



**Bharat Heavy Electricals Limited, Bhopal**  
*Transformer Engineering Department*

Tender Enquiry No. E02140601

Dated : 15-12-2021

To,

**Subject: TENDER ENQUIRY “TO CONDUCT SHORT CIRCUIT TEST ON 1 No. 275 MVA, 21/420/ $\sqrt{3}$  KV, 1-PHASE, GENERATOR TRANSFORMER”.**

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Dear Sir,

We are manufacturing 275 MVA, 21/420/ $\sqrt{3}$  KV, 1-phase, Generator Transformer for M/s UPRVUNL, Panki in which short circuit test is to be conducted.

We invite your quotation for “Conducting Short Circuit Test” on the above-mentioned transformer at your test lab.

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**A. SCOPE OF WORK**

1. The scope of test is as per attached Annexure -A
2. Technical specification is as per attached Annexure-B

**B. GENERAL TERMS & CONDITIONS OF ENQUIRY**

1. Offer shall be sent through courier having 2 different envelopes put in 1 outer envelope as mentioned below:
  - **First Part** – It must contain only the technical offer and commercial terms and conditions (but without price i.e. unpriced offer). If price is indicated in this part, then offer is liable to be rejected.
  - **Second Part** – It must contain the actual price and price breakup (i.e. price bid), **Total Price must be indicated in figures and words both and in case any ambiguity between the figures and words, words shall prevail.**
  - **Both these parts shall be duly signed by authorized representative of the bidder.**
2. BHEL expects that the bidder must respond to the enquiry. Regret letter, for not participating in the tender will be submitted where the bidder is unable to submit offer. Repeated lack of response on the part of vendor may lead to his deletion from BHEL's approved vendor list.



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### **3. Pricing Terms**

Prices once quoted shall remain firm within the validity or any extension thereof for placement of order, till complete execution of the order, without any escalation / increase for any reason, whatsoever, unless specifically provided for in the Enquiry & PO.

### **4. Terms of Payment**

Payment shall be released by BHEL normally within 90 days by electronic-pay mode on submission of invoice for the work after completion of work.

### **5. Taxes and Duties**

All taxes/bank charges as per statutory requirement in the country of bidder shall be borne by the bidder. Income tax as applicable shall be deducted during final settlement of bill. TDS will be deducted from contractors Bill both under Income Tax Act and GST Act.

Necessary tax deduction at source from supplier's bill will be made as per statutory requirements. Tax if applicable shall be paid extra. Any new tax introduced in future shall be considered as applicable. Any loss of tax credit to BHEL due to the reason attributable to the contractor will be recovered from them along with interest

- a) Wherever bidders are required to supply services at project site Party has to submit GST registration no. of the State in which project site is located along with copy of registration certificate at the time of submission of Bid. In case the same is not available at the time of submission of bid, the contractor has to give an undertaking that the same will be arranged before award of work order
- b) HSN Code/SAC, rate of tax under GST and applicable GST (IGSTCGST/SGST/UTGST) and GSTIN shall be clearly mentioned by the Bidder
- c) GST portion of the invoice shall be released only upon: -
  1. All invoices raised by contractors/vendors must be GST compliant Tax invoices as per GST invoice rules.
  2. Contractor declaring such invoice in his GSTR-1 or any modified return as notified by government
  3. Receipt of goods/services and Tax Invoice by BHEL and
  4. Confirmation of payment of GST thereon by contractor on GSTN portal
  5. Alternatively, Contractor has to submit BG of appropriate value which shall be valid at least one month after the confirmation of date of payment of GST by contractor on GSTN portal and receipt of Tax invoice and receipt of services, whichever is later. Contractor has to give an undertaking in this regard
  6. Contractor has to give an undertaking to BHEL that they have declared invoice in his return and paying GST within timeline prescribed for availing ITC by BHEL
- d) Payment to Contractor for GST portion will be released only after completion of above activity and on availment of ITC by BHEL
- e) In case GST credit is delayed/denied to BHEL due to non/delayed receipt of services/goods and/or tax invoice or expiry of the timeline prescribed in GST Law for availing such ITC, or



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any other reasons not attributable to BHEL, GST amount shall be recoverable from the contractor along with interest levied/ leviable on BHEL

- f) Tax Deduction at source (TDS) as per extant provisions of the Income Tax Act and GST Act shall be deducted from supplier/contractor bill.
- 6. The offer shall be evaluated on the basis of total delivered cost of entire package to BHEL (including all the activities starting from sending transformer from BHEL works & receiving back transformer to BHEL works & completion of all activities related to Short Circuit at BHEL works till certification) which shall include foreign currency conversion rate on the date of technical bid opening.
- 7. In case of any deviation, the same may be clearly mentioned in the offer and checklist to be filled in by the bidder.

### **8. Variation of orders**

No variation to the Engineering Order is permitted unless authorized in writing and signed by or on behalf of purchase executive, BHEL Bhopal.

### **9. Secrecy Clause**

Bidder should not divulge any technical document/ information of BHEL to any third party without prior written permission of BHEL. Further no publications/ patent to be taken from above work without prior written permission of BHEL.

### **10. Arbitration:**

Any disputes arising out at any stage of execution of the work to be mutually discussed and settled. Any Arbitration shall be conducted in accordance with the provisions of the Indian Arbitration and Reconciliation Act, 1996 with latest amendments.

