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भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 003- Rev 02

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 05) and General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 03).

These two documents along with Special Conditions of Contract annexed to this RFQ will form an integral part of the contract as and when the RFQ culminates into a Purchase Order / Contract.

BHEL-EDN invites you to quote your best competitive prices as per the purchase specification. Kindly submit your quotation as a two-part bid in EPS portal: <https://eprocurebhel.co.in/nicgep/app> within Due- Date & Time of____<as per E-procurement website>_____.

RFQ No. : ATL0000003

Project : Yadadri (5x800MW) – FGD Package

Customer/Consultant : M/s. TSGENCO/ TCE

Item Description : VFD for 950 KW, 3.3 KV Motor

Type of Bid: Two-Part Bid (Pre-Qualification bid + Techno-commercial bid: Part-I; Price-bid: Part-II)

Purchase Executives: Clarifications with regard to the tender shall be addressed to purchase officers whose e-mail IDs are given below:

sathishkumars@bhel.in or atulsood@bhel.in or mounishg@bhel.in

Destination: For Indigenous scope of supply, items are to be directly despatched to BHEL site office/stores located at __ **Nalgonda (district)** in _ **Telangana** __ state respectively, India. Detailed Consignee details will be issued by BHEL along with Despatch Clearance.

Reverse Auction: Not applicable for this tender.

Terms of Delivery:

- **Indigenous scope of supply:** Ex-works, ____<indicate station of dispatch>_____ (including Packing & Forwarding charges but excluding Taxes).

Under-mentioned details shall be provided against Indigenous supplies and services:

a. GeM Seller ID: _____

b. If bidder is MSE vendor, is supporting document enclosed: Yes /No
(If MSE, supporting document viz., Udyam certificate has to be enclosed)

c. GSTIN (no.) of place of supply: _____

d. HSN (Harmonized System of Nomenclature) code: _____

Applicable tax and Rate: _____ & _____

e. SAC (Service Accounting Code) no.: _____

Applicable tax and Rate: _____ & _____

f. GSTIN (no.) of place of supply of service: _____

I. Bidder to provide compliance for the under-mentioned terms:

SL. NO.	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	REMARKS, if any
01	Delivery Period	Within 30 weeks from the date of issue of Manufacturing clearance along with Code-2 document. However, for mandatory spares, delivery period shall be within 16 weeks from the date of issue of Manufacturing clearance along with approved document. Delay in contractual delivery will attract Penalty as per GCC Clause no.04.b.	AGREE weeks weeks	
02	Terms of Payment at the time of material supply	With reference to <u>Clause:F</u> of Instructions to Bidder, following is the BHEL standard Payment term: <i>"100% of basic PO value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later."</i> <u>Note:</u> MSME vendors may opt to get payment through Trade Receivables electronic Discounting System (TReDS)	AGREE	
03	Please provide Percentage of local content and details of location(s) at which the local value addition is made:	'Local content' means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.	Percentage of local content: _____% Location(s) at which the local value addition is made: _____ _____	

II. Bidder to note that Deviations shall not be permitted for the below mentioned terms and are deemed to be complied. In case of non-compliance/deviation, offer may be liable for rejection:

- (1) **Freight Charges:** Freight charges for complete scope for total consignment up to project site shall be to vendor's account. Bidder to quote reasonable Freight charges along with applicable tax, in price bid.
- (2) **Validity:** The offer will be valid for a period of 90 days from the date of Part-I bid opening and in case of Negotiation/counter offer/RA, price validity will apply afresh for a period of 30 days from the date of according final price by bidder (or) up to original validity period, whichever is later.
- (3) Warranty period of the supplied products shall be applicable for a period of 24 months from the date of commissioning (or) 36 months from the date of last dispatch of goods, whichever is earlier. However for any repaired/replaced goods during the defect-liability period, the warranty shall be extended till 12 months only for that repaired/replaced goods portion.
- (4) **Evaluation criteria to determine L1 bidder:** Items will not be split on item-wise lowest offer. Evaluation of the lowest bidder will be done as package basis. The Procuring Entity reserves its right to grant preferences to eligible Bidders under various Government Policies/ directives (policies relating to Make in India, MSME etc.)

a. Preference to Micro & Small Enterprises (MSEs): Purchase preference will be given to MSEs as defined in *Public Procurement Policy* for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of MSME (and its subsequent Orders/Notifications issued by concerned Ministry) & the latest *Office Memorandum* issued by Department of Expenditure dt:18.05.2023.

If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods. Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product.

b. Preference to Make in India (MII) products: Preference shall be given to Class 1 local supplier as defined in public procurement (Preference to Make in India) order 2017 as amended from time to time (and its subsequent Orders/Notifications issued by concerned Nodal Ministry for specific Goods/Products) & the latest *Office Memorandum* issued by Department of Expenditure dt:18.05.2023.

{‘Class-I local supplier’ means a supplier or service provider, whose goods, services or works offered for procurement, has local content equal to or more than 50%, as defined under Public procurement order no.P-45021/2/2017-PP (BE-II) dt: 16.09.2020.

‘Class-II local supplier’ means a supplier or service provider, whose goods, services or works offered for procurement, has local content more than 20% but less than 50%, as defined under Public procurement order no.P-45021/2/2017-PP (BE-II) dt: 16.09.2020.

In the event of any Nodal Ministry prescribing higher or lower margin of purchase preference and/or higher or lower percentage of local content in respect of this procurement, same shall be applicable.’}

If the bidder wants to avail the Purchase preference, the bidder must upload a certificate from the OEM regarding the percentage of the local content and the details of locations at which the local value addition is made along with their bid, failing which no purchase preference shall be granted.

Default margin of purchase preference shall be 20% to local suppliers with default minimum local content of 50%.

Operation methodology of Purchase preference clause to MSE & MII bidders is as detailed under clause:4.c.b) in the Office Memorandum issued by Department of Expenditure dt:18.05.2023 (ref. Annexure-VIII of ITB).

Note: In case of negotiations, the margin of purchase preference (20% for Class-I Non-MSE or 15% for MSE) shall be based on pre-negotiated L1 price and the eligible Class-I & MSE local bidder will have to match the negotiated L1 price.

- (5) **Performance security:** Performance Bank Guarantee (PBG) or Security Deposit (SD), hereafter referred as performance security has to be submitted by successful bidder for 05% of the contract value.

PBG has to be furnished within 05 weeks after notification of the award and it should remain valid for a period of 60 days beyond the date of completion of all contractual obligations, including warranty obligations.

Refer Clause “H” of Instructions to Bidders. Also note that PBG should be in the format specified in Annexure-VII of ITB and no deviation to this format will be allowed.

In case of breach of contract (failure of supplier), wherever the value of Performance security available with BHEL against the said contract is at least 10% of the contract value, the same shall be encashed. In case the value of the security instruments available is less than 10% of the contract value, the balance amount shall be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, etc. with BHEL) or legal remedies be pursued.

- (6) **Submission of documents post PO viz., datasheet, preliminary GA drawing, sizing calculation etc. as indicated in Cl: 04 of GCC:** Within 28 days from the date of receipt of PO. Delay in the submission of complete set of specified documents in NIT, will attract Penalty as per GCC Clause no.04.a).
- (7) **Despatch Documents:** Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to Purchase Executive/BHEL directly.

Despatch documents shall include but not limited to the following documents:

Invoice (01 original and 01 copy with original sign & seal / digitally signed invoice), Lorry Receipt (L/R), Packing List, NIL Short-Shipment Certificate, Warranty Certificate, insurance intimation letter, Original Proof of Delivery, Transporter's invoice (for payment of freight charges) etc.

One set of Invoice, L/R, Packing List & E-way bill (Part-B) shall be e-mailed to BHEL-EDN immediately after despatch.

Note: Detailed Packing List should indicate package-wise content details and also Net & Gross weight of each package.

- (8) **Erection Supervision & Commissioning:**

E&C charges should not be less than 05% of the main item supply value (excluding cable accessories and cables, mandatory spares, Laptop). In case the quoted total E&C value is less than 05% of the main item supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price proportionally from all items and apportioning towards E&C charges.

Payment terms for E&C charges: 100% Lump Sum charges finalised towards E&C along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of successful installation & commissioning duly certified by Engineer-in-Charge. Contractor's payment is subject to TDS, TCS as per applicable act of Govt.

- (9) Based on the under-mentioned declarations in company letterhead of Bidder as insisted under Rule 144(Xi) of General Financial Rules,2017 amendment dt 24.02.2023, eligibility of offer will be ascertained in the tender:

"I have read the clause regarding restrictions on procurement from a bidder of a country which shares a land border with India; I certify that our firm is not from such a country or, if from such a country, has been registered with the Competent Authority. I hereby certify that our firm fulfils all requirements in this regard and is eligible to be considered."

Note: Wherever applicable, evidence of valid registration by the Competent Authority shall be attached.

Additional declaration by Bidder in the cases of specified Transfer of Technology (ToT):

"I have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. I certify that our firm does not have any ToT arrangement requiring registration with the Competent Authority."

OR

"I have read the clause regarding restrictions on procurement from a bidder having Transfer of Technology (ToT) arrangement. I certify that our firm has valid registration to participate in this procurement."

- (10) **Integrity Pact:** Execution of Integrity Pact is applicable for this tender (Refer clause "K" of Instructions to Bidders). The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with Part-I bid. Only those Bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

- (11) It is the obligation on the part of supplier to discharge his liability by payment of GST to Government of India in cash (or) utilization of input Tax credit in respect of such supply or services through GST invoice under this contract, so that BHEL will avail input tax credit on such supply. In the event that the input tax credit of the GST charged by the supplier is denied by the tax authorities to BHEL due to reasons attributable to supplier, BHEL shall be entitled to recover such amount from the supplier by way of adjustment from the next invoice or from Bank Guarantee. In addition to the amount of GST, BHEL shall also be entitled to recover interest and penalty, in case same is imposed by the tax authorities on BHEL.

If BHEL is not able to avail the credit of CGST & SGST/IGST, partially or entirely because the supplier issued a defective invoice or failed to produce the requisite documents, then the supplier shall immediately indemnify BHEL for such loss of tax credit which would be otherwise available to BHEL.

BHEL, in such case, may, at its sole discretion, decide to recover such loss by way of deduction from payment due to the supplier or invoking the contract Performance Bank Guarantee.

The classification of goods as per GST should be correctly done by the supplier to ensure that ITC benefit is not lost to the BHEL on account of any error on the part of the supplier.

Any statutory increase in taxes and duties (i.e GST) or introduction of new taxes and duties within the Contractual Delivery Period shall be to BHEL's account and shall be reimbursed against documentary evidence. However, any statutory increase in taxes and duties (i.e GST) or introduction of new taxes and duties beyond the Contractual Delivery Date shall be borne by BHEL to the extent documents are passed on to BHEL and BHEL is in the position to get the claim from the authorities. Any corresponding decrease on account of above shall be passed on to BHEL.

Any variation in CGST & SGST / IGST at the time of supplies for any reason other than statutory, including variations due to turnover, shall be borne by supplier.

In case GST or any taxes or duties is not applicable at present but become applicable at the time of contractual delivery period due to any reason other than statutory, the same shall be borne by supplier

With this, we hereby confirm that all the terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 05) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 03) are also accepted without any deviation.

Vendor's Signature with Seal

Note: The above filled-in document shall be furnished as a part of Techno-commercial (i.e., Part-I) bid.



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Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE:PR:001- Rev 05

INSTRUCTIONS TO BIDDERS

Bidder is requested to read the instructions carefully and submit their quotation taking into consideration of all the points:

A. GENERAL INSTRUCTIONS:

1. Any Purchase Order resulting from this enquiry shall be governed by the Instructions to Bidders (document reference: CE: PR: 001 – Rev 05), General Conditions of Contract (document reference: CE: PR: 002 - Rev 03) and Special Conditions of Contract, if any, of the enquiry. If any term mentioned in Special Conditions of Contract (SCC) contradicts relevant clause in either Instructions to Bidders (ITB) or General Conditions of Contract (GCC), the term mentioned in SCC will supersede the corresponding term in ITB / GCC.
2. Any deviations from or additions to the “General Conditions of Contract” or “Special Conditions of Contract” require BHEL’s express written consent. The general terms of business or sale of the bidder shall not apply to this tender.
3. Regret letter (either through post or by mail or by EPS) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender.

Supplier shall be liable for removal as a registered vendor of BHEL when the supplier fails to quote against four consecutive tender enquiries for the same item or all enquiries in last two years for the same item, whichever is earlier.

4. Procurement directly from the manufacturers is preferred. However, if the OEM/ Principal insist on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender.

Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. Agent/Representative authorized by the OEM/Principal in turn cannot further sub authorize any other firm for submitting the offer or for placement of order.

In case bids are received from the manufacturer/ supplier and his agent, bid received from the agent shall be ignored.

5. Consultant / firm (and any of its affiliates) shall not be eligible to participate in the tender/s for the related goods for the same project if they were engaged for consultancy services for the same project.
6. If an Indian representative/associate/liaison office quotes on behalf of a foreign based bidder, such representative shall furnish the following documents:
 - a. Authorization letter to quote and negotiate on behalf of such foreign-based bidder.
 - b. Undertaking from such foreign based bidder that such contract will be honored and executed according to agreed scope of supply and commercial terms and conditions.

- c. Undertaking shall be furnished by the Indian representative stating that the co-ordination and smooth execution of the contract and settlement of shortages/damages/replacement/repair of imported scope till the equipment is commissioned and handed over to customer will be the sole responsibility of the Indian representative/associates/agent/liaison office.

- d. Refer **Annexure I** on “Guidelines for Indian Agents”.

- 7. In case of imported scope of supply, customs clearance & customs duty payment will be to BHEL account after the consignment is received at Indian Airport /Seaport. Bidders must provide all original documents required for completing the customs clearance along with the shipment.

Warehousing charges due to incomplete or missing documentation will be to supplier’s account. All offers for imported scope of supply by air, must be made from any of the gateway ports (within the country) indicated **(Refer Annexure II)**.

- 8. The offers of the bidders who are on the banned list and also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of the banned firms is available on BHEL website: http://www.bhel.com/vender_registration/vender.php
- 9. Business dealings with bidders will be suspended if they are found to have indulged in any malpractices/misconduct which are contrary to business ethics like bribery, corruption, fraud, pilferage, cartel formation, submission of fake/false/forged documents, certificates, information to BHEL or if they tamper with tendering procedure affecting the ordering process or fail to execute a contract, or rejection of 3 consecutive supplies or if their firms / works are under strike/lockout for a long period. Bidder may refer “Guidelines for Suspension of Business Dealings with Suppliers/ Contractors” available on www.bhel.com for more details.

The Bidder declares that they will not enter into any illegal or undisclosed agreement or understanding, whether formal or informal with other Bidder(s). 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. In case, the Bidder is found having indulged in above activities, suitable action shall be taken by BHEL as per extant policies / guidelines.

- 10. The bidder along with its associate/collaborators/sub-contractors/sub-vendors/consultants/service providers shall strictly adhere to BHEL Fraud Prevention Policy displayed on BHEL website <http://www.bhel.com> and shall immediately bring to the notice of BHEL Management about any fraud or suspected fraud as soon as it comes to your notice.

- 11. Offer is to be submitted in English language only.

- 12. For this procurement, the local content to categorize a supplier as a Class-I local supplier/ Class-II local supplier/ Non-local supplier and purchase preference to Class-I local supplier, is as defined in Public procurement (Preference to Make in India), Order 2017 dated 16.09.2020 issued by DPIIT.

In case of subsequent Orders issued by the Nodal Ministry, changing the definition of local content for the items of the NIT, the same shall be applicable even if issued after issue of this NIT, but before opening of price bids against this NIT. Default margin of purchase preference shall be 20% for Class-I local supplier only.

- 13. The Bidder shall mandatorily submit Declaration as mentioned under Rule 144(xi) of General Financial Rules, 2017 amendment dt 23.07.2020 issued by Ministry of Finance, Govt. of India. Where applicable, evidence of valid registration by the Competent Authority shall be attached.

The Competent Authority for the purpose of registration under this Order shall be the Registration Committee constituted by the Department for Promotion of Industry and Internal Trade (DPIIT). Refer Annexure-IX for 'Restrictions under Rule 144(Xi) of General Financial Rules, 2017 amendment dt: 23.07.2020'.

B. GUIDELINES FOR PREPARATION OF OFFER:

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:

- **SINGLE PART BID:** Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
- **TWO PART BID:** Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the "Price Bid" without the prices** should be enclosed in one cover and the cover must be super scribed "**Techno-commercial offer**) and Priced offer i.e. "Price Bid" containing price summary in a separate sealed envelope and must be super scribed "**Price Bid**".

Both these envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.

- **THREE PART BID:** Pre-qualification Bid (Part-I), Techno Commercial Bid with filled in BHEL Standard Commercial terms and conditions (Part-II), and Price Bid (Part-III). All three envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.

If any of the offers (Part I, Part II or Part III) are not submitted before the due date and time of submission (or) if any part of the offer is incomplete, the entire offer of the bidder is liable for rejection.

2. Supplier shall ensure to superscribe each envelope with RFQ number, RFQ Date, RFQ Due date and time, Item Description and Project clearly & boldly. Also mention on the envelope whether it is "Techno Commercial Bid" or "Price Bid" or "Pre-Qualification Bid".

Please ensure complete address, department name and purchase executive name is mentioned on the envelope (before dropping in the tender box or handing over) so that the tender is available in time for bid opening.

3. BHEL standard Commercial Terms and Conditions (duly filled, signed & stamped) must accompany Technical-Commercial offer without fail and should be submitted in original only.

The above indicated submission of Offers in "sealed envelope/hard copy" as mentioned in points B.1-B.3 is applicable for tenders that are not floated through E-Procurement System (EPS).

4. Validity: Unless otherwise specified in SCC (special commercial conditions of contract), the offer will be valid for a period of 90 days from the date of part-I bid opening and in case of Negotiation/Counter-offer/Reverse Auction, price validity will apply afresh for a period of 60 days from the date of according final price by bidder (or) up to original validity period, whichever is later.
5. Any of the terms and conditions not acceptable to supplier, shall be explicitly mentioned in the Techno-Commercial Bid.

If no deviations are brought out in the offer it will be treated as if all terms and conditions of this enquiry are accepted by the supplier without deviation.

6. Deviation to this specification/item description, if any, shall be brought out clearly indicating “DEVIATION TO BHEL SPECIFICATION” without fail, as a part of Techno-Commercial Bid.

If no deviations are brought out in the offer it will be treated as if the entire specification of this enquiry is accepted without deviation.

7. Suppliers shall submit one set of original catalogue, datasheets, bill of materials, dimensional drawings, mounting details and/or any other relevant documents called in purchase specification as part of Technical Bid.
8. “Price Bid” shall be complete in all respects containing price break-up of all components along with all applicable taxes and duties, freight charges (if applicable) etc. Once submitted no modification / addition / deletion will be allowed in the “Price Bid.” Bidders are advised to thoroughly check the unit price, total price to avoid any discrepancy.
9. In addition, bidder shall also quote for erection & commissioning charges/erection supervision & commissioning charges (E&C service charges), documentation charges, testing Charges (type & routine), training charges etc. if & as applicable along with corresponding tax. The price summary must indicate all the elements clearly.
10. Wherever applicable, bidders should indicate “lumpsum” Erection and Commissioning (or) Erection Supervision and Commissioning charges, as applicable (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for carrying out E&C activity and further handing over to customer.

The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist (if any).

11. Wherever bidders require PAC (Project Authority Certificate)/applicable certificates for import of raw materials, components required for DECC, EPCG Power Projects, Export Projects or other similar projects wherein supplies are eligible for customs duty benefits, lists and quantities of such items and their values (CIF) has to be mentioned in the offer. Prices must be quoted taking into account of such benefits.
12. Prices should be indicated in both figures & words. 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 rejection.

Any typographical error, totalling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure III** “Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid” and BHEL decision will be final.
13. Documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder. However, this requirement is not mandatory for offers uploaded through E-Procurement System (EPS).

C. GUIDELINES FOR OFFER SUBMISSION:

The under-mentioned clauses 1, 2&3 will not be applicable for EPS tenders.

1. Offers / Quotations must be dropped in tender box before 13.00 Hrs. on or before due date mentioned in RFQ. The offers are to be dropped in the proper slot of the Tender Box kept in our reception area with caption “CE, SC&PV, DEFENCE”.

