details in the tender document in connection with this contract.

11.2 All debris/Malba resulting due to work shall be removed on daily basis and completion of the work shall only be accepted after the site has been cleaned of from all malba. In case contractor fails to comply, the same shall be got removed by the other agency at the cost of the contractor payment which shall be recovered from the bill of the contractor.

11.3 Contractor shall be bound to execute such additional items which can be termed as logical, essential and necessary (even though not listed in schedule of work) for the effective execution of the work in totality; rates for such items of work shall be rationally analyzed/derived and would be binding on the contractor.

12.0 INSPECTION AND TESTING

12.1 Equipments i.e. Transformers shall be offered for initial inspection at manufacturers works. The contractor will intimate the date of testing of equipments at the manufacturer's works before dispatch. The successful tenderer shall give advance notice of minimum two weeks regarding the dates proposed for such tests to t he department's representative to facilitate his presence during testing. The Engineer-In-charge may witness such testing. The cost of the Engineer's visit to the factory will be borne by the department. Equipments will be inspected at the manufacturer/ Authorized Dealers premises, before dispatch to the site by the contractor if so desired by the 37 Engineer-In-charge. However, Inspection may be waived off as per discretion of Engineer-In-Charge.

12.2 Copies of all documents of routine and type test certificate of the equipment, carried out at the manufacturers premises shall be furnished to the Engineer-In-charge and consignee.

12.3 After completion of the work in all respect the contractor shall offer the installation for testing and operation.

12.4 After completion of the installation, the same shall be offered for inspection by the representatives of the Central Electricity Authority/ Local bodies. The contractor will extend all help including testing facilities to the representatives of CEA. The observations of CEA will be attended by the contractor. The installation will be commissioned only after getting clearance from CEA.

12.5 Adequate care to ensure that only tested and genuine materials of proper quality are used in work shall be ensured by firm. The firm shall ensure that:

(i) Material will be ordered & delivered at site only with the prior approval of the Engineer- In-Charge to ensure timely delivery.

(ii) As and when the order is placed for the material , its copy shall be endorsed to the ITPO Engineer-in-Charge.

(iii) The firm will be required to procure material directly from the manufacturer/authorized dealers to ensure genuineness & quality and as per the approved makes only. Proof in this regard shall be submitted by the contractor if required by the department.

(iv) The contractor shall provide all necessary facilities for inspection of equipment. The contractor shall also furnish the routine test certificates for the materials /equipment /accessories to be used in this work to the satisfaction of Engineer-in-charge.

13. COMPLIANCE WITH REGULATIONS AND INDIAN STANDARDS :

13.1 All works shall be carried out in accordance with relevant regulation both statutory and those specified by the Indian Standards related to the works covered by this specification. In particular, the equipment and installation will comply with the following acts & rules:

(i) Factories Act.

(ii) Indian Electricity Rules.

(iii) B.I.S. & other standards as applicable.

(iv) Workmen's compensation Act.

(v) Statutory norms prescribed by local bodies like CEA, Power Supply Co., CFO etc.

(vi) All components shall conform to relevant Indian standard specifications wherever existing. Materials with ISI certification mark shall be preferred.

13.2 Nothing in this specification shall be construed to relieve the successful tenderer of his responsibility for the design, manufacture and installation of the equipment with all accessories in accordance with currently applicable statutory regulations and safety codes.

13.3 Successful tenderer shall arrange for compliance with statutory provisions of safety regulations and departmental requirements of safety codes in respect of labour employed on the work by the tenderer. Failure to provide such safety requirements would make the tenderer liable for penalty of

Rs.5000/- for each default. In addition, the department will be at liberty to make arrangement for the safety requirements at the cost of tenderer and recover the cost thereof from him.

14.0 INDEMNITY : The successful tenderer shall at all times indemnify the department, consequent on this works contract. The successful tenderer shall be liable in accordance with the Indian Law and Regulations for any accident occurring due to any cause and the contractor shall be responsible for any accident or damage incurred or claims arising thereoff during the period of erection, construction and putting into operation the equipments and ancillary equipments under the supervision of the successful tenderer in so far as the latter is responsible. The successful tenderer shall also provide all insurance including third party insurance as may be necessary to cover the risk. No extra payment would be made to the successful tenderer on account of the above.