The arbitration proceedings shall be held in Bhopal.

### **11. Right of rejection/Non-placement of PO:**

BHEL reserves the right to accept the offers in part or in full, cancel the Tender Enquiry or short close the contract without assigning any reason.

### **12. THE BHEL CONCILIATION SCHEME:**

The Parties agree that if at any time (whether before, during or after the arbitral or judicial proceedings), any Disputes (which term shall mean and include any dispute, difference, question or disagreement arising in connection with construction, meaning, operation, effect, interpretation or breach of the agreement, contract or the Memorandum of Understanding (delete whichever is inapplicable), which the Parties are unable to settle mutually), arise inter-se the Parties, the same may, be referred by either party to Conciliation to be conducted through Independent Experts Committee to be appointed by competent authority of BHEL from the BHEL Panel of Conciliators.

#### **Notes:**

- (i) No serving or a retired employee of BHEL/Administrative Ministry of BHEL shall be included in the BHEL Panel of Conciliators.



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(ii) Any other person(s) can be appointed as Conciliator(s) who is/are mutually agreeable to both the parties from outside the BHEL Panel of Conciliators.

The proceedings of Conciliation shall broadly be governed by Part-III of the Arbitration and Conciliation Act 1996 or any statutory modification thereof and as provided in BRIEF PROCEDURE FOR CONDUCT OF CONCILIATION PROCEEDINGS.

### **13. OVERWRITING IN THE PRICE BID**

Bid should be free from correction, overwriting, using corrective fluid etc. Any interlineation, cutting erasure or overwriting shall be valid only if they are attested under full signature(s) of person(s) signing the bid else bid shall be liable for the rejection.

### **14. DISCREPANCY IN WORDS & FIGURES - QUOTED IN THE PRICE BID**

(a) If, in the price structure quoted for the required goods! services! works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.

(b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

(c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject of (a) and (b) above.

(d) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the purchaser, the bid is liable to be ignored.

### **15. EVALUATION IN CASE OF MORE THAN ONE L-1 BIDDER**

In the course of evaluation, if more than one bidder happens to occupy L-1 status, effective L-1 will be decided by soliciting discounts from the respective L-1 bidders.

In case more than one bidder happens to occupy the L1 status even after soliciting discounts, the L-1 bidder shall be decided by a toss / draw of lots, in the presence of the respective L-1 bidder(s) or their representative(s)-

Ranking will be done accordingly. BHEL's decision in such situations shall be final and binding.

### **16. RISK AND COST**

If the work is not executed or partly executed within the agreed execution period, BHEL reserves the right to cancel the order and get the executed from alternate source(s) at the Risk and Cost of Contractor. In such an even, it shall be obligatory on the part of contractor to make good any loss suffered by BHEL.



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#### **17. FORCE MAJEURE**

“Notwithstanding anything contained in the contract, neither BHEL nor the Contractor shall be held responsible for total or partial non-execution of any of the contractual obligations, should the obligation become unreasonably onerous or impossible due to occurrence of a 'Force Majeure' which directly affects the obligations to be performed by the BHEL or the contractor; Such events include war, military operations of any nature, blockages, revolutions, insurrections, riots, civil commotions, insurgency, sabotage, acts of public enemy, fires, explosion, epidemics, quarantine restrictions, floods, earthquake, or acts of God, restrictions by Govt. authorities; over which the BHEL or the contractor has no control.

The party claiming to be affected by force majeure shall notify the other party in writing without delay, within two weeks from the occurrence of such situation and on the cessation thereof. Extension of time sought by the contractor along with supporting evidence and so granted by BHEL for the work affected, if any, shall not be construed as waiver in respect of remaining execution. Rescheduling of execution on account of force majeure conditions, if so agreed by BHEL, will not entail the contractor to claim any increase in the price on whatsoever account.

Notwithstanding above provisions, BHEL shall reserve the right to cancel the Contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements. If deemed necessary, BHEL may takeover partly processed work at a mutually agreed price”

#### **18. INTEGRITY PACT**

Bidder shall submit integrity pact duly signed by its authorized signatory (Format for the same is attached).

#### **19. MSME BENEFIT APPLICABILITY**

Bidder shall submit the all the necessary registration certificates in case of applicability of MSME benefits.

#### **20. DECLARATION REQUIRED BY FOREIGN BIDDERS**

Foreign bidders to submit declaration of Permanent Establishment and business connection (PEBC) for remittances purpose. Declaration to be submitted in formats either in Annexure A or B whichever is applicable as per their transaction entered into with BHEL.

In the absence of certificates from the bidders, withholding tax at applicable rates along with surcharge and cess will be recovered at the time of remittance to the bidder.

Foreign bidders to submit Tax Residency Certificate (TRC) & Form 10F (for obtaining DTAA benefits) as per Annexure C in respect of services. The TRC (tax residency certificate) is to be issued by the authorities of the government of bidder's country. If the informative part of the format (other than residency) is not furnished by the authorities, the same may be furnished by the bidder as a declaration.”

#### **20. PRICE BID FORMAT**

Bidders to submit the price bid in given price bid format.