Tenders are opened on 3 days in a week (Monday/Wednesday/Friday). Tender must be deposited in the slot corresponding to the day (Monday - Box no.4/Wednesday - Box no. 6 /Friday - Box no.8) while depositing the offer.

2. E-Mail/ Internet/EDI offers received in time shall be considered only when such offers are complete in all respects. In case of offers received through E-mail, please send the offer to the email ID specified in the SCC document of the tender.
3. Offers of Vendors who already have a valid Technical/Commercial MOU with BHEL-EDN for the items of the RFQ shall mention the relevant MOU reference no. and give only such other details not covered in the MOU.
4. In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand or through posts/couriers, the offers are to be handed over either of the two purchase officers whose names are mentioned in the SCC document of tender RFQ.
5. Tenders will be opened on due date, time and venue as indicated in the RFQ in the presence of bidders at the venue indicated in the RFQ. For EPS tenders, e-mail notifications will be automatically generated and forwarded to registered e-mail ID/s of bidders during opening of tenders.
6. Bidder will be solely responsible:
 - a. For submission of offers before due date and time. Offers submitted after due date and time will be treated as "Late offers" and will be rejected.
 - b. For submission of offers in the correct compartment of the tender box based on the day of due date (Monday/Wednesday/Friday). Please check before dropping your offer in the correct tender box.
 - c. For depositing offers in proper sealed condition in the tender box. If the bidder drops the tender in the wrong tender box (or) if the tender document is handed over to the wrong person, BHEL will not be responsible for any such delays.
 - d. For offers received through email etc., suppliers are fully responsible for lack of secrecy on information and ensuring timely receipt of such offers in the tender box before due date & time (This clause will not be applicable for EPS tenders).

The above indicated submission of Offers as mentioned in points 6.a-6.d is applicable for tenders that are not floated through EPS.

- e. In case of e-tender, all required documents should be uploaded before due date and time. Availability of power, internet connections, system/software requirements etc. will be the sole responsibility of the bidder.

Wherever assistance is needed for submission of e-tenders, help-line numbers as available in the web-site of service provider of BHEL may be contacted.

Purchase Executive/ BHEL shall not be responsible for any of the activities relating to submission of offer.

D. PROCESSING OF OFFERS RECEIVED:

1. Any discount/ revised offer submitted by the supplier on its own shall be accepted provided it is received on or before the due date and time of offer submission (i.e. Part-I bid).
The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.
2. Changes in offers or Revised offers given after Part-I bid opening shall not be considered as a part of the original offer unless such changes/revisions are requested by BHEL.

In case of withdrawal of any Technical/Commercial deviation(s) by the bidder before opening of price bids/conducting the Reverse Auction, revision of price/impact bid will not be accepted.

3. In case there is no change in the technical scope and/ or specifications and/ or commercial terms & conditions, the supplier will not be allowed to change any of their bids after Technical bids are opened (after the due date and time of tender opening).
4. In case of changes in scope and/ or technical specifications and/ or commercial terms & conditions by BHEL and it accounts for price implications from bidders, all techno-commercially acceptable bidders shall be asked by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid.

Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening.

5. Un-opened bids (including price bids) will be returned to the respective bidders after release of Purchase order.

Regarding Offers for EPS tenders that get rejected on PQC/ techno-commercial grounds, the bids for the subsequent parts will not be opened i.e., both technical bid and price bid (Parts-II & III) will not be opened in case of rejection on PQC ground and price bid (Part-II/Part-III, as applicable) will not be opened in case of rejection on techno-commercial ground.

6. After receipt of Purchase Order, supplier should submit required documents viz., specified drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report, O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
7. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL and agreed upon in the Purchase Order.
8. Evaluation shall be on the basis of delivered cost (i.e. "Total Cost to BHEL").

"Total Cost to BHEL" shall include total basic cost, packing & forwarding charges, taxes and/or duties (as applicable), freight charges, taxes on Services, customs clearance charges for imported items, any other cost indicated by bidder for execution of the contract and loading factors (for non-compliance to BHEL Standard Commercial Terms & Conditions).

Benefits arising out of Nil Import Duty on DEEC, EPCG, DFIA Projects, Physical Exports or such 100% exemptions (statutory benefits), project imports, customer reimbursements of statutory duties (like Basic Customs Duty and cess on customs duty), Input tax credits as applicable will also be taken into account for arriving at the Total cost to BHEL (wherever applicable and as indicated in SCC document of tender).

For EPS tenders, it shall be noted that the prices (including discounts) vis-a-vis currency quoted in EPS portal only will be considered as Final for the purpose of evaluation of the lowest bidder.

Bidder shall ensure to indicate the applicable taxes against each line item in online portal, failing to which the same will be considered as inclusive/NIL.

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 L-1 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.

9. The evaluation currency for this tender shall be INR. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:

Single part bids: Date of tender opening

Two/three part bids: Date of Part-I bid opening

Reverse Auction: Date of Part-I bid opening

In case of Performance Bank Guarantee (PBG) also, exchange rate will be considered as mentioned above for converting foreign currency to Indian currency and vice versa.

If the relevant day happens to be a bank holiday, then the exchange rate as on the previous working day of the bank (SBI) shall be taken.

10. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers.
11. GeM Seller ID shall be mandatory before placement of order/award of contract for goods and services to the successful bidder(s), for orders exceeding Rs.25 lakhs (including all taxes etc.). Department of Expenditure (DoE) OM no.6/9/2020-PPD dated: 24.08.2020 may be referred in this regard.

E. INFORMATION ON PAYMENT TERMS:

1. All payments will be through Electronic Fund transfer (EFT). Vendor has to furnish necessary details as per BHEL standard format (**Refer Annexure IV**) for receiving all payments through NEFT. (Applicable for Indian vendors only).
2. In case of High Sea Sales transaction, customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors.

All warehousing charges due to delay in submission of complete and or correct HSS documents to BHEL will be to supplier's account only. Such recovery will be made out of any of the available bills (**Refer Annexure V**).

3. Statutory deductions, if any, will be made and the deduction certificate shall be issued.
 - A. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act.
In addition to the above, Foreign vendors shall also submit relevant details of their bankers like Swift Code, Banker's Name & Address etc.
 - B. TDS deduction as per section 51 of CGST Act, 2017 shall be applicable as per Gazette Notification No. 50/2018-Central Tax, Dated: 13th September 2018 and subsequent notification/s, as and when released by Govt. authorities.

4. Procurement of Goods/ Works/ Services/ Consultancy Services [under clause relating to "Income Tax and Corporate Tax" or "TDS"]

a) Provision w.r.t. TDS on Purchase of Goods under section 194Q of Income Tax Act applicable from 01.07.2021 is as under:

- i. TDS as applicable will be deducted by BHEL under section 194Q of the Income Tax Act, 1961 on Purchases exceeds, the amount of Rupees. 50 Lakhs or limit defined therein from time to time during the financial year under the Indian Income Tax act 1961.

ii. Since BHEL is liable to deduct Income Tax TDS under section 194Q, the provision of TCS as per section 206C(1H) of the Income Tax Act, 1961 shall not be applicable.

b) Higher rate of TDS for non-filers of ITR as per Section 206AB of Income Tax Act, 1961, in case of any vendor who does not filed their Income Tax Return for both of the two previous years preceding to current year and aggregate amount of TDS is more than or equal to Rs. 50,000/- in each of those previous two years (or limit defined by Govt. from time to time), then TDS will be deducted at the higher of following rates:

(i) Twice the rate mentioned in relevant TDS section.

(ii) Twice the rate or rates in force

(iii) 5%.

5. Incomplete documentation will not be accepted. Delayed submission of invoice / documents may result in corresponding delay in payment. In this connection, request to also refer clause: G about invoicing & payment formalities under GST regime.

Applicable documents shall be submitted to the purchaser at the time of execution of supplies/services for availing GST input credits.

F. STANDARD PAYMENT TERMS OF BHEL-EDN:

<u>PURCHASE ORDERS FOR:</u>	<u>SUPPLY WITH SERVICE(S)</u>	<u>SUPPLY ONLY</u>
<u>INDIGENOUS PROCUREMENT</u>	a. 100% of basic value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later. <u>Note:</u> In case PBG is not furnished, only 90% payment will be released against 100% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	b. 100% of PO value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later.
<u>IMPORT PROCUREMENT</u>	c. 100% of basic value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents. <u>Note:</u> In case PBG is not furnished, only 90% payment will be released against 100% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	d. 100% of PO value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents.

<u>HIGH-SEA SALES PROCUREMENT</u>	e. 100% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later <u>Note:</u> In case PBG is not furnished, only 90% payment will be released against 100% claim without the consent of Vendor. This 10% basic amount withheld towards PBG will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.	f. 100% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later.
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g. Erection and Commissioning:

Evaluation methodology: Unless and otherwise specified in SCC, E&C charges should not be less than 05% of the main supply value. In case the quoted total E&C value is less than 05% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price proportionally from all items and apportioning towards E&C charges.

Payment term: 100% E&C charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of E&C.

h. Erection Supervision and Commissioning:

Evaluation methodology: Unless and otherwise specified in SCC, Commissioning charges should not be less than 05% of the main supply value. In case the quoted total Commissioning charges is less than 05% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price proportionally from all items and apportioning towards Commissioning charges.

Payment term: 100% Commissioning charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of Commissioning.

i. Comprehensive Annual Maintenance Contract:

Evaluation methodology: Unless and otherwise specified in SCC, CAMC will be applicable for a period of 04 years from the date of expiry of warranty period (or) from the date of completion of commissioning of equipment, whichever is later and the total CAMC value should not be less than 20% of the main supply value. In case the quoted total CAMC value is less than 20% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price proportionally from all items and apportioning towards CAMC charges.

Payment terms: 100% CAMC charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of CAMC on yearly basis.

j. Terms of Payment for Training: 100% payment will be made in 45 days from the date of completion of Training or 15 days from the date of submission of complete set of invoice along with documentary evidence, whichever is later.

LOADING FACTORS FOR DEVIATION IN PAYMENT TERMS:**i) INDIGENOUS PROCUREMENT:**

For payment term with credit period of less than 45 days for indigenous supply, 'Base rate of SBI (as applicable on the date of bid opening; Techno-commercial bid opening in case of two part bids) +6%', shall be considered for loading for the period of relaxation sought.

ii) IMPORT PROCUREMENT:

- 1) For offers received with Sight draft payment term in place of Usance draft, loading applicable will be 1.0% of basic value.
- 2) For offers received with Letter of Credit payment term with Usance of 45 days, loading applicable will be 2.5% of basic value. Additional loading of 2% will be applicable for payment term as Letter of Credit at Sight.

k. Any other variation of payment terms are liable for rejection.

l. Standard payment terms indicated in Clauses: F (a), (b), (c), (d), (e), (f), (g), (h), (i) & (j) will not attract any loading.

Note 1: Basic value of Purchase Order mentioned above will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable). Wherever the Purchase Order is split into import portion and indigenous portion of supply, minimum % to be quoted for Services, wherever mentioned, will be of both purchase order values put together.

Note 2: In case of multiple packages/units in a power plant, payment of E&C charges will be processed on pro-rata basis.

Note 3: No deviation will be permitted from the duration of Guarantee/Warranty and/or Comprehensive Annual Maintenance Contract period specified in SCC.

Note 4: Indigenous bidder opting to quote with usance LC payment term of 120 days shall note that LC processing charges viz., opening, amendment/ discrepancy (if & as applicable) will be to supplier's account. Bank charges of Seller's bank shall be to Seller's account and bank charges of Owner's bank other than Bill collection charges shall be to Owner's account. Bill collection charges will be borne by Seller.

G. Terms & Conditions to be complied under GST regime:

1. All invoices to contain BHEL-EDN (buyer) GSTIN number: 29AAACB4146P1ZB. However for CGST +SGST/UGST billing outside the state of Karnataka, invoice has to be generated with BHEL's Nodal Agency GSTIN number. Address of Nodal Agency along with GSTIN number will be provided by BHEL at the time of issuing dispatch clearance.
2. The Bidder shall mention Bidder's GSTIN number in all quotations and Invoices submitted.
3. The Bidder shall also mention HSN (Harmonized System of Nomenclature) / SAC (Services Accounting Code) mandatorily in all quotations and invoices submitted.
4. Invoice submitted should be in the format as specified under GST Laws viz., all details as mentioned in Invoice Rules like GST registration number(GSTIN), invoice number with date of issue, quantity, rate, value, taxes with

nomenclature – CGST, SGST, UGST, IGST mentioned separately, HSN Code / SAC Code etc. Invoice should be submitted in original for buyer plus duplicate for credit availment.

5. Payment of GST to Vendor will be made only if it is matching with data uploaded by the Vendor in GST portal.
6. For invoices paid on Reverse charge basis – “Tax payable on reverse charge basis” to be mentioned on the invoice.
7. In case GST credit is delayed/denied to BHEL due to non/delayed receipt of goods and/or tax invoice or expiry of timeline prescribed in GST law for availing such ITC, or any other reasons not attributable to BHEL, GST amount will be recoverable from vendor along with interest levied/ leviable on BHEL.
8. In case vendor delays declaring such invoice in his return and GST credit availed by BHEL is denied or reversed subsequently as per GST law, GST amount paid by BHEL towards such ITC reversal as per GST law will be recoverable from vendor/contractor along with interest levied/ leviable on BHEL.
9. Vendor should intimate BHEL immediately on the same date of invoicing without any delay.
10. In case of discrepancy in the data uploaded by supplier in the GSTN portal or in case of any shortages or rejection in the supply, then BHEL will not be able to avail the tax credit and will notify the supplier of the same. Supplier has to rectify the data discrepancy in the GSTN portal or issue credit note (details to be uploaded in GSTN portal) for the shortages or rejections in the supplies, within the calendar month notified by BHEL.
11. Bidders to note that Rules & Regulations pertaining to E-way bill system are to be strictly adhered to, as and when notified by Govt. authorities.
12. As per Notification no.17/2022-Central Tax dated 01st August,2022 (applicable w.e.f. 01st day of October, 2022), the turnover for applicability of E-invoicing provisions has been reduced from 20 crore rupees to 10 crore rupees. In other words, registered person [other than a SEZ unit and those referred in Rule 54(2), 54(3), 54(4) and 54(4A) of the CGST Rules], whose aggregate turnover in any of the previous FY beginning from 2017-18 and onwards exceeds 10 crores, is required to comply with the requirement of IRN and QR code in respect of supply of goods or services or both to a registered person or for exports.

H. Performance security: To ensure due performance of the contract, Performance Bank Guarantee (PBG) or Security Deposit (SD), hereafter referred as performance security has to be submitted by successful bidder for 05% (unless specified otherwise) of the contract value.

Modes of deposit:

- a) Performance security may be furnished in the following forms:
 - (i) Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL.
 - (ii) Bank Guarantee from Scheduled Banks / Public Financial Institutions as defined in the Companies Act. PBG should be in the format specified in Annexure-VII of ITB and no deviation to this format will be allowed.

(iii) Fixed Deposit Receipt issued by Scheduled Banks / Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL).

(iv) Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL).

(v) Insurance Surety Bond.

Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith)

- b) PBG has to be furnished within 14 days (unless specified otherwise) after notification of the award and it should remain valid for a period of 60 days beyond the date of completion of all contractual obligations, including warranty obligations.
- c) The Performance security will be forfeited and credited to BHEL's account in the event of a breach of contract by the supplier.
- d) Performance security shall be refunded to the supplier without interest, after duly performing and completing the contract in all respects but not later than 60 days of completion of all such obligations including the warranty under the contract.
- e) The Performance security shall not carry any interest.

I. PURCHASE PREFERENCE FOR MSE (MICRO AND SMALL ENTERPRISES) VENDORS:

Purchase preference will be given to MSEs as defined in Public Procurement Policy for Micro and Small Enterprises (MSEs) Order, 2012 dated 23.03.2012 issued by Ministry of Micro, Small and Medium Enterprises and its subsequent Orders/Notifications issued by concerned Ministry. If the bidder wants to avail the Purchase preference, the bidder must be the manufacturer of the offered product in case of bid for supply of goods.

Traders are excluded from the purview of Public Procurement Policy for Micro and Small Enterprises. Relevant documentary evidence in this regard shall be uploaded along with the bid in respect of the offered product. Purchase preference to Micro and Small Enterprises clause in the bid, the same will get precedence over this clause.

1. If tendered quantity is Splitable: In tender, participating MSEs quoting price within price band of L1+15 percent shall also be allowed to supply a portion of requirement by bringing down their price to L1 price in a situation where L1 price from someone other than a MSE and such MSE shall be allowed to supply at least 25% of total tendered value. In case of more than one such MSE, the supply shall be shared proportionately (to tendered quantity).

- 3% of the 25% will be earmarked for women owned MSEs.
- 25% of the 25% (i.e., 6.25% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) & (2) are fulfilled.

- In case where no SC/ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, the 6.25% of earmarked quantity for SC/ST owned MSE firms will be distributed among the other eligible MSE vendors who have participated in the tender.

2. If tendered quantity is Non-Splittable: If L-1 is not an MSE and MSE Seller (s) has/have quoted price within L-1+ 15% of margin of purchase preference /price band defined in relevant policy, such Seller shall be given opportunity to match L-1 price and contract will be awarded for 100% of total value.

Operation methodology of Purchase preference clause to MSE & MII bidders is as detailed in the attached Office Memorandum issued by Department of Expenditure dt:18.05.2023 (Annexure-VIII).

J. INTEGRITY COMMITMENT IN THE TENDER PROCESS, AND EXECUTION OF CONTRACTS:

1. Commitment by BHEL: BHEL commits to take all measures necessary to prevent corruption in connection with the Tender process and execution of the Contract. BHEL will, during the tender process, treat all bidder / suppliers in a transparent and fair manner, and with equity.
2. Commitment by Bidder(s)/ Contractor(s):
 - a. The Bidder(s)/ Contractor(s) commit(s) to take all measures to prevent corruption and will not directly or indirectly try to influence any decision or benefit which he is not legally entitled to.
 - b. The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding or any actions to restrict competition.
 - c. The Bidder(s)/ Contractor(s) will not commit any offence under the relevant Acts. 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 BHEL as part of business relationship.
 - d. 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 and shall adhere to the relevant guidelines issued from time to time by Government of India/ BHEL.

If the Bidder(s) / Contractor(s), before award or during execution of the Contract commit(s) a transgression of the above or in any other manner such as to put his reliability or credibility in question, BHEL is entitled to disqualify the Bidder(s) / Contractor (s) from the tender process or terminate the contract and/ or take suitable action as deemed fit.

K. Integrity Pact (IP):

- (a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

Sl	IEM	Email
1.	Shri Otem Dai, IAS (Retd.)	iem1@bhel.in
2.	Shri Bishwamitra Pandey, IRAS (Retd.)	iem2@bhel.in
3.	Shri Mukesh Mittal, IRS (Retd.)	iem3@bhel.in

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- (c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided in SCC document of tender.

L. Conflict of Interest among Bidders/Agents:

*"A bidder shall not have conflict of interest with other bidders. Such conflict of interest can lead to anti-competitive practices to the detriment of Procuring Entity's interests. **The bidder found to have a conflict of interest shall be disqualified.** A bidder may be considered to have a conflict of interest with one or more parties in this bidding process, if:*

- a) they have controlling partner (s) in common; **or***
- b) they receive **or** have received any direct or indirect subsidy/ financial stake from any of them; **or***
- c) they have the same legal representative/agent for purposes of this bid; **or***
- d) they have relationship with each other, directly or through common third parties, that puts them in a position to have access to information about or influence on the bid of another Bidder; **or***
- e) Bidder participates in more than one bid in this bidding process. Participation by a Bidder in more than one Bid will result in the disqualification of all bids in which the parties are involved. However, this does not limit the inclusion of the components/ sub-assembly/ Assemblies from one bidding manufacturer in more than one bid; **or***

- f) *In cases of agents quoting in offshore procurements, on behalf of their principal manufacturers, one agent cannot represent two manufacturers or quote on their behalf in a particular tender enquiry. One manufacturer can also authorise only one agent/dealer. There can be only one bid from the following:*
- 1. The principal manufacturer directly or through one Indian agent on his behalf; and*
 - 2. Indian/foreign agent on behalf of only one principal;*
- or**
- g) *A Bidder or any of its affiliates participated as a consultant in the preparation of the design or technical specifications of the contract that is the subject of the Bid; or*
- h) *In case of a holding company having more than one independently manufacturing units, or more than one unit having common business ownership/management, only one unit should quote. Similar restrictions would apply to closely related sister companies. Bidders must proactively declare such sister/ common business/ management units in same/ similar line of business."*

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 VFD for 950kW, 3.3KV Motor for Yadadani (5x800MW) - FGD Package (hereinafter referred to as "Contract"). 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 panel of Independent External Monitor(s) (IEMs), 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. The Bidder(s)/ Contractor(s) commits himself to observe the following principles during 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 shall 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, terminate the contract, if already awarded, exclude from future business dealings and/ 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 (s) from the tender process before award / order acceptance according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.
- 4.2 If the Principal is entitled to terminate the Contract according to Section 3, or terminates the Contract in application of Section 3 above, the Bidder(s)/ Contractor (s) transgression through a violation of Section 2 above shall be construed breach of contract and the Principal shall be entitled to demand and recover from the Contractor an amount equal to 5% of the contract value or the amount equivalent to Security Deposit/ Performance Bank Guarantee, whichever is higher, as damages, in addition to and without prejudice to its right to demand and recover compensation for any other loss or damages specified elsewhere in the contract.