15.0 ERECTION TOOLS : No tools and tackles either for unloading or for shifting the equipments for erection purposes would be made available by the department. The successful tenderer shall make his own arrangement for all these facilities.

16.0 INSURANCE AND STORAGE : All consignments are to be duly insured up to the destination from warehouse at the cost of the contractor. The insurance covers shall be valid till the equipment is handed over, duly installed, tested and commissioned.

17.0 MAINTENANCE : 17.1 Sufficient trained and experienced staff & Engineer shall be made available to meet any exigency of work during the guarantee/defect liability period of five years from the date of handing over of the installation.

18.0 Testing and commissioning of complete installation as per CPWD specifications and to the satisfaction of the Engineer in charge.

19.0 All tools and tackles required for handling of equipments and materials at site of work as well as for their assembly and erection and also necessary test instruments shall be the responsibility of the Contractor.

20.0 Watch and ward of the materials shall be the responsibility of the contractor till their handing over to the department on completion of the work.

21.0 All materials shall be supplied and used in items of works by the Contractor should be of standard and approved quality. They should be got approved from the Engineer-in-Charge before installation otherwise no payment will be made for an unapproved material used on the work and will be removed at their risk & cost.

22.0 The firm should deploy his Engineer in the relevant field at the site till the completion of work. Persons executing the work should be experienced and responsible to execute the work.

23.0 Extreme care and precautions are to be taken while carrying out the work. In case of any incident due to negligence of the staff/ technician, the contractor shall be held responsible and liable to pay all the expenses and compensation.

24.0 The whole installation complete in working condition shall be handed over to the department after successful completion of work. Any damage done to the equipment partially or wholly shall be set right by the contractor. Nothing extra shall be payable. The firm should submit the name of the persons or workers to be deployed at site for the execution of the work for getting permission from the competent authority.

25.0 The agency/ firm is required to submit documentary evidence such as delivery challan/ bill for purchase of material from authorized dealer/ manufacturer of the material for ascertaining genuineness of material if required by the department.

FORCE MAJEURE

1) The Parties shall not be liable for any failure to perform, any of its obligations under this Agreement if the performance is prevented, hindered or delayed by a Force Majeure event (defined below) and in such case its obligations shall be suspended for so long as the Force Majeure Event continues. Each party shall promptly inform the other of the existence of a Force Majeure Event and shall consult together to find a mutually acceptable solution. "Force Majeure Event" means any event due to any cause beyond the reasonable control of the Party, including, without limitation, unavailability of any communication system, sabotage, fire, flood, explosion, acts of God, civil commotion, , riots, insurrection, war or acts of government.

"Force Majeure Event" means any event due to any cause beyond the reasonable control of the Party, including, without limitation, unavailability of any communication system, sabotage, fire, flood, explosion, acts of God, civil commotion, , riots, insurrection, war or acts of government.

Safety Guidelines for Preventive measures in the wake of Covid-19.

The agency will take the following effective necessary measures to prevent spread of COVID-19 epidemic and will implement various measures issued by government time to time at their **own cost** while carrying out different services at Pragati Maidan:-

1. Physical distancing of at least 6 feet to be followed as far as feasible.
2. Use of face covers/ masks to be mandatory.
3. Frequent hand washing with soap (for at least 40-60 seconds) even when hands are not visibly dirty. Use of alcohol based hand sanitizers can be made wherever feasible.
4. Spitting shall be strictly prohibited and if found shall be fined as per ITPO norms.
5. The furniture and other surfaces (frequently touched or otherwise) brought by the agency need to be wiped with disinfectant regularly.
6. While transporting the prefabricated materials to Pragati Maidan or back to warehouse, the agency must ensure to sanitize the delivery vehicle and all materials before loading & try to avoid unnecessary stopover during transit.
7. Driver and other personnel involved in transportation of material must ensure social distancing and wear all necessary PPE.
8. Ensure contactless transportation of materials to the exhibition ground.
9. Ensure all work to be carried out at site with maintaining social distancing as far as feasible.
10. Any structure/ stall fabricated by the agency at site must be sanitized before dismantling.
11. The agency will engage the entire worker whose temperature is not normal and if in case a person falls sick, they must report to the First Aid Desk/ nearby hospital immediately.

Senior Manager(Elect.)