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**C. ADDRESS FOR SENDING OFFERS**

**3.** Offer may be sent in sealed envelope to following address:

In Charge,  
Works Contract (GREEN BOX),  
MM Tender Room  
BHEL Administrative Building, GF  
BHEL Piplani, Bhopal (India) 462022

**Before tender due date 10<sup>th</sup> Jan. 2022 (Monday) & time 11am, clearly super scribing the  
Tender Enquiry No. & Subject on the top of envelope.**

**4. The quotation thus received shall be opened on the same day i.e. 10<sup>th</sup> Jan. 2022 at 2 pm.**

Thanking you.

(Kamlesh Agrawal)  
Manager (TRE)  
BHEL, BHOPAL, INDIA



**Bharat Heavy Electricals Limited, Bhopal**  
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**CHECKLIST FOR SCOPE OF WORK (Annexure-A)**

Note: Bidder shall fill in the following details and no column should be left blank

1	Name & address of the bidder Fax / Email address		
2	Name & designation of the official of the tenderer to whom all the references shall be made.		
3	Bidder's proposal No. & date		
		YES	NO
4	Sl. No. 4.1		
	Sl. No. 4.2		
	Sl. No. 4.3		
	Sl. No. 4.4		
	Sl. No. 4.5		
	Sl. No. 4.6		
	Sl. No. 4.7		
	Sl. No. 4.8		
	Sl. No. 4.9		
	Sl. No. 4.10		
	Sl. No. 4.11		
5	Sl. No. 5.0		
6	Sl. No. 6.0		
7	Sl. No. 7.0		
8	Sl. No. 8.0		
9	Sl. No. 9.0		
10	Sl. No. 10.0		
11	Sl. No. 11.0		
12	Sl. No. 12.0		
13	Sl. No. 13.0		
14	Sl. No. 14.0		
15	Sl. No. 15.0		



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**CHECKLIST FOR GENERAL TERMS & CONDITIONS OF ENQUIRY**

Note: Bidder shall fill in the following details and no column should be left blank

1	Name & address of the bidder Fax / Email address		
2	Name & designation of the official of the tenderer to whom all the references shall be made		
3	Bidder's proposal No. & date		
		YES	NO
4	Sl. No. 3		
5	Sl. No. 4		
6	Sl. No. 5		
7	Sl. No. 6		
8	Sl. No. 7		
9	Sl. No. 8		
10	Sl. No. 9		
11	Sl. No. 10		
12	Sl. No. 11		
13	Sl. No. 12		
14	Sl. No. 13		
15	Sl. No. 14		
16	Sl. No. 15		
17	Sl. No. 16		
18	Sl. No. 17		
19	Sl. No. 18		
20	Sl. No. 19		
21	Sl. No. 20		
22	Sl. No. 21		

## **INTEGRITY PACT**

### **Between**

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi - 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

**and**

\_\_\_\_\_, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

### **Preamble**

The Principal intends to award, under laid-down organizational procedures, contract/s for

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\_\_\_\_\_. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

### **Section 1- Commitments of the Principal**

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/ additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions:

**Section 2 - Commitments of the Bidder(s)/ Contractor(s)**

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he/ she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant Indian Penal Code (IPC) and Prevention of Corruption Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 Foreign Bidder(s)/ Contractor(s) shall disclose the name and address of agents and representatives in India and Indian Bidder(s)/ Contractor(s) to disclose their foreign principals or associates. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

2.3 The Bidder(s)/ Contractor(s) shall not approach the Courts while representing the matters to IEMs and will await their decision in the matter.

**Section 3 - Disqualification from tender process and exclusion from future contracts**

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

**Section 4 - Compensation for Damages**

4.1 If the Principal has disqualified the Bidder from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to

demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher.

### **Section 5 - Previous Transgression**

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.
- 5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

### **Section 6 - Equal treatment of all Bidders/ Contractors / Sub-contractors**

- 6.1 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors. In case of sub-contracting, the Principal contractor shall be responsible for the adoption of IP by his sub-contractors and shall continue to remain responsible for any default by his sub-contractors.
- 6.2 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

### **Section 7 - Criminal Charges against violating Bidders/ Contractors /Subcontractors**

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

### **Section 8 - Independent External Monitor(s)**

- 8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.
- 8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.
- 8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality in line with Non- disclosure agreement.
- 8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

- 8.5 The role of IEMs is advisory, would not be legally binding and it is restricted to resolving issues raised by an intending bidder regarding any aspect of the tender which allegedly restricts competition or bias towards some bidders. At the same time, it must be understood that IEMs are not consultants to the Management. Their role is independent in nature and the advice once tendered would not be subject to review at the request of the organization.
- 8.6 For ensuring the desired transparency and objectivity in dealing with the complaints arising out of any tendering process, the matter should be examined by the full panel of IEMs jointly as far as possible, who would look into the records, conduct an investigation, and submit their joint recommendations to the Management.
- 8.7 The IEMs would examine all complaints received by them and give their recommendations/ views to CMD, BHEL, at the earliest. They may also send their report directly to the CVO and the Commission, in case of suspicion of serious irregularities requiring legal/ administrative action. IEMs will tender their advice on the complaints within 10 days as far as possible.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.
- 8.9 IEM should examine the process integrity, they are not expected to concern themselves with fixing of responsibility of officers. Complaints alleging mala fide on the part of any officer of the organization should be looked into by the CVO of the concerned organisation.
- 8.10 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant Indian Penal Code/ Prevention of Corruption Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.
- 8.12 The word 'Monitor' would include both singular and plural.