Section 5 - Previous Transgression

- 5.1 The Bidder declares that no previous transgressions occurred in the last 3 (three) 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 or action can be taken as per the separate "Guidelines on Banning of Business dealings with Suppliers/ Contractors", framed by the Principal.

Section 6 - Equal treatment of all Bidder (s)/ Contractor (s) / Sub-contractor (s)

- 6.1 The Principal will enter into Integrity Pacts with identical conditions as this Integrity Pact with all Bidders and Contractors.
- 6.2 In case of Sub-contracting, the Principal Contractor shall take the responsibility of the adoption of Integrity Pact by the Sub-contractor(s) and ensure that all Sub-contractors also sign the Integrity Pact.
- 6.3 The Principal will disqualify from the tender process all Bidders who do not sign this Integrity 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 panel of Independent External Monitor (s) (IEMs) for this Integrity Pact. The task of the IEMs is to review independently and objectively, whether and to what extent the parties comply with the obligations under this Integrity Pact.
- 8.2 The IEMs are 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 IEMs shall be provided access to all documents/ records pertaining to the Contract, for which a complaint or issue is raised before them as and when warranted. However, the documents/records/information having National Security implications and those documents which have been classified as Secret/Top Secret are not to be disclosed.
- 8.4 The Principal will provide to the IEMs 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 IEMs the option to participate in such meetings.

- 8.5 The advisory role of IEMs is envisaged as that of a friend, philosopher and guide. The advice of IEMs would not be legally binding and it is restricted to resolving issues raised by a 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 or during execution of Contract, the matter should be examined by the full panel of IEMs jointly, 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 the CMD, BHEL at the earliest. They may also send their report directly to the CVO, in case of suspicion of serious irregularities requiring legal/ administrative action. Only in case of very serious issue having a specific, verifiable Vigilance angle, the matter should be reported directly to the Commission. IEMs will tender their advice on the complaints within 30 days.
- 8.8 The CMD, BHEL shall decide the compensation to be paid to the IEMs and its terms and conditions.
- 8.9 IEMs 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 Principal should be looked into by the CVO of the Principal.
- 8.10 If the IEMs have 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 IEMs may also transmit this information directly to the Central Vigilance Commissioner, Government of India.
- 8.11 After award of work, the IEMs shall look into any issue relating to execution of Contract, if specifically raised before them. As an illustrative example, if a Contractor who has been awarded the Contract, during the execution of Contract, raises issue of delayed payment etc. before the IEMs, the same shall be examined by the panel of IEMs. Issues like warranty/ guarantee etc. shall be outside the purview of IEMs.
- 8.12 However, the IEMs may suggest systemic improvements to the management of the Principal, if considered necessary, to bring about transparency, equity and fairness in the system of procurement.
- 8.13 The word 'Monitor' would include both singular and plural.

Section 9 - Pact Duration

- 9.1 This Integrity Pact shall be operative from the date this Integrity Pact 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. Any violation of the same would entail disqualification of the bidders and exclusion from future business dealings.
- 9.2 If any claim is made/ lodged during currency of this Integrity Pact, 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.

AtwSord

Section 10 - Other Provisions

- 10.1 This Integrity Pact is subject to Indian Laws and exclusive jurisdiction shall be of the competent Courts as indicated in the Tender or Contract, as the case may be.
- 10.2 Changes and supplements as well as termination notices need to be made in writing.
- 10.3 If the Bidder(s)/ Contractor(s) is a partnership or a consortium or a joint venture, this Integrity Pact shall be signed by all partners of the partnership or joint venture or all consortium members.
- 10.4 Should one or several provisions of this Integrity Pact turn out to be invalid, the remainder of this Integrity Pact 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 Integrity Pact with the Principal would be competent to participate in the bidding. In other words, entering into this Integrity Pact would be a preliminary qualification.
- 10.6 In the event of any dispute between the Principal and Bidder(s)/ Contractor(s) relating to the Contract, in case, both the parties are agreeable, they may try to settle dispute through Mediation before the panel of IEMs in a time bound manner. In case, the dispute remains unresolved even after mediation by the panel of IEMs, either party may take further action as the terms & conditions of the Contract. The fees/expenses on dispute resolution through mediation shall be shared by both the parties. Further, the mediation proceedings shall be confidential in nature and the parties shall keep confidential all matters relating to the mediation proceedings including any settlement agreement arrived at between the parties as outcome of mediation. Any views expressed, suggestions, admissions or proposals etc. made by either party in the course of mediation shall not be relied upon or introduced as evidence in any further arbitral or judicial proceedings, whether or not such proceedings relate to the dispute that is the subject of mediation proceedings. Neither of the parties shall present IEMs as witness in any Alternative Dispute Resolution or judicial proceedings in respect of the dispute that was subject of mediation.

ಅತುಲ ಸುಖಾಚಾರ್ಯ/ಬಿ.ಟಿ.ಡಿ.-ಎಂಜಿ.-ಸಿ.ಐ.ಇ.
 ಅತುಲ ಸುಖಾಚಾರ್ಯ/ಬಿ.ಟಿ.ಡಿ.-ಎಂಜಿ.-ಸಿ.ಐ.ಇ.
 For & On behalf of the Principal
 BHEL-EDN (Office Seal)
 ATOL S. KHACHARY/ T & PD ENGG-COF
 CE-MM-PR
 BHEL-EDN, MYSURU ROAD, BENGALURU-560 026

Place Bangalore
 Date 01-10-24

Witness: Sathish
 (Name & Address) ಎಸ್. ಸತೀಶ್ ಕುಮಾರ್, ಬೆಂಗಳೂರು/ನಿ.ಉ.-ಎಂಜಿ.-ಬಿ.ಟಿ.ಇ.
 ಎಸ್. ಸತೀಶ್ ಕುಮಾರ್, ಬೆಂಗಳೂರು/ನಿ.ಉ.-ಎಂಜಿ.-ಬಿ.ಟಿ.ಇ.
 S. SATHISH KUMAR, MANAGER/CE
 BHEL-EDN, MYSURU ROAD, BENGALURU-560 026

For & On behalf of the Bidder/ Contractor
 (Office Seal)

Witness: _____
 (Name & Address) _____

Clause on IP in the tender**“Integrity Pact (IP)”**

- (a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner. Following Independent External Monitors (IEMs) on the present panel have been appointed by BHEL with the approval of CVC to oversee implementation of IP in BHEL.

SI	IEM	Email
1.	Shri Arun Chandra Verma, IPS (Retd.)	acverma1@gmail.com
2.	Shri Virendra Bahadur Singh, IPS (Retd.)	vbsinghips@gmail.com

- (b) The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory) along with techno-commercial bid (Part-I, in case of two/ three part bid). Only those bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.
- (c) Please refer Section-8 of IP for Role and Responsibilities of IEMs. In case of any complaint arising out of the tendering process, the matter may be referred to any of the above IEM(s). All correspondence with the IEMs shall be done through email only.

Note:

No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department's officials whose contact details are provided below:

Details of contact person(s):

Name: Sathish Kumar S
 Dept.: CE-MM-PR
 Address: BHEL-EDN, Bangalore
 Phone: 9449869753
 Email: sathishkumars@bhel.in

Name: Atul Sood
 Dept.: CE-MM-PR
 Address: BHEL-EDN, Bangalore
 Phone: 7795367467
 Email: atulsood@bhel.in

Annexure

Annexure I
Guidelines for Indian Agents

- **Definition of Indian Agent:** An Indian Agent of foreign principal is an individual, a partnership, an association of persons, a private or public company, that carries out specific obligation(s) towards processing of BHEL tender or finalization or execution of BHEL's contract on behalf of the foreign supplier.

In case of yes, vendor to note the following and reply accordingly:

- i. BHEL shall deal directly with foreign vendors, wherever required, for procurement of goods. However, if the foreign principal desires to avail of the services of an Indian agent, then the foreign principal should ensure compliance to regulatory guidelines - which require mandatory submission of an Agency Agreement.
- ii. It shall be incumbent on the Indian agent and the foreign principal to adhere to the relevant guidelines of Government of India, issued from time to time.
- iii. The Agency Agreement should specify the precise relationship between the foreign OEM / foreign principal and their Indian agent and their mutual interest in the business. All services to be rendered by agent/ associate, whether of general nature or in relation to the particular contract, must be clearly stated by the foreign supplier/ Indian agent. Any payment, which the agent or associate receives in India or abroad from the OEM, whether as commission or as a general retainer fee should be brought on record in the Agreement and be made explicit in order to ensure compliance to laws of the country.
- iv. Any agency commission to be paid by BHEL to the Indian agent shall be in Indian currency only.
- v. Tax deduction at source is applicable to the agency commission paid to the Indian agent as per the prevailing rules.
- vi. In the absence of any agency agreement, BHEL shall not deal with any Indian agent (authorized representatives / associate / consultant, or by whatever name called) and shall deal directly with the foreign principal only for all correspondence and business purposes.
- vii. The "Guidelines for Indian Agents of Foreign Suppliers" enclosed at annexure - 'A' shall apply in all such cases.

- viii. The supply and execution of the Purchase Order (including indigenous supplies/ service) shall be in the scope of the OEM/ foreign principal. The OEM/ foreign principal should submit their offer inclusive of all indigenous supplies/ services and evaluation will be based on 'total cost to BHEL'. In case OEM/ foreign principal recommends placement of order(s) towards indigenous portion of supplies/ services on Indian supplier(s)/ agent on their behalf, the credentials/ capacity/ capability of the Indian supplier(s)/ agent to make the supplies/ services shall be checked by BHEL as per the extant guidelines of Supplier Evaluation, Approval & Review Procedure (SEARP), before opening of price bids. In this regard, details may be checked as per Annexure-B (copy enclosed). It will be the responsibility of the OEM/ foreign principal to get acquainted with the evaluation requirements of Indian supplier/ agent as per SEARP available on www.bhel.com.

The responsibility for successful execution of the contract (including indigenous supplies/ services) lies with the OEM/ foreign principal. All bank guarantees to this effect shall be in the scope of the OEM/ foreign principal.

—X—

Vendor's Signature with Seal

Guidelines for Indian Agents of Foreign Suppliers

- 1.0 There shall be compulsory registration of agents for all Global (Open) Tender and Limited Tender. An agent who is not registered with BHEL shall apply for registration in the registration form in line with SEARP.
- 1.1 Registered agents will file an authenticated Photostat copy duly attested by a Notary Public/Original certificate of the Principal confirming the agency agreement and giving the status being enjoyed by the agent and the commission/ remuneration/ salary/ retainership being paid by the principal to the agent before the placement of order by BHEL.
- 1.2 Wherever the Indian representatives have communicated on behalf of their principals and the foreign parties have stated that they are not paying any commission to the Indian agents, and the Indian representative is working on the basis of salary or as retainer, a written declaration to this effect should be submitted by the party (i.e. Principal) before finalizing the order.
- 2.0 **Disclosure of particulars of agents/ representatives in India, if any.**
- 2.1 Tenderers of Foreign nationality shall furnish the following details in their offers:
 - 2.1.1 The Bidder(s)/ Contractor(s) of foreign origin shall disclose the name and address of the agents/ representatives in India if any and the extent of authorization and authority given to commit the Principals. In case the agent/ representative be a foreign Company, it shall be confirmed whether it is existing Company and details of the same shall be furnished.
 - 2.1.2 The amount of commission/ remuneration included in the quoted price(s) for such agents/ representatives in India.
 - 2.1.3 Confirmation of the Tenderer that the commission/ remuneration, if any, payable to his agents/ representatives in India, may be paid by BHEL in Indian Rupees only.
- 2.2 Tenderers of Indian Nationality shall furnish the following details in their offers:
 - 2.2.1 The Bidder(s)/ Contractor(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any, indicating their nationality as well as their status, i.e. whether manufacturer or agents of manufacturer holding the Letter of Authority of the Principal specifically authorizing the agent to make an offer in India in response to tender either directly or through the agents/ representatives.
 - 2.2.2 The amount of commission/ remuneration included in the price (s) quoted by the Tenderer for himself.
 - 2.2.3 Confirmation of the foreign principals of the Tenderer that the commission/ remuneration, if any, reserved for the Tenderer in the quoted price(s), may be paid by BHEL in India in equivalent Indian Rupees on satisfactory completion of the Project or supplies of Stores and Spares in case of operation items.
- 2.3 In either case, in the event of contract materializing, the terms of payment will provide for payment of the commission/ remuneration, if any payable to the agents/ representatives in India in Indian Rupees on expiry of 90 days after the discharge of the obligations under the contract.
- 2.4 Failure to furnish correct and detailed information as called for in paragraph 2.0 above will render the concerned tender liable to rejection or in the event of a contract materializing, the same liable to termination by BHEL. Besides this there would be a penalty of banning business dealings with BHEL or damage or payment of a named sum.

ANNEXURE - II
LIST OF INTERNATIONAL GATEWAY AIRPORTS

For air based consignment, terms of delivery will be on FCA basis from following listed airports only. Vendors are requested to verify this list for use before submission of offer.

SCHEDULE NO	COUNTRY	CURRENCY CODE	AIRPORT
D01	UK	GBP	LONDON (HEATHROW)
D02	UK	GBP	NEW CASTLE
D03	UK	GBP	OXFORD. CHETLAM
D04	UK	GBP	BRISTOL. WELLINGBOROUGH
D05	UK	GBP	BIRMINGHAM
D06	UK	GBP	EAST MIDLANDS
D07	UK	GBP	MANCHESTER
D08	UK	GBP	LEEDS
D09	UK	GBP	GLASGOW
D10	FRANCE	EURO	PARIS (ROISSY) & LYON
D11	SWEDEN	EURO	STOCKHOLM
D12	SWEDEN	EURO	GOTHENBERG & MALMO
D13	ITALY	EURO	ROMA, MILAN
D14	ITALY	EURO	TURIN, BOLOGNA, FLORENCE
D15	NETHERLANDS	EURO	AMSTERDAM, ROTTERDAM
D16	AUSTRIA	EURO	VIENNA, LINZ, GRAZ
D17	BELGIUM	EURO	ANTWERP, BRUSSELS
D18	DENMARK	DKK	COPENHAGEN
D19	JAPAN	JPY	TOKYO, OSAKA
D20	SINGAPORE	SGD	SINGAPORE
D21	CANADA	CAD	TORONTO
D22	CANADA	CAD	MONTREAL
D23	USA	USD	NEW YORK, BOSTON
D24	USA	USD	CHICAGO
D25	USA	USD	SAN FRANCISCO, LOS ANGELES
D26	USA	USD	ALANTA, HOUSTON
D27	GERMANY	EURO	MUNICH, KOLN, DUSSELDORF, HANNOVER, HAMBURG, STUTTGART, DAMSTADT, MANIHIEM, NURUMBERG
D28	GERMANY	EURO	FRANKFURT
D29	GERMANY	EURO	BERLIN
D30	SWITZERLAND	SFR	BASLE, ZURICH, GENEVA
D31	SPAIN	EURO	BARCELONA
D32	AUSTRALIA	AUD	SYDNEY
D33	AUSTRALIA	AUD	MELBOURNE
D34	AUSTRALIA	AUD	PERTH
D35	CZECH	EURO	PRAGUE
D36	HONG KONG	HKD	HONG KONG
D37	NEW ZELAND	NZD	AUCKLAND
D38	RUSSIA	USD	MOSCOW
D39	SOUTH KOREA	USD	KIMPO INTERNATIONAL, INCHEON
D40	FINLAND	EURO	HELSINKI
D41	ROMANIA	EURO	BUCHAREST
D42	NORWAY	EURO	OSLO
D43	IRELAND	EURO	DUBLIN
D44	ISRAEL	USD	TEL AVIV
D45	UAE	USD	DUBAI
D46	OMAN	USD	MUSCAT
D47	EGYPT	USD	CAIRO
D48	TAIWAN	USD	TAIPEI
D49	UKRAINE	USD	KIEV
D50	CHINA	USD	SHANGHAI, SHENZHEN
D51	PHILIPINES	USD	MANILA
D52	MALAYSIA	USD	KUALALUMPUR, PE NANG
D53	CYPRUS	USD	LARNACA
D54	SOUTH AFRICA	USD	JOHANNESBERG, DURBAN
D55	SLOVAKIA	EURO	BARTISLOVA
D56	SAUDI ARABIA	SAR	RIYADH
D57	TURKEY	EURO	ISTANBUL
D58	THAILAND	USD	BANGKOK
D59	BRAZIL	USD	SAO PAULO, RIO DE JANEIRO

ANNEXURE – III

DISCREPANCY IN WORDS & FIGURES – QUOTED IN PRICE BID

Following guidelines will be followed in case of discrepancy in words & figures-quoted in 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 to (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.

ANNEXURE - IV
Electronic Funds Transfer (EFT) OR
Paylink Direct Credit Form

Please Fill up the form in **CAPITAL LETTERS** only.

TYPE OF REQUEST(Tick one): ☐ CREATE ☐ CHANGE

BHEL Vendor / Supplier Code:

Company Name :

Permanent Account Number(PAN):

Address

City:

PINCODE

STATE

Contact Person(s)

Telephone No:

Fax No:

e-mail id:

1 Bank Name:

2 Bank Address:

3 Bank Telephone No:

4 Bank Account No:

5 Account Type: Savings/Cash Credit

6 9 Digit Code Number of Bank and branch

appearing on MICR cheque issued by Bank

7 Bank IFSC Code(applicable for NEFT)

8 Bank IFSC code(applicable for RTGS)

(Indian Financial System Code)

- A I hereby certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorise BHEL, EDN, Bangalore to electronically deposit payments to the designated bank account.
- B If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transferring Bank responsible.
- C This authority remains in full force until BHEL, EDN, Bangalore receives written notification requesting a change or cancellation.
- D I have read the contents of the covering letter and agree to discharge the responsibility expected of me as a participant under ECS / EFT.

Date:

Authorised Signatory:

Designation:

Telephone No. with STD Code

Company Seal

Bank Certificate

We certify that _____ has an Account No _____ with us and we confirm that the bank details given above are correct as per our records.

Date:

(.....)

Place:

Signature

Please return completed form along with a blank cancelled cheque or photocopy thereof to:

Bharath Heavy Electricals Ltd,

Attn:

Electronics Division, Mysore Road,

BANGALORE - 560 026

In case of any Query, please call concerned purchase executive.

ANNEXURE - V
PRESENT PROCEDURE FOR SALE IN TRANSIT (HIGH SEA SALES)

In case of High Sea Sales, vendor should submit following documents:

1. ORIGINAL HIGH SEA SALES AGREEMENT

- Sale agreement (on Rs. 200/- non-judicial stamp paper & notarised with 2 witnesses with identity) has to be signed between BHEL and the Party importing material. The date of the sale documents should be in between the date of House Air Way Bill / Bill of Lading and before landing of the goods in Indian origin.
- Following shall be included in the High Sea Sales Agreement:
"THE BUYER ALSO UNDERTAKE DISCHARGES, THE OBLIGATION AND FULFILLMENT OF CONDITIONS, IF ANY, ATTACHED TO THE IMPORTATION, ASSESSMENT AND CLEARANCE OF THE GOODS IN TERMS CUSTOMS TARIFF ACT 1975, THE CUSTOMS ACT 1962 & RULES & REGULATIONS MADE THERE UNDER AND OTHER RELEVANT ACTS, ORDERS, NOTIFICATIONS".