### **Section 9 - Pact Duration**

- 9.1 This Pact shall be operative from the date IP is signed by both the parties till the final completion of contract for successful bidder and for all other bidders 6 months after the contract has been awarded. Issues like warranty / guarantee etc. should be outside the purview of IEMs.
- 9.2 If any claim is made/ lodged during currency of IP, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/ determined by the CMD, BHEL.

### **Section 10 - Other Provisions**

- 10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders / contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

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For & On behalf of the Principal

(Office Seal)

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For & On behalf of the Bidder/

Contractor

(Office Seal)

Place-----

Date-----

Witness:\_\_\_\_\_

(Name & Address) \_\_\_\_\_

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Witness:\_\_\_\_\_

(Name & Address) \_\_\_\_\_

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## PRICE BID FORMAT

Tender Enquiry No.:

Rating of Transformer:

Name of Test:

S. No.	Description	Charges
1	SC Test Charges	
2	Inspection Charges	
3	Other charges if any	

**BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL**  
**TRANSFORMER ENGINEERING DEPARTMENT**

FORM NO: TRE-2003A

Sht 1 of 2 sheets

ANNEXURE TO INDENT-CUM-ENQUIRY - **E02140601**

DTD.: -

DESCRIPTION OF EQUIPMENT : SHORT CIRCUIT TEST ON 275 MVA, 21/420 kV, 1-Ph,  
 GENERATOR TRANSFORMER.

WORK ORDER NO. : **66025-A-512-01**

CUSTOMER : M/s UPRVUNL, Panki

**SPECIFICATION OF SHORT CIRCUIT TESTING OF TRANSFORMER**

- 1 This specification calls for short circuit testing of Power Transformer as per IEC: 60076-5:2006 having technical particulars as per Annexure 'B'.
2. Transformer shall be assembled to our OGA drawing no. 34520001145 (Project drg. no. BP-DG-423-301-0001) enclosed herewith, however cooling equipments & associated fittings as per OGA part list shall not be assembled during this test.
3. The transformer shall be tested for short circuit between HV-LV pair by applying 3 shots on HV terminal with LV terminals pre-shorted i.e one at maximum tap position, one at normal tap position & one at minimum tap position.  
 Bidder to submit the complete procedure for testing alongwith the offer including values of currents, duration of each shot, test arrangement & justification for each value chosen and also how the effect of system impedance shall be taken into consideration.
4. Scope of work: Bidder to cover the following in their scope of work & if necessary in collaboration with other agencies for part of work normally not performed by them.
  - 4.1 Unloading of transformer at nearest sea-port (if applicable).
  - 4.2 Transportation upto test laboratory.
  - 4.3 Transportation upto test bed.
  - 4.4 Arranging crane, crane operator etc for mounting bushings, turrets, pipework, conservator & other fittings. **Charges for the same are to be quoted by bidder on per hour or per day basis** specifying constraints, limitations if any. Number of working hours considered in a day with time applicable. **Additional charges (if any) for providing above facilities after normal working hours & on weekly off days to be clearly spelt out.**  
 This facility shall also be required after Short Circuit testing for dismantling the fittings.
  - 4.5 Arranging of **processed oil as per IEC 600296** suitable for filling in Transformer tank. The oil should **specifically comply the following requirements** in addition to IEC:  
**BDV ≥ 70 kV, ppm ≤ 5, Tan delta at 90°C: 0.002(max.)**  
 Total oil quantity required: 60000 litres approx.  
 The offer should also include charges **for disposal/ processing** in case oil parameter exceeds the limit of IEC: 600296 after completion of test.
  - 4.6 Arranging vacuum pump, oil filtration plant etc for processing of transformer. The processing of transformer shall include the following activities:
    - 4.6.1 Vacuum pulling & holding vacuum for 72 hours approx.
    - 4.6.2 Oil filling under vacuum at the rate of 3500-4500 LPH.
    - 4.6.3 Oil circulation for 45 hours approx. (Approx. 3 complete circulation of oil)  
 The above process shall be continuous without any break & therefore may include weekly-off days depending on the day the process is started. **Bidder to furnish the charges of complete processing on lump sum basis. Bidder is also required to quote charges for additional working hours on per hour basis if the above process could not be completed in the mentioned duration** due to oil parameters after circulation not meeting the desired parameters.
    - 4.6.4 Draining of oil after completion of test.

**BHARAT HEAVY ELECTRICALS LIMITED, BHOPAL**  
**TRANSFORMER ENGINEERING DEPARTMENT**

FORM NO: TRE-2003A

Sht 2 of 2 sheets

ANNEXURE TO INDENT-CUM-ENQUIRY -

WORK ORDER NO.