2. ORIGINAL INVOICES: INDIGENOUS RUPEE INVOICE & FOREIGN CURRENCY INVOICE

- Prices should be C.I.F., designated airport/seaport basis.
- I.E.C., C.S.T., K.S.T. Nos. to be mentioned.
- Description of item (Nomenclature), Unit & Quantity in both the Foreign Currency & the Indigenous Invoice in Rupee shall be exactly as per Purchase Order Description of item, Quantity and Unit. The Indigenous Invoice value shall be exactly as per Purchase Order value.
- Seller should give Foreign Currency Invoice from the original consignor. The Foreign Currency Invoice value should be at least 2% (two per cent) less than the Indigenous Rupee Invoice value in equivalent foreign currency.

4. ORIGINAL HOUSE AIR WAY BILL/ BILL OF LADING

- The sale agents should duly endorse House Air Way Bill (HAWB) for air shipments or original Bill of Lading (O.B.L.) for sea shipments and Foreign Currency Invoice in favour of BHEL-EDN.

5. ORIGINAL CARGO ARRIVAL NOTICE FROM FORWARDER.

6. ORIGINAL DELIVERY ORDER ISSUED IN NAME OF BHEL-EDN.

7. ORIGINAL PACKING LIST.

8. A LETTER TO THE COMMISSIONER OF CUSTOMS FOR EFFECTING ABOVE SALE.

9. A LETTER TO THE DEPUTY ASSESSOR (OCTROI) FOR EFFECTING ABOVE SALE IN FAVOUR OF BHEL.

REMARKS: In case vendor needs any clarifications on the above, the same may be sought in writing.

Sl. No.	Name of the bank
1	State Bank of India
2	Canara Bank
3	IDBI Bank Limited
4	ICICI Bank Limited
5	HDFC Bank Limited
6	Axis Bank
7	IndusInd Bank Limited
8	Bank of Baroda
9	Exim Bank
10	Indian Bank
11	Punjab National Bank
12	Union Bank of India
13	Yes Bank Limited
14	RBL Bank Ltd.
15	Standard Chartered Bank
16	Indian Overseas Bank
17	Kotak Mahindra Bank Limited
18	Federal Bank Limited
19	Hongkong and Shanghai Banking Corporation Ltd

Annexure-X

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To
NAME
& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____¹ through its Unit at.....(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) with its registered office at _____² hereinafter referred to as the ' Vendor / Contractor / Supplier ', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref No.....dated³ valued at Rs.....⁴ (Rupees -----)/FC.....(in words.....) for⁵ (hereinafter called the 'Contract') and the Vendor / Contractor / Supplier having agreed to provide a Contract Performance Bank Guarantee, equivalent to% (.... Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we,, (hereinafter referred to as the Bank), having registered/Head office at and inter alia a branch at being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs —⁶ (Rupees -----) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor / Contractor / Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the Vendor / Contractor / Supplier shall have no claim against us for making such payment.

We thebank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance guarantee period as per the terms of the Contract and that it shall continue to be enforceable till

all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

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

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Vendor / Contractor / Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the Vendor / Contractor / Supplier 's liabilities.

This Guarantee shall remain in force upto and including.....⁷ and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Vendor / Contractor / Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the⁵ we shall be discharged from all liabilities under this guarantee thereafter.

We, BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

- a) The liability of the Bank under this Guarantee shall not exceed.....⁶
- b) This Guarantee shall be valid up to⁷
- c) Unless the Bank is served a written claim or demand on or before⁸ all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Dated.....

Place of Issue.....

¹ NAME AND ADDRESS OF EMPLOYER i.e Bharat Heavy Electricals Limited

² NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.

³ DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE

⁴ CONTRACT VALUE

⁵ PROJECT/SUPPLY DETAILS

⁶ BG AMOUNT IN FIGURES AND WORDS

⁷ VALIDITY DATE

⁸ DATE OF EXPIRY OF CLAIM PERIOD

F. No. DPE/3(3)/10-Fin.
Government of India
Ministry of Finance
Department of Public Enterprises

Block No. 14, CGO Complex,
Lodi Road, New Delhi-110003
Dated the 29th May, 2023

To,

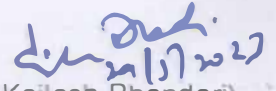
Chief Executives of all CPSEs

Subject:- Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017 - regarding

Sir/Madam,

The undersigned is directed to forward herewith a copy of Department of Expenditure O.M. dated 18th May, 2023 on the subject mentioned above for information and strict compliance.

Encl : As stated


(Kailash Bhandari)
Deputy Director
Tel : 2436-6247

Copy to :- Shri Kanwalpreet, Director, Department of Expenditure, Room No. 264-C,
North Block, New Delhi.

No.F.1/4/2021-PPD
Government of India
Ministry of Finance
Department of Expenditure
Public Procurement Division

264-C, North Block, New Delhi.
18.05.2023.

OFFICE MEMORANDUM

Subject: Concurrent application of Public Procurement Policy for Micro and Small Enterprises Order, 2012 and Public Procurement (Preference to Make in India) Order, 2017.

The undersigned is directed to refer two Preferential Procurement Orders mandated for the Public Procurement in India, namely:

- i. Public Procurement Policy for Micro and Small Enterprises (MSEs) Order dated 23.03.2012 (PPP-MSE Order) issued by Ministry of Micro, Small and Medium Enterprises (MoMSME) in exercise of the powers conferred in Section 11 of the MSME Development Act, 2006. (Last revised on 09.11.2018)
 - ii. Public Procurement (Preference to Make in India) Order, 2017 (PPP-MII order), under Rule 153(iii) of the General Financial Rules (GFRs) 2017, approved by the Cabinet. Implementation of this PPP-MII order is monitored by Department for Promotion of Industry and Internal Trade (DPIIT). (Last revised on 16.09.2020.)
2. It has been brought to the notice of this Department that concurrent application of these two orders are creating confusion to the procuring entities and different procuring entities interpret them differently. In order to bring predictability both to the procuring entities as well as bidders, following guidelines are being issued.

Guidelines

3. The Class-I local suppliers, under PPP-MII Order, participating in any government tender, may or may not be MSEs, as defined under the MSME Act. Similarly, MSEs participating in any government tender, may or may not be Class-I local suppliers. Suppliers may be categorised in following four broad categories for consideration or applicability of purchase preference:

Category	Terminology
Supplier is both MSE & Class-I local supplier.	"MSE Class-I local supplier"
Supplier is MSE but not Class-I local supplier.	"MSE but non-Class-I local supplier"
Supplier is not MSE but is Class-I local supplier.	"Non-MSE but Class-I local supplier"
Supplier is neither MSE nor Class-I local.	"Non-MSE non-Class-I local supplier"

4. The applicability of PPP-MSE Order and PPP-MII Order in various scenarios, involving simultaneous purchase preference to MSEs and Class-I local suppliers under PPP-MSE Order and PPP-MII Order respectively, shall be as under:

a) *Items covered under Para 3(a) of PPP- MII Order, 2017 for which Nodal Ministry has notified sufficient local capacity and competition:* For these items, only Class-I local suppliers are eligible to bid irrespective of purchase value. Hence, Class-II local suppliers or Non-local suppliers, including MSEs which are Class-II local suppliers/ Non-local suppliers, are not eligible to bid. Possible scenarios can be as under:

- (i) L-1 is "MSE Class-I local supplier" - 100% of the tendered quantity is to be awarded to L-1.
- (ii) L-1 is "Non-MSE but Class-I local supplier" - Purchase preference is given to MSEs as per PPP-MSE Order. Balance quantity is to be awarded to the L-1 bidder.

b) *Items reserved exclusively for procurement from MSEs as per PPP-MSE Order:* These items are reserved exclusively for purchase from MSEs. Hence, non-MSEs are not eligible to bid for these items. Possible scenarios can be as under:

- (i) L-1 is "MSE Class-I local supplier" - 100% of the tendered quantity is to be awarded to L-1.
- (ii) L-1 is "MSE non-Class-I local supplier" - Purchase preference is to be given to Class-I local supplier as per PPP-MII Order. Balance quantity, is to be awarded to L-1 bidder.

c) *If items are neither notified for sufficient local capacity nor reserved for MSEs, then the process will be as follows:*

c (a) Items covered under Para 3A(b) of PPP-MII Order are divisible items and both MSEs as well as Class-I local suppliers are eligible for purchase preference. Possible scenarios can be as under:

- (i) L-1 is "MSE Class-I local supplier" - 100% of the tendered quantity is to be awarded to L-1.
- (ii) L-1 is "Non-MSE but Class-I local supplier" - Purchase preference is to be given to MSEs, if eligible, as per PPP-MSE Order. Balance quantity is to be awarded to L-1 bidder.
- (iii) L-1 is "MSE but non-Class-I local supplier" - Purchase preference is to be given to Class-I local suppliers, if eligible, as per PPP-MII Order. Balance quantity is to be awarded to L-1 bidder.
- (iv) L-1 is "Non-MSE non-Class-I local supplier" - Purchase preference is to be given to MSEs as per PPP-MSE Order. Thereafter, purchase preference is to be given to Class-I local suppliers for "50% of the tendered quantity minus quantity allotted to MSEs

above" as per PPP- MII Order. For the balance quantity, contract is to be awarded to L-1 bidder. (Kindly refer to the illustrative example in the annexure).

- c (b) Items covered under Para 3A(c) of PPP-MII Order, 2017 are non-divisible items and both MSEs as well as Class-I local suppliers are eligible for purchase preference. Possible scenarios can be as under:
- (i) L-1 is "MSE Class-I local supplier" - Contract is awarded to L-1.
 - (ii) L-1 is not "MSE Class-I local supplier" but the "MSE Class-I local supplier" falls within 15% margin of purchase preference - Purchase preference is to be given to lowest quoting "MSE Class-I local supplier". If lowest quoting "MSE Class-I local supplier" does not accept the L-1 rates, the next higher "MSE Class-I local supplier" falling within 15% margin of purchase preference is to be given purchase preference and so on.
 - (iii) If conditions mentioned in sub paras (i) and (ii) above are not met i.e. L-1 is neither "MSE Class-I local supplier" nor "MSE Class-I local supplier" is eligible to take benefit of purchase preference, the contract is to be awarded/ purchase preference to be given in different possible scenarios as under:
 - A. L1 is "MSE but non-Class-I local supplier" or "Non-MSE but Class-I local supplier" – Contract is to be awarded to L1.
 - B. L1 is "Non-MSE non-Class-I local supplier" - First purchase preference to be given to MSE as per PPP-MSE Order. If MSE not eligible/ does not accept - purchase preference to be given to Class- I Local supplier as per PPP-MII Order. If Class-I Local supplier also not eligible/ does not accept – contract to be awarded to L-1.
- d) *Items reserved for both MSEs and Class-I local suppliers:* These items are reserved exclusively for purchase from MSEs as well as Class-I local suppliers. Hence, only "MSE Class-I local supplier" are eligible to bid for these items. Non-MSEs/Class-II local suppliers/ Non-local suppliers cannot bid for these items. Hence the question of purchase preference does not arise.
- e) Non-local suppliers, including MSEs falling in the category of Non-local suppliers, shall be eligible to bid only against Global Tender Enquiry.

(Kanwalpreet)
Director

Tel.: -223093811; email: - kanwal.irss@gov.in

To

1. Secretaries of all Central Government Ministries/ Departments.
2. Secretary Department of Public Enterprises with a request for issuing suitable instructions to all Central Public Sector Enterprises in this regard.

Example explaining applicability in scenario explained in para 4 c (a)(iv)

(Scenario: Divisible items, both MSEs as well as Class-I local suppliers eligible for purchase preference and L-1 is "Non-MSE non-Class-I local supplier")

Item – Desktop computer

Qty – 50 Nos.

Details of bids received

Sr. No.	Name of bidder	Rates quoted	Price Ranking	Status of bidder
1.	A	100	L1	"Non-MSE non- Class-I local supplier"
2.	B	110	L2	"Non-MSE but Class-I local supplier"
3.	C	112	L3	"MSE but non- Class-I local supplier"
4.	D	115	L4	"Non-MSE but Class-I local supplier"
5.	E	118	L5	"MSE but non- Class-I local supplier"
6.	F	120	L6	"MSE Class-I local supplier"

1. In this case, first purchase preference is to be given to MSEs as per PPP-MSE Order for 25% of tendered quantity of 50 Nos. i.e. 12.5 Nos. (rounded off to the next whole number say 13 Nos). Accordingly, invite L3 (bidder C), whose quoted rates falls within 15% margin of purchase preference to match L1 price i.e. Rs. 100/- for quantity of 13 Nos. Bidder "E" and "F", although MSEs, will not get purchase preference since their quoted rates don't fall within 15% margin of purchase preference. Bidder C will be considered for order of 13 Nos. on confirmation of reduction of price.
2. For 50% of balance quantity of 37 number (tendered quantity of 50 – 13 awarded to bidder C; assuming bidder C has confirmed to accept L1 rates), purchase preference will be given to lowest Class-I local supplier as per PPP-MII Order. Accordingly, bidder B will be invited to match L-1 price for 50% of 37 Nos i.e. 18.5 (say 19 Nos of computers). If bidder "B" does not accept the L1 price i.e. price of Rs. 100/- per unit, next higher Class-I local supplier falling within 20% margin of purchase preference, i.e. bidder "D", may be invited to match L-1 price for 19 Nos. of computers and so on.
3. For remaining quantity i.e. 18 Nos (50-13-19), the contract will be awarded to lowest quoting bidder i.e. Bidder "A", who is L-1 in the example.

Annexure-X

Restrictions under Rule 144(xi) of General Financial Rules, 2017 amendment dt: 23.07.2020

- I. Any bidder from a country which shares a land border with India will be eligible to bid in this tender only if the bidder is registered with the Competent Authority.
- II. "Bidder" (including the term 'tenderer', 'consultant' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency branch or office controlled by such person, participating in a procurement process.
- III. "Bidder from a country which shares a land border with India" for the purpose of this Order means :-
 - a. An entity incorporated, established or registered in such a country; or
 - b. A subsidiary of an entity incorporated, established or registered in such a country; or
 - c. An entity substantially controlled through entities incorporated, established or registered in such a country; or
 - d. An entity whose *beneficial owner* is situated in such a country; or
 - e. An Indian (or other) agent of such an entity; or
 - f. A natural person who is a citizen of such a country; or
 - g. A consortium or joint venture where any member of the consortium or joint venture falls under any of the above
- IV. The *beneficial owner* for the purpose of (iii) above will be as under:
 1. In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has a controlling ownership interest or who exercises control through other means.

Explanation--

 - a. "Controlling ownership interest" means ownership of or entitlement to more than twenty-five per cent of shares or capital or profits of the company;
 - b. "Control" shall include the right to appoint majority of the directors or to control the management or policy decisions including by virtue of their shareholding or management rights or shareholders agreements or voting agreements;
 2. In case of a partnership firm, the beneficial owner is the natural person(s) who, whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

3. In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
4. Where no natural person is identified under (1) or (2) or (3) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
5. In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.

V. An Agent is a person employed to do any act for another, or to represent another in dealings with third person.



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division

PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 002- Rev 03

GENERAL COMMERCIAL CONDITIONS FOR CONTRACT

These 'General Commercial Conditions for Contract for Purchase' herein after referred to as GCC apply to all enquiries, tenders, requests for quotations, orders, contracts and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliveries") to Bharat Heavy Electricals Limited and any of its units, regions or divisions (hereinafter referred to as "BHEL" or the Purchaser) or its projects/ customers.

Any deviations from or additions to these GCC require BHEL's express written consent. The general terms of business or sale of the vendor shall not apply to BHEL. Acceptance, receipt of shipments or services or effecting payment shall not mean that the general terms of business or sale of the vendor have been accepted.

Orders, agreements and amendments thereto shall be binding if made or confirmed by BHEL in writing. Only the Purchasing department of BHEL is authorized to issue the Purchase Order or any amendment thereof.

Definitions: Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.

- a) 'The Purchaser' means Bharat Heavy Electricals Limited, Electronics division, Mysore road, Bangalore 560 026, a Unit of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act having its registered office at BHEL House, Siri Fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.
- b) 'The vendor' means the person, firm, company or organization on whom the Purchase Order is placed and shall be deemed to include the vendor's successors, representative heirs, executors and administrator as the case may be. It may also be referred to as Seller, Contractor or Supplier.
- c) 'Contract' shall mean and include the Purchase Order incorporating various agreements, viz. tender/ RFQ, offer, letter of intent/acceptance/ award, the General Conditions of Contract and Special Conditions of Contract for Purchase, Specifications, Inspection/ Quality Plan, Schedule of Prices and Quantities, Drawings, if any enclosed or to be provided by BHEL or his authorized nominee and the samples or patterns if any to be provided under the provisions of the contract.
- d) 'Parties to the Contract' shall mean the 'The Vendor' and the Purchaser as named in the main body of the Purchase Order.

Order of Precedence:

In case of any inconsistency or contradiction between any of the documents, the order of precedence shall be Purchase Order, LOI / LOA, Special Conditions of Contract and General Conditions of Contract for commercial conditions; and specific agreement on technical conditions, RFQ/offer and specification for Technical Conditions.

Interpretation:

In the contract, except where the context requires otherwise:

- a) words indicating one gender include all genders;
- b) words indicating the singular also include the plural and words indicating the plural also include the singular;

- c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
- d) "Written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

Applicable Conditions:

1. Price Basis: All prices shall be firm until the purchase order is executed / completed in all respects. No price variations / escalation shall be permitted.
2. Ordering and confirmation of Order: Vendor shall send the order acceptance on their company letter head/ through e-mail within a week from the date of receipt of Purchase Order or such other period as specified/ agreed by BHEL. BHEL reserves the right to revoke the order placed if the order confirmation differs from the original order placed. The acceptance of goods/services/supplies by BHEL as well as payments made in this regard shall not imply acceptance of any deviations.
The purchase order will be deemed to have been accepted if no communication to the contrary is received within one week (or the time limit as specified/agreed by BHEL) from the date of receipt of the purchase order.
3. Documentation: After receipt of Purchase Order, vendor should submit necessary documents (if & as applicable) like drawings specified, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report, O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
At any stage within the contract period, the vendor shall notify of any error, fault or other defect found in BHEL's documents /specifications or any other items for reference. If and to the extent that (taking account of cost and time) any vendor exercising due care would have discovered the error, fault or other defect when examining the documents/specifications before submitting the tender, the time for completion shall not be extended. However if errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the vendor's documents, they shall be corrected at his cost, notwithstanding any consent or approval.
4. Penalty:
 - a. For delay in documentation: In the event of delay in submission of complete set of specified documents ((like drawings, bill of materials, datasheets, catalogues, quality plan etc. as called in tender specifications including soft copies wherever applicable) in required sets beyond two(02) weeks (or as agreed/indicated in the SCC/Purchase Order) from the date of receipt of Purchase Order(by email), penalty at 0.5% (half percent) per week or part thereof, limited to a maximum of 5% (five percent) of the basic material value of the Purchase Order will be applicable.

Penalty for delayed documentation if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted. GST as applicable will be recovered along with penalty amount.

- b. For delay in delivery: In the event of delay in agreed contractual delivery as per Purchase Order, penalty @ 0.5 % (half percent) per week or part thereof but limited to a max of 10% (ten percent) value of undelivered portion (basic material cost) will be applicable. Delivery will commence from the date of issue of Manufacturing clearance along with approved document. The date for which Inspection call is issued by vendor along with test certificates / test reports /Certificate of Conformance / calibration reports, as proof of completion of manufacturing will be treated as date of deemed delivery for penalty calculation. In the absence of furnishing such document indicated above as proof of completion of manufacturing along with inspection call, actual date of inspection will be considered as date of deemed delivery and BHEL will not be responsible for delay in actual date of inspection.

Penalty for delayed delivery if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be

deducted.

5. Contract variations (Increase or decrease in the scope of supply): BHEL may vary the contracted scope as per requirements at site. If vendor is of the opinion that the variation has an effect on the agreed price or delivery period, BHEL shall be informed of this immediately in writing along with technical details. Where unit rates are available in the Contract, the same shall be the basis for such additional work. Vendor shall not perform additional work before BHEL has issued written instructions/ amendment to the Purchase Order to that effect. The work which the vendor should have or could have anticipated in terms of delivering the service(s) and functionality (i.e.) as described in this agreement, or which is considered to be the result of an attributable error on the vendor's part, shall not be considered additional work.
6. Pre-dispatch inspection at Seller premises: Before dispatch, the goods will be inspected by Buyer / Consignee or their Authorized Representative or by Nominated External Inspection Agency (independently or jointly with Buyer or Consignee as decided by the Buyer) at Seller premises (or at designated place for inspection as declared / communicated by the seller) for their compliance to the contract specification. For in-house testing, the Sellers will provide necessary facilities free of cost.

Prior written notice of at least 10 days shall be given along with internal test certificates/COC and applicable test certificates. Buyer will notify the Seller about the Authorized Representative/ Nominated External Inspection Agency and the date for testing. Scope of inspection is limited to 'approved Quality plan or QA Checklist or Purchase specification'. BHEL reserves the right for conducting repeat test, if required. All tests have to be conducted as applicable in line with approved Quality plan or QA Checklist or Purchase specification and original reports shall be furnished to BHEL-EDN, Bangalore for verification/acceptance for issue of dispatch clearance.

All costs related to re-inspection(s) shall be borne by vendor. Whether the Contract provides for tests on the premises of the vendor or any of his Sub-contractor/s, vendor shall be responsible to provide such assistance, labour, materials, electricity, fuel, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by BHEL only if specifically agreed to in the purchase order.

7. Transit Insurance: Transit insurance coverage between vendor's works and project site shall be to the account of BHEL, unless specifically agreed otherwise. However, vendor shall send intimation directly to insurance agency (as mentioned in dispatch instructions issued by BHEL) through fax/courier/e-mail, immediately on dispatch of goods for covering insurance. A copy of such intimation sent by vendor to insurance agency shall be given to BHEL along with dispatch documents. Dispatch documents will be treated as incomplete without such intimation copy. BHEL shall not be responsible for sending intimations to insurance agency on behalf of the vendor.
8. Mode of dispatch:
Indigenous Scope: By road on Door Delivery Consignee Copy attached basis through your approved transporter (unless otherwise indicated in Dispatch Instructions), only on receipt of Despatch Clearance from BHEL.
Import Scope: By Air/Sea through BHEL approved Freight Forwarder/supplier approved Consolidator respectively as per agreed contractual terms, only on receipt of Dispatch Clearance from BHEL.
9. Changes in Statutory levies:
 If any rates of Tax are increased or decreased, a new Tax is introduced, an existing Tax is abolished, or any change in interpretation or application of any Tax occurs in the course of the execution of Contract, which was or will be assessed on the bidder in connection with performance of the Contract, an equitable adjustment of the Contract Price shall be made to fully take into account any such change by addition to the Contract Price or deduction there from, as the case may be. However, these adjustments would be restricted to direct transactions between BHEL and the bidder /agent of foreign bidder (if applicable). These adjustments shall not be applicable on procurement of raw materials, intermediary components etc. by the bidder /agent.

It is the obligation on the part of supplier to discharge his liability by payment of GST to Government of India in cash (or) utilization of input Tax credit in respect of such supply or services through GST invoice under this contract, so that BHEL will avail input tax credit on such supply. In the event that the input tax credit of the GST charged by the supplier is denied by the tax authorities to BHEL due to reasons attributable to supplier, BHEL shall be entitled to recover such amount from the supplier by way of adjustment from the next invoice or from Bank Guarantee. In addition to the amount of GST, BHEL shall also be entitled to recover interest and penalty, in case same is imposed by the tax authorities on BHEL.

If BHEL is not able to avail the credit of CGST & SGST/IGST, partially or entirely because the supplier issued a defective invoice or failed to produce the requisite documents, then the supplier shall immediately indemnify BHEL for such loss of tax credit which would be otherwise available to BHEL. BHEL, in such case, may, at its sole discretion, decide to recover such loss by way of deduction from payment due to the supplier or invoking the contract Performance Bank Guarantee.

The classification of goods as per GST should be correctly done by the supplier to ensure that ITC benefit is not lost to the BHEL on account of any error on the part of the supplier.

Any statutory increase in the CGST & SGST / IGST or any new or additional taxes or duties imposed within the Contractual Delivery Period or extended Contractual Delivery Period shall be to BHEL's account whereas if it is after Contractual Delivery period, it shall be to supplier's account. Any corresponding decrease on account of above shall be passed on to BHEL.

In case GST or any taxes or duties is not applicable at present but become applicable at the time of contractual delivery period due to any reason other than statutory, the same shall be borne by supplier.

10. Availing duty/tax exemption benefits by bidder, wherever applicable: BHEL shall issue the required Certificate/s, as per relevant policies of the Govt. of India, to facilitate the bidders to avail any such benefits under the Contract. In case of failure of the bidders to receive the benefits partly or fully from the Govt. of India and/or in case of any delay in receipt of such benefits, BHEL shall neither be liable nor responsible in any manner whatsoever.
11. Taxes against sub-vendor dispatches: All taxes/levies, as applicable in respect of all components, equipments and material to be despatched directly from the sub-vendor's works to Site irrespective of the fact whether such taxes and levies are assessable and chargeable on Vendor or the BHEL, shall be to the vendor's account and no separate claim in this regard will be entertained by BHEL.
12. High Sea Sales (HSS): Customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors.
Any delay in submission of complete/correct HSS documents to BHEL may incur demurrage charges. All demurrage charges on account of incomplete /incorrect HSS documents submission by vendor will be to vendor's account and all such charges will be recovered from any of the available vendor bills with BHEL.
13. Packaging and dispatch: The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea/ Air / Rail/ Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures/ hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.
The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. *For facilitating smooth movement of shipment, the consignment has to be in stackable condition.* Any Imported/Physical Exports items packed with raw/ solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitary/ Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet)

exist for an item or the packaging, vendor must provide this information without fail along with the consignment.

Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (LxBxH) and Seller's name. Packing list of goods inside each package with PO item number and quantity must also be fixed securely outside the box to indicate the contents of each box. Total number of packages in the consignment must also be indicated in the packing list.

Separate packing & identification of items should be as follows.

1. Main Scope - All items must be tagged with part no. & item description.
2. Commissioning accessories/spares - All items must be tagged with part no. & item description.
3. Mandatory spares - All items must be tagged with part no. & item description.

Nevertheless, vendor shall adhere to dispatch & packing instructions issued by BHEL at the time of dispatch.

14. Assignment of Rights & Obligations; Subcontracting: Vendor is not permitted to subcontract the delivery or any part thereof to third party or to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from BHEL. Any permission or approval given by the BHEL shall, however, not absolve the vendor of the responsibility of his obligations under the Contract.
15. Progress report: Vendor shall render such report as to the progress of work and in such form as may be called for by the concerned purchase officer from time to time. The submission and acceptance of such reports shall not prejudice the rights of BHEL in any manner.
16. Non-disclosure and Information Obligations: Vendor shall provide with all necessary information pertaining to the goods as it could be of importance to BHEL. Vendor shall not reveal any specified confidential information that may be divulged by BHEL to Vendor's employees not involved with the tender/ contract & its execution and delivery or to third parties, unless BHEL has agreed to this in writing beforehand. Vendor shall not be entitled to use the BHEL name in advertisements and other commercial publications without prior written permission from BHEL.
17. Cancellation /Termination of contract: BHEL shall have the right to completely or partially terminate the agreement by means of written notice to that effect. Termination of the Contract, for whatever reason, shall be without prejudice to the rights of the parties accrued under the Contract up to the time of termination.
BHEL shall have the right to cancel/foreclose the Order/ Contract, wholly or in part, in case it is constrained to do so on account of any decline, diminution, curtailment or stoppage of the business.
18. Breach of Contract, Remedies & Termination: In case of breach of contract (failure of supplier), wherever the value of Performance security available with BHEL against the said contract is atleast 10% of the contract value, the same shall be encashed.

In case the value of the security instruments available with BHEL is less than 10% of the contract value, the balance amount will be recovered from other financial remedies (i.e. available bills of the contractor, retention amount, etc. with BHEL) or legal remedies shall be pursued.

Further, levy of liquidated damages, debarment, termination, de-scoping, short-closure, etc. shall be applied as per provisions of the contract.

19. Shortages: In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages, caused by supplier's act or omission, shall be made good at free of cost within a reasonable time that BHEL may allow from such intimation.

Transit Damages: In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, supplier shall make good of all such damages within a reasonable time from such intimation by BHEL. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will be reimbursed to supplier.

20. Remedial work: Notwithstanding any previous test or certification, BHEL may instruct the vendor to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly BHEL may ask the vendor to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Vendor shall provide such services within a reasonable time as specified by BHEL.
21. Indemnity Clause: Vendor shall comply with all applicable safety regulations and take care for the safety of all persons involved. Vendor is fully responsible for the safety of its personnel or that of his subcontractor's men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the vendor. Vendor is fully responsible for ensuring that all legal compliances are followed in course of such employment. Vendor shall fully indemnify and keep indemnified BHEL against all claims of whatsoever nature arising during the course and out of execution of this Order/Contract.
22. Product Information, Drawings and Documents: All specified drawings, technical documents or other technical information received by Vendor from BHEL or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.

Vendor, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable BHEL to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.

All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.

23. Intellectual Property Rights, Licenses: If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery (goods/related service) or accompanying documentation shall be the exclusive property of the Vendor and BHEL shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by vendor and/or by its employees or third parties involved by the vendor for performance of the agreement shall belong to BHEL. Vendor shall perform everything necessary to obtain or establish the above mentioned rights. The Vendor guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Vendor shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged) claims by third parties. The Vendor shall indemnify BHEL against any (alleged) claims by third parties in this regard and shall reimburse BHEL for any damages suffered as a result thereof.
24. Force Majeure: If at any time during the continuance of the Contract, the performance in whole or in part by either party of any obligation under this Contract shall be prevented or delayed by the reasons of any war, hostility, acts of the public enemy, epidemics, civil commotion, sabotage, fires, floods, explosion, quarantine restrictions, strikes, lockouts or act of God provided notice of happening of such event duly evidenced with documents is given by one party to the other within 10 days from the date of occurrence thereof, neither party shall be by reasons of such event, be entitled to terminate the Contract nor shall either party have any claim for damages against the other in respect of such non-performance or the delay in performance, and deliveries under the contract shall be resumed as soon as practicable after such event has come to an end or ceased to exist, and the decision of the Buyer as to whether the deliveries have been so resumed or not, shall be final and conclusive.

If force majeure applies, dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

Notwithstanding above provisions, in an event of Force Majeure, BHEL reserves for itself the right to cancel the order/ contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of deliveries and other schedules.

25. Warranty:

Wherever required, and so provided in the specifications/ Purchaser Order, the Seller shall ensure that the goods supplied shall comply with the specifications laid down, for materials, workmanship and performance.

Unless otherwise specified in SCC, warranty period shall be applicable for a period of 24 months from the date of delivery of goods or 18 months from the date of commissioning of goods, whichever is earlier.

The warranty period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery. Unless otherwise specifically provided in the Purchase Order, Vendor's liability shall be co terminus with the expiration of the applicable warranty period.

26. Limitation of Liability: Vendor's liability towards this contract is limited to a maximum of 100% of the contract value and consequential damages are excluded. However the limits of liability will have no effect in cases of criminal negligence or wilful misconduct.

The total liability of Vendor for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed the total Contract price.

27. Liability during warranty: Vendor shall arrange replacement / repair of all the defective materials / services under its obligation during the warranty period. The rejected goods shall be taken away by vendor and replaced / repaired. In the event of the vendor's failure to comply, BHEL may take appropriate action including disposal of rejections and replenishment by any other sources at the cost and risk of the vendor.

In case, defects attributable to vendor are detected during Warranty period or where the commissioning call is issued within the warranty period, vendor shall be responsible for replacement/ repair of the goods as required by BHEL at vendor's cost even after expiry of warranty period.

Further if the equipment or any part thereof cannot be used by reason of such defect and/or making good of such defect, the warranty period of the equipment or such part, as the case may be, shall be extended by a period equal to the period during which the equipment or such part cannot be used by BHEL because of any of the aforesaid reasons. Upon correction of the defects in the facilities or any part thereof by repair/replacement, such repair/replacement shall have the warranty period for a period of twelve (12) months from the time such replacement/repair of the equipment or any part thereof has been completed.

28. Liability after warranty period: At the end of the warranty, the Vendor's liability ceases except for latent defects. For the purpose of this clause, latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the warranty Period, but later. The Contractor's liability for latent defects warranty for the equipment including spares shall be limited to a period of six months from the end of the warranty period of the respective equipment including spares or first time commissioning, whichever is later but not later than one (01) year from the date of expiry of warranty period.

29. Compliance with Laws: Vendor shall, in performing the contract, comply with all applicable laws. The vendor shall make all remittances, give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the laws in relation to the execution and completion of the contract and for remedying of any defects; and the Contractor shall indemnify and hold BHEL harmless against and from the consequences of any failure to do so.

30. Settlement of Disputes: Except as otherwise specifically provided in the Purchase Order, decision of BHEL shall be binding on the vendor with respect to all questions relating to the interpretation or meaning of the

terms and conditions and instructions herein before mentioned and as to the completion of supplies/work/services, other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the contract, instructions, orders or these conditions or otherwise concerning the supply or the execution or failure to execute the order, whether arising during the schedule of supply/work or after the completion or abandonment thereof. Any disputes or differences among the parties shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration. Vendor shall continue to perform the contract, pending settlement of dispute(s).

31. Arbitration Clause in case of Contract with vendors other than Public Sector Enterprise (PSE) or a Government Department:

Arbitration & Conciliation:

The parties shall attempt to settle any disputes or difference arising out of the formation, breach, termination, validity or execution of the Contract; or, the respective rights and liabilities of the parties; or, in relation to interpretation of any provision of the Contract; or, in any manner touching upon the Contract, or in connection with this contract through friendly discussions. In case no amicable settlement can be reached between the parties through such discussions, in respect of any dispute; then, either Party may, by a notice in writing to the other Party refer such dispute or difference to the sole arbitration of an arbitrator appointed by Head of the BHEL–EDN. Such Sole Arbitrator appointed, shall conduct the arbitration in English language.

The Arbitrator shall pass a reasoned award and the award of the Arbitration shall be final and binding upon the Parties.

Subject as aforesaid, the provisions of Arbitration and Conciliation Act 1996 (India) or statutory modifications or re-enactments thereof and the rules made thereunder and for the time being in force shall apply to the arbitration proceedings under this clause. The seat of arbitration shall be Bangalore.

The cost of arbitration shall be borne as decided by the Arbitrator upon him entering the reference.

Subject to the Arbitration Clause as above, the Courts at Bangalore alone shall have exclusive jurisdiction over any matter arising out of or in connection with this Contract.

Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the parties shall proceed with and continue without hindrance the performance of its obligations under this Contract with due diligence and efficiency in a professional manner except where the Contract has been terminated by either Party in terms of this Contract.

Arbitration Clause in case of Contract with a Public Sector Enterprise (PSE) or a Government Department:

In the event of any dispute or difference relating to the interpretation and application of the provisions of the Contract, such dispute or difference shall be referred by either party for Arbitration to the Sole Arbitrator in the Department of Public Enterprises to be nominated by the Secretary to the Government of India in-charge of the Department of Public Enterprises. The Arbitration and Conciliation Act, 1996 shall not be applicable to arbitration under this clause. The award of the Arbitrator shall be binding upon the parties to the dispute, provided, however, any Party aggrieved by such Award may make further reference for setting aside or revision of the Award to the Law Secretary, Department of Legal Affairs, Ministry of Law and Justice, Government of India. Upon such reference the dispute shall be decided by the Law Secretary or the Special Secretary or Additional Secretary when so authorized by the Law Secretary, whose decision shall bind the Parties hereto finally and conclusively. The Parties to the dispute will share equally the cost of arbitration as intimated by the Arbitrator.'

32. Applicable Laws and Jurisdiction of Courts: Prevailing Indian laws both substantive and procedural, including modifications thereto, shall govern the Contract. Subject to the conditions as aforesaid, the competent courts in Bangalore alone shall have jurisdiction to consider over any matters touching upon this contract.

33. General Terms: That any non-exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents.

That the headings used in this agreement are for convenience of reference only.

That all notices etc., to be given under the Purchase order shall be in writing, type script or printed and if sent by registered post or by courier service to the address given in this document shall be deemed to have been served on the date when in the ordinary course, they would have been delivered to the addressee.

Pre-Qualification Criteria

Item: VFD for RC Pump (950KW, 3.3kV Motor)

Project : Yadadri TPS (5x800MW) FGD Package

Customer : M/s. TSGENCO

1. The vendor shall be an Original Equipment Manufacturer (OEM) of VFD Equipment. Only the OEM is eligible to submit offer.
2. The vendor should have designed, engineered, manufactured, type tested or got type tested, supplied and commissioned or supervised commissioning of at least one (1) number of VFD system (of the type & model offered) for feeding squirrel cage induction motor/ synchronous motor of 950 kW, 3.3kV or higher rating, which is in successful operation for a period of at least one (1) year as on the date of bid opening. Necessary supporting document shall be provided. The Reference List of VFD supplies made indicating the ratings, application, details of the customers, year of supply and commissioning status to be provided along with the offer.
3. The vendor or their authorized service representatives shall have trained engineers for commissioning & service for the offered equipment and shall be in a position to provide prompt after sales service and spares support for our installations. This service network shall necessarily be available in India.
4. The vendor shall be in a position to undertake AMC or provide service support for the equipment supplied, after the expiry of the warranty / guarantee period either directly or through a service representative.
5. Technical clearance of vendor offer will be based on Customer acceptance of Vendor Credentials (does not apply to customer approved vendors for this project).

Note:

- a. Vendor must furnish all necessary supporting documents, as required, along with the bid to satisfy Pre-Qualification criteria as specified above.
- b. The Pre-Qualification criteria are mandatory requirements and the technical bids will be evaluated only when the Pre-Qualification criteria are met.

Checklist for Pre-Qualification Criteria

Sl. No.	Vendor Confirmation to the points above	Reference of documents attached
1	Yes / No	
2	Yes / No	
3	Yes / No	
4	Yes / No	
5	Yes / No	

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		REV. NO.	DATE	NATURE OF CHANGE	REASONS	PREPARED BY	APPROVED BY
		00	19-08-2024	FIRST ISSUE	-----	MOUNISH G	L SUBBALAKSHMI
		REVISION 00		APPROVED BY L SUBBALAKSHMI			
				PREPARED BY MOUNISH G	ISSUED BY T&PD/COE	DATE 19-08-2024	



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TECHNICAL SPECIFICATION OF IGBT/ IGCT/ SGCT BASED VFD FOR SQUIRREL CAGE INDUCTION MOTOR

1. Project Details

Sl. No.	Parameter	Specification
1	Project title	As per attached Annexure to Specification
2	Customer	

2. Environment Specifications

Sl. No.	Parameter	Specification
1	Maximum Ambient Temperature	As per attached Annexure to Specification
2	Minimum Ambient Temperature	
3	Equipment Design Temperature (IS-9676)	
4	Relative Humidity	
5	Altitude	
6	Location of VFD Panels	
7	Seismic Zone	
8	Environment	

REVISION 00

APPROVED BY
L SUBBALAKSHMI

PREPARED BY
MOUNISH G

ISSUED BY
T&PD/COE

DATE
19-08-2024

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3. Input and Transformer Data

Sl. No.	Parameter	Specification
1	System Voltage / Frequency / Phase	Refer attached Annexure to Specification
2	Voltage Variation	
3	Frequency Variation	
4	Combined Voltage and Frequency Variation	
5	Fault Level	
6	Transformer Type	
7	Rating	Transformer must be designed to carry 110% current of calculated VFD rating. Transformer sizing calculation shall be provided along with offer.
8	Power Cables	1. Cable glands (Weatherproof) to be provided by the vendor for Transformer HV side cable termination suitable for Cable size mentioned in Annexure to Specification. The exact no. and size will be intimated during drawing approval stage. Cables and termination kits are in Customer /BHEL scope. 2. All interconnecting cables and cable lugs for VFD panel to Transformer connection to be provided by vendor. Refer attached Annexure to Specification for more details. For VFD with non-integrated Transformer, Power Cables selection between Transformer & VFD shall also consider adequate derating factor as these cables shall be routed through trenches and trays. 3. For VFD panel with non-integrated type transformer, Cables glands and termination kits for connection between Transformer LV side and VFD input side termination shall also be supplied by the vendor.
9	Termination cubicle	Any special termination cubicle, supporting structures, etc. if required for non-integrated type VFD system shall also be supplied by the VFD vendor.