: **66025-A-512-01**

**4.7 Performance of Short Circuit Test including all LV tests (as listed below) before & after SC Test.**

*(If breakup cost is not given, and if repetition of these tests are required then it shall be considered that the cost of same has been built-in the Short Circuit test charges)*

- 4.7.1 Measurement of capacitance and tan δ of windings and HV bushing.
- 4.7.2-DGA
- 4.7.3-Measurement of Transformation ratio at all taps
- 4.7.4-Measurement of resistance of HV winding at max, min & rated taps & full winding of LV
- 4.7.5-Measurement of insulation resistance
- 4.7.6-Measurement of Magnetizing current at low voltage
- 4.7.7-Measurement of oil parameters e.g. **BDV, PPM (shall be conducted 3 times).**
- 4.7.8-SFRA Test

4.8 Transportation upto nearest seaport & loading on ship.

4.9 Inspector charges for carrying out inspection at works.

4.10 Submission of test report in 2 copies, which shall include all the tests (S.C. test, low voltage test, inspection report etc. alongwith calibration certificate of testing equipments). After successful completion of test & inspection of the transformer at our works, test certificate declaring the successful passing of S.C. test to be furnished.

4.11 Time sheet for each activity on hour/per day basis shall be prepared & duly signed by lab or its collaborator & BHEL. This shall be furnished alongwith invoice at the time of final settlement of bills.

**5.0 Short circuit test shall be continued till the following conditions are met –**

- (i) Variation of Short Circuit reactance is within 2% after each shot &**
- (ii) Current and Voltage wave shapes are sustained for entire test cycle of 0.25 second.**

**6.0 Any other observations during Short Circuit testing i.e. PRD, wave shape, DGA etc shall be dealt with as per the provisions laid down in IEC 60076-5 without interrupting the test schedule.**

**7.0 Termination of Short Circuit test to be mutually agreed between Testing laboratory and BHEL.**

8.0 All the test and measuring instruments employed in the Short Circuit Testing should have been calibrated and calibration certificates made available to BHEL or its end customer whenever required.

9.0 Bidder may also quote the other miscellaneous charges required for satisfactory completion of testing eg. Assembly hall, photograph, N2 cylinder & custom clearance.

10.0 The bidder to confirm that in case of unforeseen circumstances like accident, transportation delay etc. the scheduled test dates may have to be cancelled/deferred.

11.0 Bidder to submit the details about the laboratory & list of transformer tested therein for Short Circuit test.

12.0 Bidder should allow test witness by purchaser's representatives.

13.0 Bidder to furnish complete techno-commercial offer and a specific point wise response to each of the clauses of this indent. Any offer not responding to any of the clauses may be ignored without any explanation.

14.0 Our staff will be at test laboratory for assembly, dismantling, witnessing of test etc. of the transformer. Suitable office accommodation to be provided for them during their stay.

**ANNEXURE 'B'**

**TECHNICAL PARAMETERS**

<b><u>SL. NO.</u></b>	<b><u>ITEM</u></b>	<b><u>DETAILS</u></b>
1.	Type of cooling	OFAF
2.	Continuous rating (MVA)	
	(a) HV	275
	(b) LV	275
3.	Rated Voltage (KV)	
	(a) HV at principal tap	420/V3
	(b) LV	21
4.	Rated frequency (Hz)	50
5.	No. of Phases	1
6.	Connections	
	(a) HV	STAR
	(b) LV	DELTA
7.	Connection symbol	YNd11 (IN BANK)
8.	Line current at rated no load voltage and on principal tap (Amps).	
	(a) HV	1193.77
	(b) LV	13095.24
9.	Terminal arrangement:	
	(a) HV side	OIL-AIR BUSHING
	(b) LV side	OIL-AIR BUSHINGS
	(c) Neutral	OIL-AIR BUSHING
10.	Test voltage for HV/LV windings	
	(a) Lightning impulse withstand test voltage (kVp)	
	HV	1425 (FW), 1570 (CW)
	LV	170 (FW), 187 (CW)
	HVN	95 (FW)
	(b) Switching Impulse (kVp) HV	1175
	(c) Power frequency withstand test voltage HV/LV(1-min.)	630/70 kVrms
	(d) Separate source on HV/LV (KV rms)	38/70
11.	Type of Tap changer	OFF CIRCUIT
12.	Tap Changer on winding	HV winding
13.	Tapping's on <b>HV winding</b> for regulations:	
	(a) Step voltage & steps	±2 x 2.5%
	(b) Plus and minus range of variation	+5% to -5%

14. Positive sequence impedance on 275 MVA base at rated current and frequency at 75°C winding temperature :

	Normal Tap (Tap 3)		Maximum Tap (Tap 1)		Minimum Tap (Tap 5)	
	Guaranteed	Calculated	Guaranteed	Calculated	Guaranteed	Calculated
HV-LV	16.0% $\pm$ 7.5% Tol.	16.5 $\pm$ 3% Tol.	15.0% (approx.)	15.0% $\pm$ 3% Tol.	18.5% (approx.)	18.5 $\pm$ 3% Tol.

15. Apparent fault level (MVA)  
HV (50 kA for 1 sec) (Um = 420 kV) 36373

16. Category III

17. Approximate mass with oil without cooling system(kg) 257000

18. Approximate volume of oil to be filled during testing (L) 60000

19. Approximate mass without oil without cooling system(kg) 205000

20. Un-tanking weight (kg) 15800

21. Approximate shipping dimensions (L x W x H) (mm) 6150 x 4770 x 4870 mm

22. Approximate height with bushings (From rail level) (mm) 10065

Outline General Arrangement (OGA) drawing no. 34520001145, Rev.05 is attached.

BHARAT HEAVY ELECTRICALS LTD.