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4. Motor Data

Sl. No.	Parameter	Specification
1	Type	Squirrel Cage Induction Motor
2	Scope	Manufactured by BHEL-Bhopal
3	Rating (kW)	Refer attached Annexure to Specification
4	Rated Voltage and Current	Refer attached Annexure to Specification
5	Fed from	Variable Frequency Drive (V/f Control)
6	Duty Class	Continuous - S1
7	Efficiency and Power Factor	Refer attached Annexure to Specification
8	Power Cables	Cable glands (Weatherproof) to be provided by the vendor for VFD Output side cable termination suitable for cable sizes mentioned in the attached Annexure. The exact no. and size will be intimated during drawing approval stage. Cables and termination kits are in Customer /BHEL scope.



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5. Scope:

Sl. No.	Scope of Supply	Description
1	Refer Consolidated Scope of Supply and Services in attached Annexure for details.	The vendor shall be responsible for engineering and functioning of the complete VFD system comprising of Dry type Transformer and VFD panel, meeting the intent and requirement of this specification, Customer specification and datasheet. This shall include but not be limited to inverter sizing, transformer sizing, transformer impedance selection, vector group, input and output harmonic filter design and sizing, output dv/dt filter sizing, adequacy of motor cable size selected by BHEL etc. All necessary interlocks as required for safe and reliable operation of VFD system along with Input breaker shall be provided in VFD system.
2	a) All interconnecting cables between VFD panel and Transformer panel both for integrated type VFD system and non- Integrated type VFD system. b) Any special cable other than power and control cables from VFD to other equipment. c) Power Cable glands & lugs for VFD and transformer. d) Any special tools and tackles.	If any special arrangement is required in input breaker, same shall be informed by the vendor in offer. The machine shall continuously run on VFD.

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6. VFD Specifications:

Sl.No.	Parameter	Specification
1	Drive Application	Refer attached Annexure to Specification
2	Input Voltage	From Dry type Transformer.
3	Power/Torque vs Speed	Torque $\propto$ Speed ² · Power $\propto$ Speed ³
4	Single Line Diagram	Refer attached Annexure to Specification
5	Output Voltage of VFD	
6	Output Current of VFD	
7	Output Frequency	0 to 50Hz , Resolution: +/- 0.01% under transient conditions; +/- 0.5% under steady state conditions
8	Overload capacity	Refer attached Annexure to Specification
9	Speed Regulation & Speed Accuracy	+ 0.5% +1%
10	Drive Control	Sensorless Vector Control
11	Braking Operation	Not Applicable
12	Output LC Sinusoidal Filter	Motor is designed for PWM operation. Distance between VFD and Motor are as indicated in the Annexure attached with Specification. Vendor to clarify and offer output Filter, if required.



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13 VFD Panel Construction

- a) Protection Class: Please refer attached Annexure
- b) Panel: Free standing, floor mounting type, comprising of rigid welded structural frames with Cold Rolled Sheet Steel enclosure of minimum thickness 2 mm for load bearing and 1.6 mm for other members. All doors and removable covers shall have neoprene gaskets. Ventilating louvers shall have easily removable and washable dust filters.
- c) Busbar Material – Electrolytic grade Copper, colour coded. Sleeving/shrouding for safety purposes shall be done.
- d) Cooling: Forced Air Cooled VFD should be considered. Cooling system shall include well dimensioned panel, adequate cooling air flow path. Vendor shall ensure that the panel dimensions and flow paths have been designed for continuous running at the specified ambient without overheating. For cooling fan redundancy, refer attached Annexure.
- e) Earth Bus – minimum 50*6 mm Copper.
- f) Door Interlock: The VFD shall have a door interlock for safety. This interlock system should ensure that none of the power cabinets can be opened until the main source of power is disconnected or will cause the main source of power to trip. Additionally, the same interlock system should ensure that power cannot be initialized to the drive unless the doors are closed. Suitable shrouding mechanism shall be provided so that the DC capacitors cannot be touched till their voltage is zero.
- g) Painting: 2 Coats of Primer and 2 Coats of Finish Paint to be given for all surfaces of enclosure. Paint shall be Epoxy Based with Powder Coated Finish - Exterior: Opaline Green shade 275 of IS:5 (Semi Glossy); Interior: Brilliant White (Glossy). Paint Thickness: 80 Microns (minimum). Exact paint shade will be confirmed during drawing approval stage.
- h) Power and Control Wiring shall be done with Fire retardant (FRLS) cables.
- i) Double compression type Nickel plated brass cable glands shall be supplied. Height of the terminal from cable gland plate shall be adequate to take care of the cable sizes and quantity mentioned. Minimum space for the power cable termination shall be 600mm clear from the cable gland plate. Cable entry will be from bottom only. Gland Plates shall be blank (undrilled) – to be drilled at site. The gland plate thickness shall be 3.0 mm for hot / cold-rolled sheet steel and 4.0 mm for non-magnetic material.



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13	VFD Panel Construction	j) All electronic modules and components shall be accessible from front of panel only. Modular assemblies for both the system control electronic equipment and power electronic equipments shall be used. k) All low voltage compartment and cabling shall be electrically and physically separated from the high voltage compartment. l) 20% spare terminals shall be provided for future use. m) For limiting dimensions (if applicable), refer attached annexure.
14	Noise Level	Shall be less than 85dB at a distance of 1 metre from the outline of VFD Panels at a height of 1.5 metres from the floor with all the fans running in the VFD Panels.
15	Storage Temp.	-40°C to +60 °C
16	Vibration	According to IEC68-2-6
17	Interference	According to IEC801 parts 2,3,4 Immunity: The panels shall be designed so as to have low Radio Freq Interference (RFI) & Electromagnetic Interference (EMI).
18	VFD Efficiency	Shall be as per attached Annexure. Exact value to be specified by the Vendor in Datasheet.
19	Duty Cycle	Class I Duty Cycle as per IEC 146-1
20	VFD Requirements	a) Input Choke: Input chokes to be provided, if necessary. b) Local/Remote: Selector switch shall be provided for operator to select type of operation: ➤ Local – Operation from VFD Panel for Speed Control from door mounted interface; ➤ Remote – Operation from DCS. If VFD is set for speed reference from Remote, it shall be possible to program the VFD to either shutdown, go to minimum speed or continue operation at its last known speed reference point whenever a loss of speed reference is detected. c) Local Start/Stop Push Button to be provided either on Panel door or on keypad. d) Door Mounted Lockable Push-Button with cover to be provided with 2NO + 2 NC contact for Emergency Stop. One normally open and close contact to be wired to Terminal Block for external Interlocking / Annunciation. e) Every Panel shall be provided with illumination lamp with limit switch and MCB. Space heater shall be provided in panel with switch fuse and variable setting thermostat. 240V power socket with MCB shall be provided.



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Sl. No.	Parameter	Specification
20	VFD Requirements	f) 230V, 1phase, 50Hz (exact rating during drawing approval stage) power Supply to the motor space heater shall be derived from VFD. Necessary interlocking arrangement for this supply shall also be made available in the VFD panels. g) PLC: PLC shall be provided for Interlocking and Protection (if required) h) The expected life time of the drive system shall be minimum 25 years. The system including all individual components forming part of the system shall have a minimum MTBF of 4 years. i) <u>Any special requirement regarding CT/ PT, protection relay or any other device, in input breaker, which is required for functioning and protection of VFD system shall be considered by the VFD vendor in their scope.</u>
21	VFD Features	a) Soft Start and Auto Restart b) Auto Speed Search Facility (Catch on Fly) shall be available for starting into rotating loads. c) Power loss ride through (Kinetic Buffering) and for voltage dips over 20% or Power interruption for less than 2 secs. d) Automatic VFD tuning during start-up. e) Flux optimisation function shall be provided to reduce the total energy consumption and noise level in case drive is operated below nominal load. f) Selectable reverse run prohibition g) Adjustable motor overload feature h) Settable minimum and maximum operating frequency i) VFD shall produce not greater than 1% torque pulsation to the shaft of driven equipment. j) Field adjustable Torque limits and acceleration and deceleration ramps k) Accelerate / Decelerate Times to be specified. l) Four (4) user programmable preset speeds. m) The equipment may be stored outdoors for long periods before installation. The packing should also be suitable for outdoor storage areas with heavy rains / high ambient temperatures. n) Vendor shall certify readiness of system fit for commissioning. Vendor's scope shall also include supply of all specialized tools and tackles required. o) VFDs shall be installed in Air-conditioned area but it shall be suitable for operation in non-air-conditioned area also. p) Earthing scheme should be provided by the vendor.



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21	VFD Features	q) Any special cable other than power and control cables required to connect VFD to other equipment shall be in vendor scope.
22	Controls and monitoring	a) VFD shall be with an interactive and user-friendly door mounted digital operator interface with LCD display and sealed membrane type keypad. b) The operator interface shall be used for drive programming, drive monitoring and drive trouble shooting. The operator interface must also be able to start and stop the drive, reset VFD faults and manually adjust the VFD's speed reference. c) The operator interface shall have LED indicators for drive fault, drive run, and drive in current limit etc. d) The operator interface shall allow monitoring of inverter operating conditions including speed, current, voltage, torque, power etc. e) Messages shall be alphanumeric in nature. All the fault messages shall be in English. f) Provision shall be made available for remote operation. g) The operator interface shall be able to display all real time operating variables and all drive programming parameters. The operator interface shall be capable of displaying a specific user selected parameter on power-up. This power-up parameter would typically be a parameter that is important to the operator such as motor speed or motor load. h) The following Control signals must be provided: ➤ Local/Remote ➤ Emergency stop ➤ Trip/Close Input breaker These are indicative. Vendor to suggest the interlocking scheme using these and other outputs as required for the system during detailed Engineering. These Outputs shall be provided with individual relay having 3 changeover potential free contacts wired to terminal blocks. i) All VFD operating parameter shall be stored in nonvolatile memory. j) The drive shall have built in monitoring of following parameters as minimum on its digital operator interface and these parameters shall also be displayed at Plant DCS through Modbus link: i) Input & Output Frequency ii) Input & Output Current iii) Motor Speed iv) Input & Output Voltage v) DC Bus Voltage vi) Torque



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Controls and monitoring

vii) Input & Output Power (It shall be possible to display power output of the drive in kW)
viii) Digital Input Status
ix) Digital Output Status
x) Analog Input Status
xi) Drive Thermal state
xii) Output kWhr of Drive
xiii) Hour run
xiv) Transformer Temperature for alarm & trip

k) Necessary transducer shall be provided with 4-20 mA output for indicating Motor Speed and Motor Current in the DCS. Transducers shall be capable of driving 500 ohms load.

l) The following indications shall be provided on the VFD Panel Door/ Keypad:

- i) Motor Running/ VFD ON
- ii) Motor Stopped/Tripped
- iii) Local/Remote status
- iv) AC Mains ON
- v) Auxiliary Control Supply ON
- vi) VFD Ready
- vii) VFD Fault
- viii) External Fault
- ix) Emergency Stop Activated
- x) Motor Overspeed
- xi) Input Breaker Trip
- xii) Motor zero speed
- xiii) Rectifier output 'ON'
- xiv) Transformer winding temperature alarm & trip.

m) The VFD shall store fault logs of minimum last 10 faults in memory.

n) The interface details of VFD shall be incorporated as required for data communication with DCS system with serial interfaces with RS485 data links. Necessary hardware shall be included in the scope and the interface protocol (i.e. Modbus RTU or TCP/IP) shall be provided.

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22	Controls and Monitoring	The following Audio-visual annunciations must be provided. 1) Rectifier fuse failure / drive fault 2) Main AC failure 3) Inverter fuse failure / Drive fault 4) Inverter overload 5) Inverter high temperature / Drive fault 6) Cooling system failure 7) Motor failed to start / Drive fault 8) Transformer fault and alarm 9) Communication and measurement system unhealthy
23	Protection	Following protections shall be built in within the inverter and any other protection as required: a) Motor Overload / Over Torque b) Instantaneous Over current (This device shall monitor the peak output current continuously and shall provide instantaneous shutdown without component failure whenever its trip point is surpassed. The trip point must be greater than or equal to 110% of the VFD's rated full load output current) c) Ground Fault Protection d) Over Voltage/Under Voltage - VFD shall be able to withstand >20% dip in supply voltage for 2 secs without damage to semiconductors or fuses. e) Output Short Circuit f) Output Phase Loss, Phase reversal, Locked rotor protection g) Phase Sequence Protection h) Input Phase Loss/Single Phasing Preventer i) Over Speed/Over frequency of motor j) Heat sink over temperature/VFD Panel Temperature High Stall prevention (During acceleration, deceleration and constant speed operation) k) Loss of Cooling Fans (Ventilation failure Indication and Alarm) l) External faults like Transformer Fault and Alarm m) Incoming and outgoing Line surge protection n) Loss of Speed reference o) Inverter fault (Converter/Inverter module failure indication) p) The system shall be designed to deliver the motor input current and torque for the complete speed torque characteristics of the driven equipment.



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Protection

- q) If the motor load exceeds the limit, the drive shall automatically reduce the frequency and voltage to the motor to guard against overload. If load demands exceed the current limit for more than 1 min, the drive shall shut down to prevent over heating of the motor and damage to the drive.
- r) The drive shall trip in case the speed exceeds 105% of the maximum operational speed or reduces to 95% of the minimum operational speed for more than 10 seconds.
- s) Fault diagnostic shall be built into the system to supervise the operation and failure of the system. The information regarding failure of any of the system including shut down of the system shall be available for a period of minimum 4 days after a shut down even though no supply available.
- t) Converter transformer: Short circuit, over current, Earth fault, and Winding temperature high protection.



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Sl. No.	Parameter	Specification
24	Dry type Transformer	Dry type Transformer a) HV: Taps of $\pm 5\%$ b) LV voltage: Multi secondary type. Number of secondaries and secondary voltage to be indicated by the vendor in technical offer. c) Class of insulation: H or higher. Winding temperature rise of the transformer shall be as per attached Annexure. d) Winding material: Electrolytic grade Copper Protection: RTDs to be provided in each limb for winding temperature measurement. Alarm and trip contacts required for annunciation for fault and tripping action. Connection: HV Incomer: Termination arrangement and Cable glands to be provided by the vendor. The exact number and sizes will be intimated during drawing approval stage. Cables in BHEL/Customer scope. LV Connection: Cables along with glands, Lugs for connection between LV secondaries and VFD to be supplied by the Vendor. This shall be used for testing of the VFD and later bunched in the panel during dispatch and the same shall be connected at site. Necessary connection and routing arrangements to be made at Vendor's works. For more details, please refer Annexure attached with this Specification. In case of non-integrated transformer, Cable termination kits (if required) for LV connection between transformer and VFD shall also be supplied by vendor.



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Sl. No.	Parameter	Specification
25	Type of Control:	Completely programmable by the user as: a) Flux vector control with speed feedback b) Flux vector control without speed feedback c) Scalar V/F. VFD shall be capable of maintaining motor speed within $\pm 0.5\%$ without the use of a motor mounted encoder or tachometer. The drive shall have programmable V/F patterns along with user definable custom V/F patterns.
26	Harmonic Limitations – Source	Shall be as per latest IEEE 519 Voltage harmonics: Vendor to inform the values with calculations during detailed engineering stage. Current harmonics: Vendor to inform the source side 5 th , 7 th & 11 th harmonics values with calculations during detailed engineering stage. Vendor to supply harmonic filters, if required, to filter the harmonics generated by VFD at input/ supply side. The above compliance shall be verified by the field measurements of harmonics at the PCC with & without VFDs operation as per Customer Specification.
27	Harmonics at VFD Output / Motor Input	Shall be as per latest IEC 61800-4. Vendor to specify the maximum amount of voltage and current harmonics at the VFD Output / Motor Input terminals.
28	Switching frequency	To be specified by the vendor in Datasheet.
29	Auxiliary Supply	Refer attached Annexure to Specification



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Sl. No.	Parameter	Specification
30	Testing and Quality Plan	a) Routine Tests shall be carried out on all Panels and transformer as per relevant standards and Customer specification & approved documents. b) Type Test Certificates for similar equipment and rating supplied by the Vendor shall be submitted during detailed engineering. Refer clause no. 28.02.00, 28.03.00 & 28.04.00 of Customer Specification. If valid type test certificates for transformer and VFD panels are not available as per Customer Specification, vendor shall conduct the type tests without any cost & time implication to BHEL/Customer. c) During fabrication, the drive and Transformer shall be subject to inspection by BHEL/ Customer, or by an agency authorized by the BHEL/ Customer to assess the progress of work, as well as to ascertain that only quality raw material is used.
31	Inspection and Commissioning Support	a) Final Inspection: BHEL / Customer representative will be present at manufacturer's works for witnessing of final testing for VFD. This is to be incorporated in the Quality Plan. No charges shall be applicable for witnessing of final tests. b) Commissioning: Commissioning of all VFD Systems at site shall be in the scope of Vendor. Final Acceptance shall be based on successful completion of the same. c) Any replacement of failed/damaged items during commissioning shall be exclusively at Vendor's cost. d) Vendor is advised to stock necessary spares and ensure easy availability to facilitate trouble free commissioning.
32	Laptop with Software for VFD Interface	Laptops shall be installed with Latest Compatible Licensed Operating System. The software must be loaded in the laptops & supplied along with interconnecting cables and accessories required for interface with the drive. The software should be an easy to use commissioning tool for drives and shall be provided along with the system. The interface details of VFD shall be incorporated as required for data communication with DCS system with serial interfaces with RS485 data links. Necessary hardware shall be included in the scope and the interface protocol (Modbus only) shall be provided.



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Sl. No.	Parameter	Specification
33	Maintenance	The procedure for maintenance of VFD panels and the schedule thereof shall be mentioned in the offer.
34	Spares	Please refer attached Annexure with this Specification.
35	Confirmations/Deviations to Specification	Point-wise confirmation to Customer Specification shall be given along with offer. Deviations if any, shall be indicated separately. If there are no deviations to the specification, supplier shall mention the same explicitly. A reply from bidder stating that “ Equipment will generally meet the specifications ” will not be accepted by BHEL. Vendor to furnish only Clause-wise Clarifications/Deviations to the Purchase Specification in the format below.

Point No.	Page No.	Confirmation / Clarification / Information / Deviation	Details	Remarks, if any

Note: Certain generic parameters (not explicitly covered in customer specification) are mentioned from the data of earlier executed VFD supplies.



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7. Documentation

Sl. No.	Parameter	Specification
1	Attached Documents	a) Customer specification for VFD System b) Motor Datasheet. c) Single Line Diagram d) "Annexure" to Specification for project specific data. e) Pre-Qualification Criteria (PQC) : Refer "Annexure" attached with the Specification.
2	Technical Information required along with Offer	a) Dimensional Drawing of Panels along with minimum clearance to be maintained for effective cooling, and Weight b) Technical Catalogue of VFD System being offered. c) Reference list for similar rating VFDs giving the following: Model number, Application, Rating, Year of supply and commissioning. Provenness Criteria of Medium Voltage Variable Frequency Drive shall be used as qualifying criteria (if attached with this specification). d) Confirmation / Clarification / Deviation List to Customer Specification and other documents in SI No. (1) above. e) Design calculation for sizing of Transformer and VFD. f) Filled-up Datasheet for VFD system. g) Signed & Stamped PQC (format) of VFD System
3	Information / Confirmations required along with offer	a) Supply of the VFD shall be by OEM only. The name of the country from which the drive is sourced and the location of the manufacturing plant should be mentioned in the offer. b) After Sales Service and Support shall be given by the Vendor for a minimum period of 10 (ten) years after commissioning. c) Vendor shall give a notice of at least 1 year to the end user of the equipment and BHEL before phasing out the product / spares to enable the end user for placement of order for spares and services.



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Sl. No.	Parameter	Specification
4	Technical (unpriced) and Commercial (priced) Bids – For Evaluation	Refer “Consolidated Scope of Supply & Services” in Annexure attached with this Specification for Unpriced and Priced Bids.
5	Information required for Customer / Consultant Approval post release of Purchase Order	a) Dimensional Drawing of Panels along with minimum clearance to be maintained for effective cooling, and Weight b) Schematic Diagram c) Bill of Materials for equipment to be supplied d) Feeder Requirements – UPS and 415V supply e) Losses at Rated Load (including Fans) f) Heat Loss for Air Conditioning System sizing g) Technical Catalogue of VFD System being offered h) Test Protocol and Quality Plan i) Type test certificates of similar or higher rating equipment j) Filled up Data sheet for VFD system and Transformer
6	Information Required along with Supply. Maintenance Manuals and Documentation	a) Erection, Commissioning and Maintenance Manuals along with Final Drawings and Documentation b) Test and Guarantee Certificates. c) Complete Bill of Material (item wise) for the equipment supplied. d) 1 no. CD ROM consisting all of the above.



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VFD SYSTEM DATA SHEET

A	<u>VFD Data</u>	
1	Manufacturer	
2	Model No.	
3	Manufacturing Location	
4	Rating and Application	
5	Applicable codes /standards	
6	Speed reference	4-20 mA from DCS
7	Speed range	
8	Switching Frequency	
9	No. of Pulse	
10	Total number of Diodes/ IGBTs/ IGCTs	
11	Drive output Voltage	
12	Overload capability	
13	Inrush current 250% In for	
14	Combined efficiency (Transformer & Drive) at:	
	i) 100% Load	
	ii) 75% Load	
	iii) 50% Load	
	iii) 25% Load	
15	Overall power factor at:	
	i) 100% Load	
	ii) 75% Load	
	iii) 50% Load	
	iii) 25% Load	
16	Output voltage range and Accuracy	
17	Output Frequency range and Accuracy	
18	Type of Cooling	
19	Redundancy in Cooling	
20	Type of feedback for speed control	
21	Output Filter/ Choke:	
	i) Manufacturer	
	ii) Type/ Model No.	
	iii) Rated Current and Voltage	
22	Acceleration / Deceleration time	

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23	Degree of protection		
24	VFD Panel Dimensions (Dimensional details inclusive of all panels shall be furnished)		
	i) Length (mm)		
	ii) Height (mm)		
	iii) Depth (mm)		
	iv) Weight (kg)		
25	Paint Shade		
26	Heat Load (kW)		
27	Auxiliary Power Requirement:	415V, 3ph, 4Wire	UPS supply
	i) KVA		
	ii) Voltage and Phase		
B	<u>Transformer Data</u>		
1	Manufacturer		
2	Manufacturing Location		
3	Type	Dry type Transformer	
4	Integrated / Non-Integrated	Non-Integrated	
5	Duty	Continuous (Converter Duty)	
6	Rating (Transformer must be designed to carry 110% current of calculated VFD rating.)		
7	Class of insulation and Temperature Rise		
8	Insulation level:		
	P. f withstand		
	i) HV Winding		
	ii) LV Winding		
	Impulse withstand		
	i) HV Winding		
	ii) LV Winding		
9	Fault Level on HV Side		
10	HV Voltage and Phase		
11	LV Voltage/ Current		
12	No. of LV Windings		
13	Rated Frequency	50Hz	
14	Impedance		
15	Cooling Type		
16	Winding Material	Electrolytic grade Copper	
17	Location of Tap Changer	HV Winding	
18	No. of Taps and Type		



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19	Vector Group	
20	Neutral CT specification:	
	51G	
	64R	
	Vk	
	Im at Vk/2	
	RCT	
21	Cable Size/Type	
	i) HV Winding	
	ii) LV Winding	
22	No Load Loss	
	i) At 100% Voltage	
	ii) At 110% Voltage	
23	Full Load Copper loss at 75°C	
24	No Load Current	
	i) At 100% Voltage	
	ii) At 110% Voltage	
25	Efficiency at 75°C and unity power factor	
	i) At 100% of Full Load	
	ii) At 75% of Full Load	
	iii) At 50% of Full Load	
	iv) At 25% of Full Load	
26	Efficiency at 75°C and 0.8 power factor	
	i) At 100% of Full Load	
	ii) At 75% of Full Load	
	iii) At 50% of Full Load	
	iv) At 25% of Full Load	
27	Load at which maximum efficiency occurs	
28	Regulation at 75°C at full load	
	i) At 0.8 pf	
	ii) At UPF	
29	Dimensions	
	i) Length (mm)	
	ii) Height (mm)	
	iii) Depth (mm)	
	iv) Weight (kg)	
30	Degree of protection for enclosure.	
31	Paint Shade	
32	Heat Load (kW)	



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ANNEXURE to Specification - VFD FOR YADADRI/FGD PACKAGE

1. Input Data

Sl. No.	Parameter	Specification
1	Project Title	Yadadri TPS (5x800MW) FGD Package Units#1-5 (1 VFD for each unit) {Stage-I: U#1&2; Stage-II: U#3,4&5}
2	Customer	M/s TSGENCO
3	Environmental Specifications:	
	Parameter	Specification
	Max. Ambient temperature	50°C
	Min. Ambient temperature	0°C
	Equipment Design temperature	50°C
	Relative Humidity	95% at 40°C
	Altitude	Less than 1000m above mean sea level
	Location of VFD Panels	Indoor, Ventillated Room with Air Conditioning
	Seismic Zone	As per IS-1893-Zone-II
	Environment	All cards/hardware of VFD panel shall be suitable for operation in harsh environmental conditions with respect to high temperature, humidity & dust.
4	Drive Application	Absorber Re-Circulation (RC) Pump
5	System Voltage/ Frequency/ Phase	3.3kV / 50 Hz / 3-phase
6	Voltage Variation	As indicated in cl:4.02.00 of customer specification
7	Frequency Variation	+/- 5%
8	Fault Level at 3.3kV input side	40kA for 1 Sec.
9	Input Supply Variation	+/- 10%
10	Output Voltage of VFD	0 to 3.3kV (V/f = Constant)
11	Overload capacity	The overload capacity shall be 115% of rated current for 1 minute at rated voltage.
12	Motor Rating and other details	950 KW, 1487 rpm & 203 A
13	Motor Efficiency & Power Factor at Full load	95% & 0.86 respectively
14	VFD type	Fully Assembled Units of 3.3kV Air Cooled VFD (IGBT/SGCT/IGCT) Panels with Non-integrated Dry type Transformer
15	Transformer type (Transformer shall be placed in Non-AC room. Further details will be shared DDE)	Dry type Transformer. Cables between VFD and transformer shall be in VFD vendor's scope. Maximum distance between VFD and transformer shall be 50 mtrs.



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16	Degree of Protection	IP-41
17	VFD Output Current at 50°C (Design Ambient)	203 A
18	Distance between VFD & Motor (approx.) in meters.	U#1:205 mtrs. U#2:110 mtrs. U#3:195 mtrs. U#4:180 mtrs. U#5:175 mtrs.
19	Cable Sizes(approx.) between: a) 3.3kV Switchboard & VFD Transformer b) VFD Transformer & VFD c) VFD & Motor Exact details will be shared DDE	a) 3.3 kV HT XLPE 3X1C X 240 sq.mm. Armoured cable b) In VFD Vendor's scope (Datasheet & TTR of suitable cable shall be provided) c) 3.3 kV HT XLPE 3X1C X 240 sq.mm. Armoured cable
20	Auxiliary Supply	a) 230V UPS feeder will be provided by BHEL. KVA rating is to be given by the Vendor. Control supply for electronic modules has to be derived from the UPS. b) Auxiliary Supply – 415V, 3φ, 50Hz, 4 wire will be provided by BHEL. Feeder Power rating (short time & continuous) to be specified by the Vendor. c) Other supplies required by the VFD system to be generated internally within the VFD system.
21	Single Line Diagram	Refer attached Drg. No. EN-DG -1276-145-1401
22	Pre-Qualification Criteria (PQC)	Pre-Qualification Criteria requirement of Medium Voltage Variable Frequency Drive (3.3 kV VFD) is attached. Vendor to furnish details in line with the document.
23	Mandatory Spares	As per Mandatory Spares list @ pg.no 4/4 of this Annexure.
24	Reference date for type test purpose	Type test certificate from Independent testing agency can be accepted if it is carried out within 05 years from the date of inspection
25	Limiting Dimensions	False ceiling height of VFD room shall be 3.5 metres. Vendor to ensure compliance to the same.
26	Cooling Fan Redundancy	N+1 redundant cooling fan with auto c/o arrangement shall be provided.
27	Insulation class / Winding temperature rise for transformer	Class- H / H
28	Efficiency	Efficiency of VFD System (excluding Transformer) shall be ≥ 98%



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29	Packing	Wooden packing shall be provided suitable to withstand shocks and vibrations during transit and also to withstand handling of equipment during loading/unloading. Material handling marks should be provided on the packages. For safe preservation, proper packing shall be provided to avoid moisture ingress during transit and also when the equipment is under covered storage.
30	Paint shade	Paint shall be Epoxy Based with Powder Coated Finish - Exterior: Opaline Green shade 275 of IS:5 (Semi Glossy); Interior: Brilliant White (Glossy)

Consolidated Scope of Supply and Services

Sl. No.	Items for VFDs of RC Pump	Quantity
1.	Fully Assembled Units of 950KW, 3.3kV VFD Panels (IGBT/SGCT/IGCT), Air Cooled with Non-integrated Dry type transformer.	05 No.
2	Cable Accessories & Cable between Transformer and VFD (one set shall consist of total qty. for 1 VFD)	05 Set
3	Laptop loaded with Drive software (01 no. common for U#1&2, 01 no. common for U#3,4 & 5)	02 No.
4	Mandatory Spares (as indicated @ pg.no 4/4 of this Annexure)	01 Set
5	Erection Supervision & Commissioning (Vendor to quote lumpsum commissioning charges for 05 mandays per VFD, which shall be considered for bid evaluation) Payment shall be made limited to actual mandays consumed at Site with per manday charges calculated on the basis of the lumpsum charges quoted above. Lumpsum charges quoted shall include travelling, boarding and lodging expenses.	05 Lots



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GROUP: T&PD/COE

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REV. NO: 00

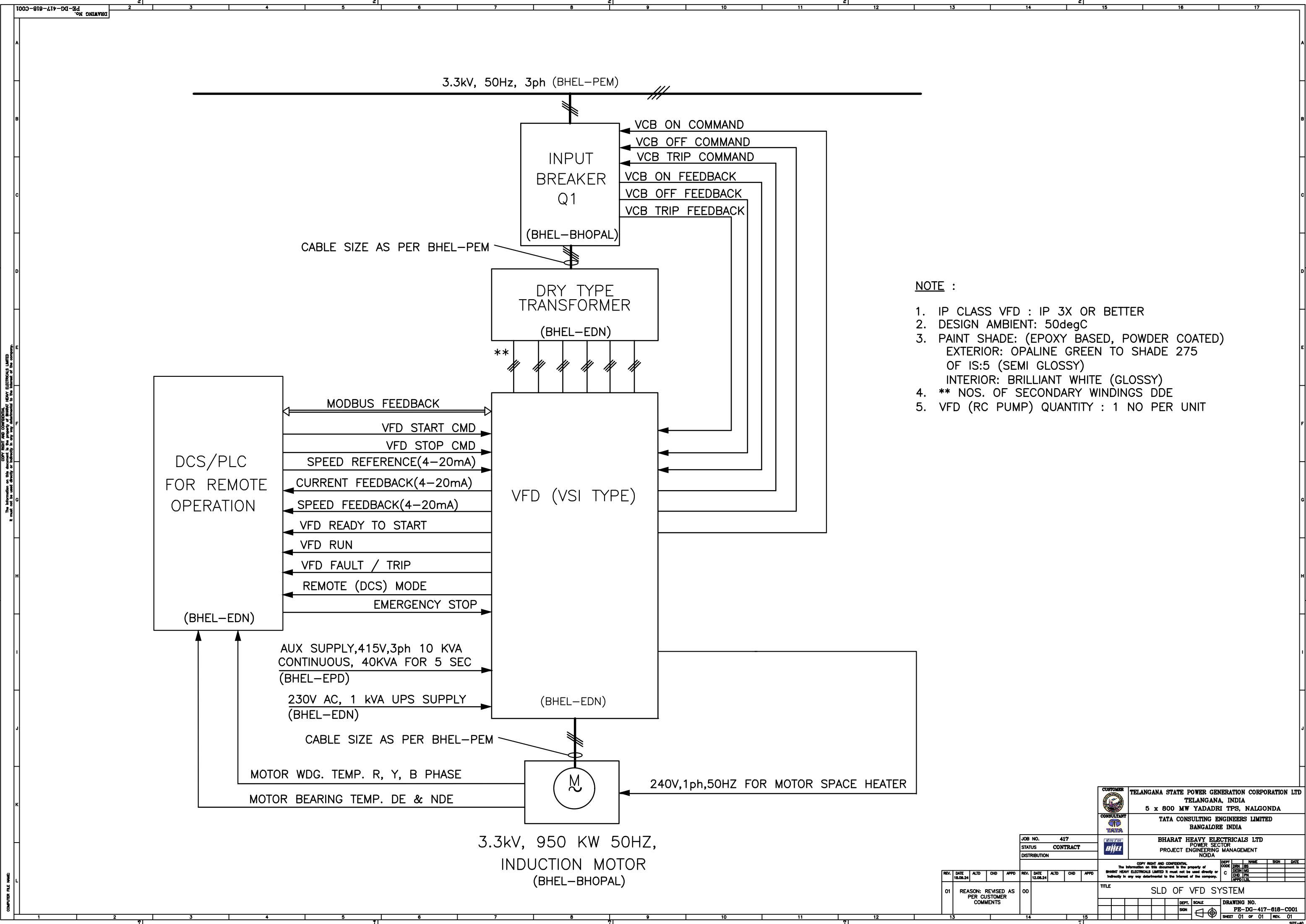
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YADADRI/FGD STPS : MANDATORY SPARES LIST FOR VFD

S. No.	Name of the item	Unit	Quantity (in No.)
1	Power supply modules	each type and rating	2
2	Power & Control fuses	each type and rating	2
3	Contactor/ Breaker	each type and rating	2
4	CT/ VT	each type and rating	2
5	Indicating lamps	each type and rating	2
6	Auxiliary contactors & relays	each type and rating	2
7	Indicating Lamp holder full set	each type and rating	2
8	Panel mounted meters	each type and rating	2

Note:-

1)	In case, spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities generally in line with the approach followed in the above list
2)	Wherever the quantities have been indicated for each type, size, thickness, material, radius, range etc., these shall cover all the items supplied and installed and the breakup for these shall be furnished in the bid.



- NOTE :
- 1. IP CLASS VFD : IP 3X OR BETTER
 - 2. DESIGN AMBIENT: 50degC
 - 3. PAINT SHADE: (EPOXY BASED, POWDER COATED)
EXTERIOR: OPALINE GREEN TO SHADE 275
OF IS:5 (SEMI GLOSSY)
INTERIOR: BRILLIANT WHITE (GLOSSY)
 - 4. ** NOS. OF SECONDARY WINDINGS DDE
 - 5. VFD (RC PUMP) QUANTITY : 1 NO PER UNIT

CUSTOMER 				TELANGANA STATE POWER GENERATION CORPORATION LTD TELANGANA, INDIA 5 x 800 MW YADADRI TPS, NALGONDA															
CONSULTANT 				TATA CONSULTING ENGINEERS LIMITED BANGALORE INDIA															
JOB NO. 417				STATUS CONTRACT				DISTRIBUTION				BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECT ENGINEERING MANAGEMENT NOIDA							
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REV. DATE ALTD CHD APPD				REV. DATE ALTD CHD APPD				DEPT CN DESIGN CHKD APPR LSL				NAME SIGN DATE							
18.08.24				12.08.24				C											
01 REASON: REVISED AS PER CUSTOMER COMMENTS				00				TITLE SLD OF VFD SYSTEM											
								DEPT. SCALE				DRAWING NO. PE-DG-417-618-C001							
								SIGN 				SHEET 01 OF 01 REV. 01							
13				14				15				SIZE-A0							



BHARAT HEAVY ELECTRICALS LIMITED BHOPAL

A.C. Machines Engineering Division

CUSTOMER : M/S TSGENCO

PROJECT : 5 X 800 MW YADADRI TPS

DOCUMENT NO.: BP-DG-417-247-002

W.O.No : 45063A-401-00

MOTOR TECHNICAL DATA - Rev. 01 DATE : 12.10.22

APPLICATION : RC Pump Motor

Sheet 1 of 9

1.0 GENERAL

1.1	Application	:	RC Pump Motor
1.2	Quantity	:	25 (Note: We confirm to provide mandatory spares as per agreement /PO copy of M/s TSGENCO. And the qty. shall be as per this PO copy/ agreement only.)
1.3	Make	:	BHEL, Bhopal
1.4	Frame Size	:	1LA7712-4
1.5	Applicable Standard	:	IS / IEC: 60034-1& IEC: 60034-1 (latest) & IEC:61800-4(for VFD application)

2.0 TYPE AND RATING

2.1	Type of Motor/ Enclosure	:	SCIM (Squirrel cage induction motor) / TETV Totally enclosed Tube Ventilated
-----	--------------------------	---	--

(Note: This motor is suitable for both VFD drive & DOL start. And earth brush at DE shaft and NDE bearing housing is insulated to fulfil VFD application requirement)

2.2	SERVICE		
2.2.1	Service Factor	:	1.0
2.2.2	Outdoor/Indoor	:	INDOOR
2.2.3	Hazardous Area Classification	:	NA
2.3	Duty Cycle / Designation	:	Continuous (S-1)
2.4	Rated Continuous output (kW)	:	950
2.4.1	Max demand at rated ambient(kW)	:	849.4
2.5	Ambient Temperature (Deg. C)	:	50
2.6	Pole	:	4 pole
2.7	Rated speed (rpm)	:	1487
2.8	Rated voltage (v)and variation	:	3300 $\pm$ 10%
2.9	Rated frequency(Hz) and variation	:	50 $\pm$ 5%
2.10	Combined voltage and Frequency variation	:	10% abs.
2.11	Full load current(amps)	:	203
2.12	No load current(amps)	:	56.0
2.13	Full load / No Load Loss	:	50 KW / 20 KW
2.14	Starting (Locked rotor) current % of FLC at Rated voltage	:	600% FLC (plus 20% tolerance)



BHARAT HEAVY ELECTRICALS LIMITED BHOPAL
A.C. Machines Engineering Division

CUSTOMER : M/S TSGENCO

PROJECT : 5 X 800 MW YADADRI TPS

DOCUMENT NO.: BP-DG-417-247-002

W.O.No : 45063A-401-00

MOTOR TECHNICAL DATA - Rev. 01 DATE : 10.12.2022

APPLICATION : RC Pump Motor Sheet 2 of 9

3.0 PERFORMANCE

3.1	Method of starting	:	VFD cum DOL		
3.2	Torque at rated voltage (Kg-m)	:	RATED TORQUE: 622 kg-m		
3.2.1	Breakaway starting torque(%of FLT)	:	80 % (497.6 kg-m)		
3.2.2	Pull-up torque (%of FLT)	:	74 % (460.28 kg-m)		
3.2.3	Pull-out torque (%of FLT)	:	210 % (1306.2 kg-m)		
3.2.4	Min. value of accelerating Torque	:	24% (149.28 Kg-m)		
3.3	Power factor (100%/75% Load/50% Load)	:	0.86 / 0.82 / 0.75		
3.4	Efficiency (100%/75% Load/50% Load)	:	95.0 / 94.5 / 93.0		
3.5	Starting time at	:	80% RV	100%RV	110% RV
	a) Load coupled (sec)	:	4.6	2.3	1.8
	b) Load un-coupled (sec)	:	4.0	1.95	1.5
			80% RV	100%RV	110% RV
3.6	Locked rotor withstand time (hot) in sec.	:	23.4	15	12.4
	(cold)	:	31.25	20	21.5
3.7	Starting requirement				
	a) No. of equally spread starts per hour	:	3		
	b) No. of cold starts	:	2		
	c) No. of hot starts	:	2		
3.8	Thermal time constant Heating/Cooling (Min)	:	50 / 150 Minutes.		
3.9	Whether motor is suitable for 150%RV while bus transfer :		Yes		
3.10	Noise Level	:	85dB (A) at 1.5 mtrs. / IS:12065		
3.11	Vibration Level (Rigid Mounting)	:	37 μ (displacement) /2.3 mm/s (velocity) as per IEC60034-14 (Both rms. figures).		
3.12	Min volt required under starting conditions to accelerate driven equipment to rated speed.	:	80% RV		
3.13	Min accelerating torque at 80% RV	:	25 % of rated torque.		
3.14	SubTransient reactance	:	0.17 (p.u.)		
3.15	Hot thermal withstand curve shall have a margin of at least 10% over the full load current of the motor.	:	OK Confirmed		
3.16	Slip	:	0.87 %		