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DRG. NO. 3452

107 106 105 104 103

REV 05 DATE 08.10.21 ALT CKD LK RAKESH CKD APPD LK/K.A. CKD APP

ZONE DRG. UPDATED INLINE WITH MANUFACTURING DRAWING, LOCATION OF DGA (IT.213) SHOWN

ZONE DRG. UPDATED DRAWING & MK IT. 216 & 216a APP

4115 1800 1610 3250 HV 1.1 R4200(MIN.) OF TRANSFORMER

8240±50 7255±50 860 1600

14f 80 14b 24 14g 109a 4 14f 100 1300 (JACK POINT) 1743 (ROLLER CENTER) 1300 (JACK POINT) 1743 (ROLLER CENTER)

SEE DETAIL-A

164 119a 12a 26 119 MK-53 14b MK-01 120 MK-58 122b MK-57 122 MK-02 LV 2.1 LV 2.2 MK-56 MK-03 MK-05 MK-06 190 123 62 14a 18d 86d 86c 50 14f 25a 003, 009 110 196 MK-08 123 160 161 125 17 14c 123 160 64 MK-09 14f 80 14b 24 14g 109a 4 14f 100 1300 (JACK POINT) 1743 (ROLLER CENTER) 1300 (JACK POINT) 1743 (ROLLER CENTER)

MK-NO. OF M

SUB ASSY. MK NO. MK-51 MK-52 MK-53 MK-55 MK-56

QTY. 001 001 001 001 001 001

MK-NO. OF M

SUB ASSY. MK NO. MK-51 MK-52 MK-53 MK-55 MK-56

QTY. 001 001 001 001 001 001

RAIL LEVEL

INVENTORY NO.	109												BHARAT RESEARCH TRIALS LTD BHOJPUR						
	REV	DATE	ALT	RAKESH	RAKESH	REV	DATE	ALT	RAKESH	RAKESH	NO. OF TRANSFORMER	4	ADDITIONAL INFORMATION						
A	02	04.06.20	CKD APPD	LK LK/K.A.	RAKESH	01	06.05.20	CKD APPD	LK LK/K.A.	RAKESH	PROJECT	1 X 660 MW - UPRUVNL PANKI TPS EXTN.	W.O. 66025-A-512-01	STATUS OF DRAWING	"U"	PEM DRG. NO.	BP-DG-426-301-0001		
	ZONE	NO CHANGE.				ZONE	DRAWING REVISED INLINE WITH CUSTOMER COMMENTS.				PO NO.	48/PPMM/SE-IV/PANKI EXTN. DATE: 31/03/18	DISTRIBUTION OF PRINTS		TITLE	OUTLINE GENERAL ARRANGEMENT ELEVATION-GT			
											TYPE OF PRODUCT	275 MVA, 21/420/3 KV, 1 PH, OFAF COOLED GT				DRAWING NO.			
											NAME OF CUSTOMER	M/S UPRUVNL	TRE-1,TRM-3			3 452 00 01145			
																SHEET 01 OF 04 REV. 05			

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Technical drawing of a large industrial equipment assembly, likely a gas turbine or compressor unit, showing front and side views with various components labeled and dimensioned. The drawing includes a legend for symbols like 'AIR FLOW' and 'C OF CMS'. A detailed table at the bottom provides specific data for the project, including revision history, project details, and customer information.

REV	DATE	ALT	RAKESH	Comments	REV	DATE	ALT	RAKESH	Comments	REV	DATE	ALT	RAKESH	Comments	
03	20.06.20	CKD	LK	Ques.	04	12.01.21	CKD	LK	Ques.	05	08.10.21	CKD	LK	Ques.	
		APPD	LK/K.A				APPD	LK/K.A				APPD	LK/K.A		
ZONE NO CHANGE.					ZONE DRG. UPDATED INLINE WITH MANUFACTURING DRAWING & MK NO ADDED.					ZONE DRG. UPDATED INLINE WITH MANUFACTURING DRAWING.					
					DRAWING REVISED INLINE WITH CUSTOMER COMMENTS.					LOCATION OF DGA (IT.213) SHOWN.					
A	REV	DATE	ALT	RAKESH	Comments	REV	DATE	ALT	RAKESH	Comments	REV	DATE	ALT	RAKESH	Comments
02	04.06.20	CKD	LK	Ques.	01	06.05.20	CKD	LK	Ques.	00	00.00.00	CKD	LK	Ques.	
		APPD	LK/K.A				APPD	LK/K.A				APPD	LK/K.A		
ZONE NO CHANGE.					NO. OF TRANSFORMER 4					ADDITIONAL INFORMATION					
ZONE DRAWING REVISED INLINE WITH CUSTOMER COMMENTS.					PROJECT 1 X 660 MW - UPRVNL PANKI TPS EXTN.					W.O.-66025-A-512-01					
					PO NO. 48/PPM/SE-IV/PANKI EXTN. DATE: 31/03/18					STATUS OF DRAWING "U"					
					TYPE OF PRODUCT 275 MVA, 21/420/3 KV, 1 PH, OFAF COOLED GT					DISTRIBUTION OF PRINTS					
					NAME OF CUSTOMER M/S UPRVNL					TRE-1,TRM-3					

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- 10 -

DETAIL-A

SEE DETAIL-B

7

1598

MK-51

12

10b

MK-66

149

14a

25a

40

3950

4770

MK-64

14a

122a

148

150

MK-65

MK-67

48

51

49

19

1500

1575 JACK POINT

1575 JACK POINT

25

14a

871.5

114

14

23

6340±100 (L.V. BUSHING)

5700±10

4870

5655±50 (N-BUSHING)

RAIL LEVEL

1575 JACK POINT

1575 JACK POINT

REV	DATE	ALT
04	12.01.21	CKD APPRO
ZONE	DRG. UPDATED IN DRAWINGS & MK N.	

### NOTES:-

- 1- WHEN THE TRANSFORMER IS WITH OIL, EITHER RESTING OR IN MOTION, 6-NOS. OF TWIN BI-DIRECTIONAL ROLLERS SHALL BE USED.
- 2- JACKING PADS (IT.19a) ARE SUITABLE FOR LIFTING TOP TANK ONLY. REMOVE ALL BUSHINGS, COOLERS, CONSERVATOR, ALL PIPE, MARSHALLING BOX, MOTOR DRIVE UNIT OF OCTC BEFORE LIFTING OF TOP TANK.
- 3- HV BUSHING IS A BOUGHT OUT ITEM & YET TO BE FINALIZED. SO, DIMENSIONS RELATED TO HV BUSHING MAY CHANGE DEPENDING UPON FINAL BUSHING DRAWING.
- 4- FOR CRITICAL DIMENSIONS, TOLERANCE ARE INDICATED AGAINST THE DIMENSIONS AND FOR OTHER DIMENSIONS, GENERAL TOLERANCE MAY BE TREATED AS  $\pm 3\%$  EXCEPT DIMENSION RELATED TO LV BUS DUCT.

4500										DRAWING & MK NO ADDED. IT. 216 & 216a ADDED.		BHARAT HEAVY ELECTRICALS LTD Bhopal										
INVENTORY NO.	REV	DATE	ALT	RAKESH	Ques	REV	DATE	ALT	RAKESH	Ques	NO. OF TRANSFORMER	4	ADDITIONAL INFORMATION		CODE DRG. NO.	BP-DG-426-301-0001						
	02	04.06.20	CKD APPD	LK LK/K.A	Ques	01	06.05.20	CKD APPD	LK LK/K.A	Ques	PROJECT	1 X 660 MW - UPRVUNL PANKI TPS EXTN.	W.O. NO.	66025-A-512-01	STATUS OF DRAWING	"U"	DISTRIBUTION OF PRINTS	DESIGNER	DR. RAKESH	DESIGNER	DR. RAKESH	17.06.19
ZONE	NO. CHANGE.	ZONE	DRAWING REVISED INLINE WITH CUSTOMER COMMENTS.										TYPE OF PRODUCT	275 MVA, 21/420/ $\sqrt{3}$ KV, 1 PH, OCAF COOLED GT	NAME OF CUSTOMER	M/S UPRVUNL	TRE-1, TRM-3	DEPT.	SCALE	DRAWING NO.	3 452 00 01145	
			308	307	306	305	304	303	302	301			DATE	04	DATE	05	DATE	03	DATE	04	DATE	05

D.R.G. NO. 3452 00 01145

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CUSTOMER'S REFERENCE DRAWING	
DESCRIPTION	DRAWING NO.
OUTLINE GENERAL ARRANGEMENT & PART LIST	3452 00 01145
LOADING GAUGE DIAGRAM	3452 00 01147
TWIN BIDIRECTIONAL ROLLER	3452 00 01148
VALVE SCHEDULE PLATE	3452 00 01149
GA DRAWING OF H.V. BUSHING	3452 00 01150
GA DRAWING OF L.V. BUSHING	3452 00 01152
GA DRAWING OF N.V. BUSHING	3452 00 01153
FOUNDATION PLAN	3452 00 01155
INTERNAL SECTION SKETCH FOR TRANSFORMER	3452 00 01156
BUS DUCT TERMINATION DETAILS	3452 00 01157
COMBINED FOUNDATION DRAWING	3452 00 01158
NEUTRAL FORMATION / GROUNDING	3452 00 01159

APPROX. WEIGHTS/OIL QUANTITY (LITERS)	
DESCRIPTION	WT. IN KG.
WEIGHT OF CORE & WINDING ASSY.	165000
WEIGHT OF OIL	54800
TOTAL WEIGHT INCLUDING OIL	276000
SHIPPING WEIGHT OF TRANSFORMER (GAS FILLED)	192500
UNTANKING WEIGHT	13800
TOTAL OIL QTY (LTR.)	63000

## NOTES:-

1. WHEN REFERRING THE O.G.A DRG. PLEASE QUOTE MVA & W.O. N.O.
2. DIMENSIONS SHOWN THUS ARE OVERALL SHIPPING DIMENSIONS(LBXH=6150X4770X4870).
3. WIRING FROM INSTRUMENTS, CTS, ETC. NOT SHOWN FOR CLARITY.
4. TRANSFORMER OIL SHALL BE SUPPLIED CONFIRMING TO UPRVNL SPECIFICATION.
5. PAINT COLOUR/PAINT THICKNESS SHALL BE AS PER UPRVNL SPECIFICATION,OUTSIDE FINISH PAINT SHADE TO RAL 5012 BLUE.
6. THE DESIGN FEATURES SHOWN ON THIS DRAWING (GENERALLY IN LINE WITH IS IS-2026 & IEC 60076 AND AGREED CUSTOMER SPECIFICATION) MEET THE STATUTORY, REGULATORY & SAFETY REQUIREMENTS WITH RESPECT TO EARTHING ARRANGEMENT & DANGER LABLES, AND CLEARANCES IN AIR, PROVISIONS FOR PRESSURE RELIEF DEVICE, GAS AND OIL ACTUATED RELAY AND ANTI EARTHING QUAKE CLAMPING ARRANGEMENT.
7. ON LINE MOISTURE REMOVAL SYSTEM SHALL BE PROVIDED FOR ONE UNIT OF 3 PHASE BANK. HOWEVER PROVISION SHALL BE KEPT IN ALL UNITS.
8. ONE UNIT OF ON LINE DGA SYSTEM FOR EACH TRANSFORMER SHALL BE PROVIDED.
9. INFRA RED THERMOMETRY SHALL BE DONE DURING TEMPERATURE RISE TEST.
10. MAKE OF ALL ITEM TO BE AS PER NTPC QA APPROVED LIST.

REV DATE ALT RAKESH

ZONE IT. 215 SHOWN IN DRAWING.

ZONE DRG. UPDATED INLINE WITH MANUFACTURING DRAWING &amp; MK NO ADDED.

ZONE DRG. UPDATED INLINE WITH MANUFACTURING DRAWING.

REV DATE ALT RAKESH

ZONE NO CHANGE.

ZONE DRAWING REVISED INLINE WITH

ZONE CUSTOMER COMMENTS.

408

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401

CONSERVATOR &amp; ITS PIPE WORK

COOLING SYSTEM

TURRETS &amp; BUSHINGS

10a INSPECTION COVER FOR CONSERVATOR

12 MAGNETIC OIL GAUGE WITH LOLA

12a RAIN HOOD (FOR PRV, MOG, BUCHHOLZ RELAY) EACH

14c DRAIN G.M.GATE VALVE FOR MAIN CONSERVATOR 50 NB

14e BREATHER CONNECTION GATE VALVE 15 NB FOR MAIN CONSERVATOR

15 OIL CONSERVATOR MAIN (1600 DIA. WITH AIR CELL)

17 SILICA GEL BREATHER FOR MAIN CONSERVATOR (3 IN SERIES)

26 BUCHHOLZ RELAY 80 NB

86a AIR RELEASE PLUG (1/4" BSP) FOR AIR CELL ON CONSERVATOR

86b AIR RELEASE PLUG (3/4" BSP) FOR MAIN CONSERVATOR

119 ISOLATING GATE VALVE FOR BUCHHOLZ RELAY 80NB

120 MAIN CONSERVATOR 80NB PIPE SET.

125 GAS COLLECTING DEVICE

119a ISOLATING GATE VALVE 80 NB FOR BUCHHOLZ RELAY

161 BUCHHOLZ GAS RELAY DEVICE PIPE 6 mm DIA (COPPER)

164 BREATHER PIPE 15 NB.(FOR MAIN CONSERVATOR)

206 MONOGRAM

211 ATMOSAEL (AIR CELL) ARRG'T. OF CONSERVATOR

211a AIR CELE LEAKAGE DETECTOR

126 PRISMATIC OIL GAUGE

14f FILTER VALVE 50 NB G.M.GATE FOR COOLERS

18d THERMOMETERS ON COOLER PIPE WORKS

62 OFAF COOLERS (5 WORKING + 1 STANDBY) WITH PAIR OF FANS EACH.

64 OIL PUMP AND MOTOR (5 WORKING + 1 STANDBY)

67a FLEXIBLE METAL HOSE 200NB

86c AIR RELEASE PLUG (3/4" BSP) ON COOLER PIPE WORK

86d PLUG (1/4" BSP)

114a DRAINPLUG (3/4") ON COOLER PIPES

123 ISOLATING B/E VALVE FOR PUMP &amp; MOTOR OIL FLOW INDICATOR 100 NB &amp; 100 NB P/W

160 OIL FLOW INDICATOR (TOP TO BOTTOM FACING DIAL) EACH WITH 2NO OR 2NC

190 TOP OIL PIPE 200 NB

198 BOTTOM OIL PIPE 200 NB

6 H.V. LINE BUSHING.

6x H.V. NEUTRAL BUSHING (BHEL MAKE)

7 L.V. BUSHING (BHEL MAKE)

10b INSPECTION COVER L.V. BUSHING CONNECTION

122 C.T. TERMINAL BOX FOR H.V.

122a CT TERMINAL BOX FOR H.V. NEUTRAL

122b CT TERMINAL BOX FOR L.V.

148 NEUTRAL TURRET

149 L.V. TURRET WITH TOP FLANGE OF NON MAGNETIC STAINLESS STL.

150 H.V. TURRET M.S.

157 NEUTRAL GROUNDING CONNECTOR (COPPER) 10 X 125 WIDE

180 TERMINAL MARKING

41 BEVEL GEAR BOX

48 OFF CIRCUIT TAP SWITCH DRIVING UNIT

49 OFF CIRCUIT TAP SWITCH DRIVING HANDLE

51 OFF CIRCUIT TAP SWITCH

41 BEVEL GEAR BOX

48 OFF CIRCUIT TAP SWITCH DRIVING UNIT

49 OFF CIRCUIT TAP SWITCH DRIVING HANDLE

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