BHARAT HEAVY ELECTRICALS LIMITED BHOPAL
A.C. Machines Engineering Division

CUSTOMER : M/S TSGENCO

PROJECT : 5 X 800 MW YADADRI TPS

DOCUMENT NO.: BP-DG-417-247-002

W.O.No : 45063A-401-00

MOTOR TECHNICAL DATA - Rev. 01 DATE : 10.12.2022

APPLICATION : RC Pump Motor Sheet 3 of 9

4.0	CONSTRUCTION		
4.1	Degree of protection(<u>Motor and all terminal Boxes</u>) :	IP-55	
4.2	Method of cooling :	IC 511	
4.3.1	Motor suitability for rotation :	BI-DIRECTIONAL	
4.3.2	DOR facing DE :	CW	
4.4	Insulation class :	F, Temp. Rise limited to class B	
4.5	Permissible temp. rise above an ambient By resistance method (Deg. C)	70	
4.6	Tropicalized (Yes/No) :	Yes	
4.7	Stator Winding connection :	Star	
4.8	BEARINGS		
4.8.1	Make :	BHEL Approved Vendors	
4.8.2	Type :	ANTIFRICTION	
4.8.3	Recommended lubricant :	GREASE	
4.8.4	Catalogue No. (DE/NDE)(Bottom/Top) :	NU228M+6228C3/NU224M	
4.8.5	Life :	40000Hours.	
4.8.6	For FOL system		
4.8.6.1	Oil flow (LPM) per bearing :	NA	
4.8.6.2	Max / Min. oil pressure (kg-m2) :	NA	
4.8.6.3	Bearing insulation :	YES,NDE SIDE.	
4.9	Drain plugs provided for draining of water :	Yes	
4.10	Paint Shade :	RAL 7032	
4.11	Type Of Coupling :	DIRECT	
5.0	METHOD OF COOLING		
5.1	Details of cooling water system		
5.1.1	No. of Cooler :	NA	
5.1.2	Water Requirement per cooler :	NA	
5.1.3	Max. Permissible temperature of cooling water at inlet :	NA	
5.1.4	Max. Permissible temperature of cooling water at outlet :	NA	
5.1.5	Max. Permissible pressure of water :	NA	
6.0	MISCELLANEOUS		
6.1	Type of mounting :	Horizontal (B3)	
6.2	Moment of inertia (GD2) KG-M2		
6.2.1	Load (referred) to motor speed :	(4 X 16.8) = 67.2 Kg-M2	
6.2.2	Motor :	168	
WEIGHTS			
6.3.1	Stator (kg) :	5400	
6.3.2	Rotor (kg) :	1300	
6.3.3	Total (kg) :	6700	



BHARAT HEAVY ELECTRICALS LIMITED BHOPAL
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APPLICATION : RC Pump Motor Sheet 4 of 9

- | | | | |
|-----|--|---|-------------------------------------|
| 6.4 | OGA Drawing no. | : | 34020048252 |
| 6.5 | Special features if any | : | DOL |
| 7.0 | ADDITIONAL INFORMATION | | |
| 7.1 | Capable of withstanding the stress imposed if started At 110 % of rated voltage. | : | Yes. |
| 7.2 | Motor shall start with rated load and accelerate to full speed with 80% rated voltage at motor terminals. | : | Yes. |
| 7.3 | Motor shall not stall at 70% of nominal voltage for 1 min: | : | Yes |
| 7.4 | Capable of operating satisfactorily at full load for 5 Minutes without injurious heating with 75% RV at terminals: | : | Yes |
| 7.5 | Over Load Capability | : | 160% load for 15 Sec as per IS. |
| 7.6 | Over Speed Capability | : | 120% speed for 2 minutes as per IS. |
| 7.7 | Motor suitable for application of 150% of rated voltage during bus transfer for 1 sec. | : | Yes |
| 7.8 | Paint should be epoxy based. : Ok confirmed | | |
| 7.9 | Anchoring arrangement : Foundation bolt 4 Nos, M42 X3X1000 MM LENGTH | | |

LIST OF ACCESSORIES:



BHARAT HEAVY ELECTRICALS LIMITED BHOPAL
A.C. Machines Engineering Division

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MOTOR TECHNICAL DATA - Rev. 01 DATE : 10.12.2022

APPLICATION : RC Pump Motor Sheet 5 of 9

1.01	RTD for winding (type/nos./leads)	:	Pt-100, 12 Nos., 3wire, Simplex
1.02	RTD for bearing (type/nos./leads)	:	Pt-100, 06 Nos., 3wire, Duplex
1.03.01	RTD for hot air (type/nos./leads)	:	NA
1.03.02	RTD for cold air (type/nos./leads)	:	NA
1.04	Space heaters	:	Yes
1.04.01	Nos.	:	04
1.04.02	Power (watts)	:	800 watts EACH, Total power = 800 watts.
1.04.03	Supply voltage	:	240V AC, 1Phase
1.05	Stator terminal box	:	
1.05.01	Type	:	PSTB,01 no.
1.05.02	Fault level (MVA)	:	500MVA
1.05.03	Fault level duration (through fault)(sec)	:	0.25
1.05.04	Suitable for being turned 360Deg in steps of 180Deg	:	YES
1.05.05	Provision of glands	:	Yes.(However gland size shall be as per approved the cable sizing)
1.06	Neutral TB	:	01 no./ Non PSTB type
1.06.1	RTD & BTB TB	:	01 no.TB for terminating both RTDs & BTBs.
1.06.2	Space heater TB	:	01 No.
1.07	Current transformers	:	NOT APPLICABLE
1.07.01	Nos.	:	--
1.07.02	Ratio	:	--
1.07.03	Accuracy class	:	--
1.07.04	Knee point voltage (volts)	:	--
1.08	Dial type thermometer	:	
1.08.01	For bearing (nos.)	:	01 no per side
1.08.02	For air temp. (nos.)	:	NA
	a) hot air	:	NA
	b) Cold air	:	NA
1.08.03	Contact rating	:	0.5/5A 220V DC/240V AC
1.08.04	Range	:	0 To 120 Deg C
1.08.05	Supply voltage	:	240 V AC, 1Phase
Note: The DTTs are provided for local indication only.			
1.09	Rotor terminal box	:	NA
1.10	TB for RTD, BTB and space heaters	:	YES
1.11	Sole plate	:	YES
1.12	Foundation and anchoring bolts	:	YES
1.13	Base Frame	:	NA
1.14	Speed Switch	:	NA
1.14.01	Supply Voltage	:	-
1.14.02	Contact Rating	:	-
1.15	Insulation of bearing	:	The NDE side bearing housing shall be insulated



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APPLICATION : RC Pump Motor Sheet 6 of 9

1.16	Forced oil lubrication	:	NA
1.17	Oil level indicator	:	NO
1.18	Noise reducer	:	NO
1.19	Water flow indicator	:	NA
1.20	Water leakage detector	:	NA
1.21	Tacho-generator	:	NA
1.22	Grounding pads	:	
1.22.01	Nos., Size on motor body	:	2, 6 tk x 25 mm wide
1.22.02	Nos. on terminal box	:	2
1.23	Vibration pads	:	
1.23.01	Nos., size	:	02, 60 mm cube
1.23.02	Location	:	On DE & NDE Endshields
1.24	Lifting eyes for hoisting	:	YES

NOTE : Data given above are subject to tolerances as per IS/IEC:60034 unless specified otherwise as '*' for which the data is guaranteed.

LIST OF CURVES:

1.	Thermal withstand curves	:	45063-00/01
2.	Torque, Current Vs Speed curves	:	45063-00/02
3.	Efficiency, PF, Current vs. Load curves	:	45063-00/03
4.	Speed, Current Vs Time curves	:	45063-00/04
5.	Negative Phase sequence Curves	:	45063-00/05
6.	Calibration Curve for RTDs/BTDs	:	45063-00/06

PREPARED BY:

(B N JENA)

Mgr. /BHEL BHOPAL



BHARAT HEAVY ELECTRICALS LIMITED BHOPAL
A.C. Machines Engineering Division

CUSTOMER : M/S TSGENCO

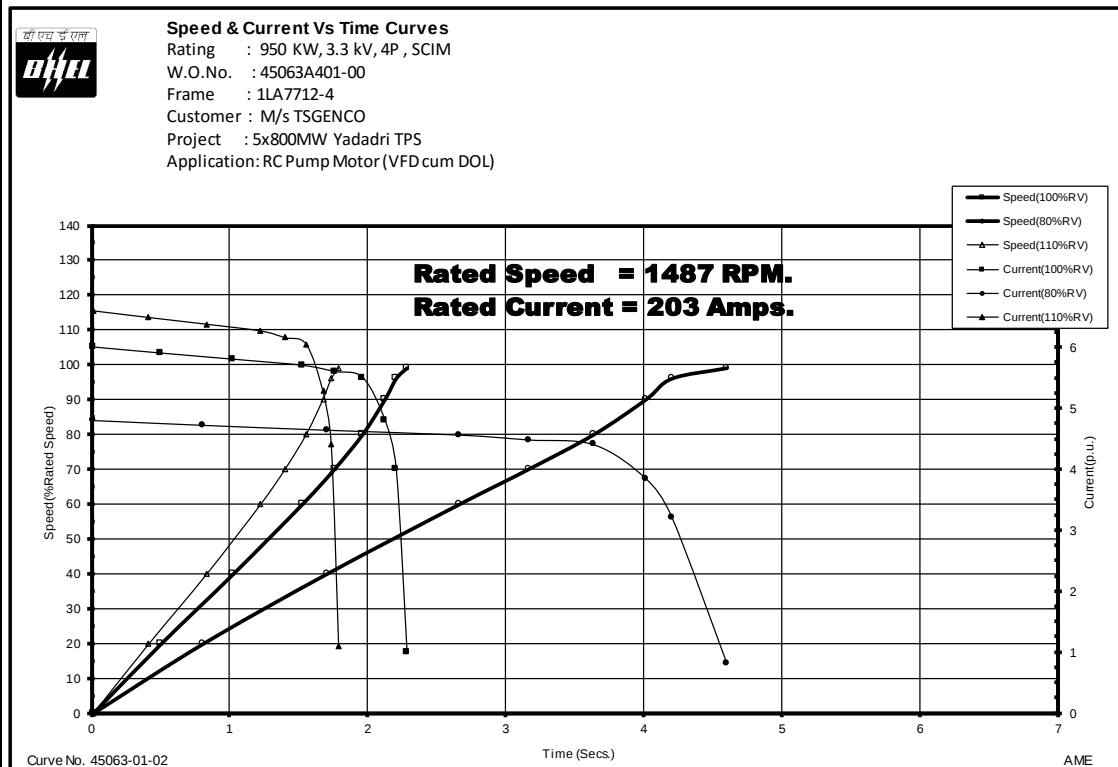
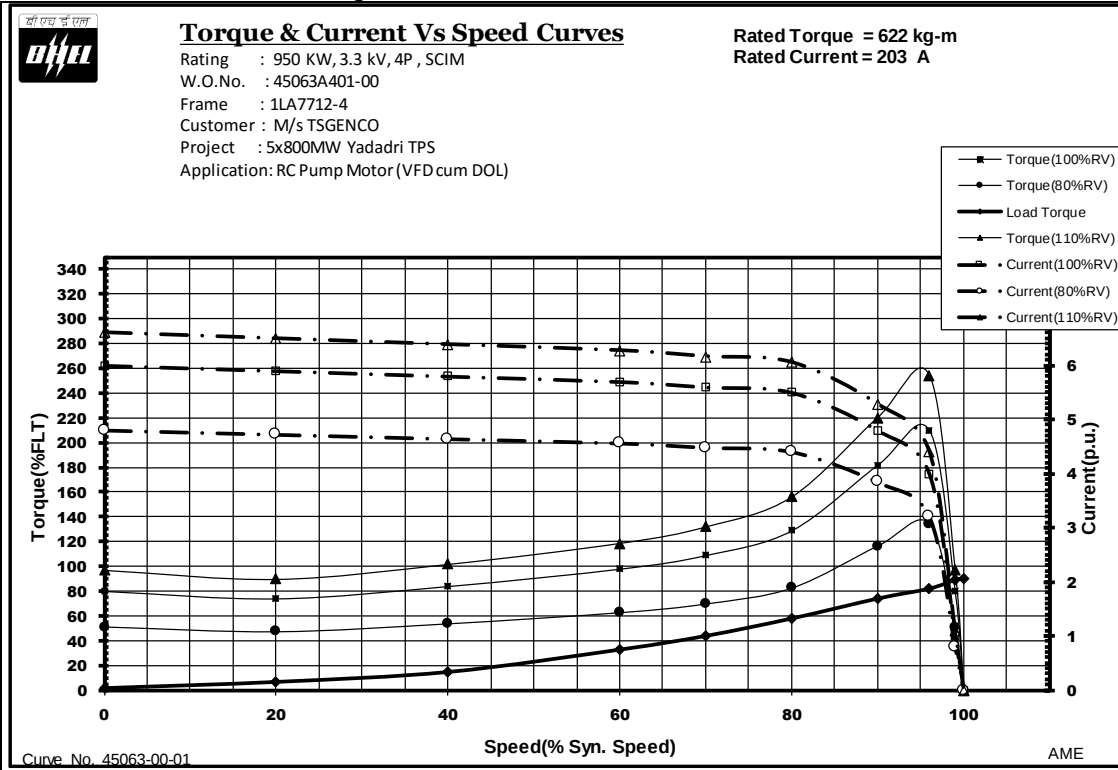
PROJECT : 5 X 800 MW YADADRI TPS

DOCUMENT NO.: BP-DG-417-247-002

W.O.No : 45063A-401-00

MOTOR TECHNICAL DATA - Rev. 01 DATE : 10.12.2022

APPLICATION : RC Pump Motor Sheet 7 of 9



Following VFD
specification of
Kothagudem-FGD
holds good for
Yadadri-FGD
project

VOLUME : V-A

SECTION-XII

**TECHNICAL SPECIFICATION
FOR
VARIABLE FREQUENCY DRIVES**

CONTENTS

CLAUSE NO.	DESCRIPTION
1.00.00	SCOPE OF SUPPLY
2.00.00	CODES AND STANDARDS
3.00.00	TYPE
4.00.00	PERFORMANCE REQUIREMENT
5.00.00	CONTROL REQUIREMENT
6.00.00	PANEL CONSTRUCTION
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9.00.00	POWER TRANSFORMER
10.00.00	POWER CONVERTER
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12.00.00	OUTPUT FILTER
13.00.00	BY PASS FEATURE
14.00.00	CT/PT/METERS
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16.00.00	PROTECTION, CONTROL, METERING, INDICATION AND ANNUNCIATION
17.00.00	OPERATOR CONTROL PANEL

CONTENT [Contd...]

CLAUSE NO.	DESCRIPTION
18.00.00	PROTECTIVE FEATURES
19.00.00	CONTROL
20.00.00	INDICATORS
21.00.00	METERING
22.00.00	AUDIO-VISUAL ANNUNCIATION
23.00.00	FAULT DIAGNOSTIC
24.00.00	EXTERNAL POWER SUPPLY FOR AUXILIARY AND CONTROL CIRCUIT
25.00.00	RELIABILITY FEATURES
26.00.00	MAINTENANCE FEATURE
27.00.00	PAINTING
28.00.00	INSPECTION, TESTING AND ACCEPTANCE
29.00.00	DRAWINGS, DATA & MANUALS

VOLUME : V-A

SECTION-XII

**TECHNICAL SPECIFICATION
FOR
VARIABLE FREQUENCY DRIVES**

1.00.00 SCOPE OF SUPPLY

1.00.01 VFD system shall consist of all components required to meet the performance, protection, safety and certification criteria of this specification.

1.00.02 Each VFD shall be furnished complete with :-

Fittings and accessories.

a. Auxiliary Equipment

b. All supporting steel work and hardwares

1.00.03 One set of special tools and tackles

1.00.04 Mandatory Spare parts

1.00.05 All relevant drawings, data and instruction manuals.

2.00.00 CODES AND STANDARDS

DC reactor – IEC 289

HT Circuit Breaker – IEC 56

Motors – IS 325 / IEC 34 / IS 4722

Transformers – IS 2026

Bushings – IS 2099 / IEC 137

Bushing CT – IEC 185 / IS 2705

Semiconductor converter – IEC 146

AC Contactor – IEC 158-1 / VDE 0660

3.00.00 TYPE

System shall be load commutated inverter type, 12-pulse design, having two channels (each channel with six pulse design) for each motor.

4.00.00 PERFORMANCE REQUIREMENTS

4.01.00 The system shall be energy efficient, designed as standard product and shall provide very high reliability, high power factor, low harmonic distortion and low vibration/ wear/ noise.

4.02.00 The system shall be designed to deliver the motor input current and torque for the complete speed torque characteristics of the large fan drives like ID Fans

and other motors as specified in the specification elsewhere as per requirement with input supply variation of $\pm 10\%$ and frequency variation of $\pm 5\%$. It shall be capable of withstanding the thermal and dynamic stresses and the transient mechanical torque, resulting from short circuit.

- 4.03.00 The drive system shall be designed to operate in one or more of the following operating modes as to suit characteristics of the driven equipment
- i) Variable torque changing as a function of speed i.e. speed squared
 - ii) Constant torque over a specific speed range
 - iii) Constant power over a specific speed range where the torque decreases when speed increases
- 4.04.00 The drive controller shall be equipped with microprocessor based digital regulator with programmable functions. The power control regulator logic shall provide for an acceleration/deceleration current limit curve and shall be capable of field be separately programmable from 0.1 to 20 seconds.
- 4.05.00 Each channel and motor rating shall be rated to meet the requirements of driven equipment. The system shall be designed for linear continuous speed control from 20% to 100% of rated speed and shall be of a modern proven design and fully compatible with excitation system offered.
- 4.06.00 The Total Harmonic Distortion (THD) of the voltage and current at inverter output shall be as per IEC 61800-4 and it shall be considered in the design of the motor.
- 4.07.00 Harmonics at the supply side of the drive system at primary of the main input transformer shall be restricted within the maximum allowable levels of current and voltage distortion as per recommendations in the latest edition of IEEE-519.
- 4.08.00 The overload capacity of the controller shall be 150% of rated current of motor for one minute for constant torque applications, and 115% of rated current for one minute for variable torque application at rated voltage. If the motor load exceeds the limit, the drive shall automatically reduce the frequency and voltage to the motor to guard against overload. If the load demand exceeds the current limit for more than one (1) minute, the drive shall shut down to prevent overheating of the motor and damage to the drive.
- 4.09.00 During operation, the system shall be capable of developing sufficient torque under all load condition to respond to a 20% alteration in speed set point within a time limit up to 60 seconds.
- 4.10.00 The integrator action of the speed set point alteration shall be independently adjustable for both an upward and downward alteration. The minimum time interval between set point adjustments by the distributed control system shall be considered as 10 second.
- 4.11.00 The drive shall trip incase the speed exceeds 105% of the maximum operational speed or reduces to 95% of the minimum operational speed for more than 10 second.

- 4.12.00 Maximum noise level from the drive at 1meter distance, under rated load with all normal cooling fans operating shall not exceed 85dBA.
- 4.13.00 Variable frequency drive shall be arranged so that it can be operated in a circuit mode, disconnected from the motor for start up adjustment and troubleshooting/ maintenance.
- 4.14.00 Voltage at motor neutral terminal shall be floating and neutral shall be insulated adequately for Load Commuted Inverter (LCI) operation.
- 4.15.00 The drive system shall ensure following
- a) Harmful VFD induced harmonics which can create motor heating are eliminated.
 - b) VFD induced torque pulsation are limited to maximum 1% (even at low speed) so there is minimal stress to the equipment.
 - c) Motor is protected from dv/dt stresses.
 - d) No appreciable increase in motor audible noise.
- 4.16.00 Electrical performance of the system shall comply to IEEE, IEC and equivalent international standard.
- 5.00.00 **CONTROL REQUIREMENT**
- 5.01.00 The system shall operate on constant V/f supply with required voltage boost capability in low frequency mode of operation.
- 5.02.00 Short time voltage dip up to 20% of nominal voltage (e.g. in case of a large motor start up connected to the same bus as VFD) shall not cause the control system to stop functioning and shall not trip the drive system.
- 5.03.00 The system shall also be equipped with a facility which will restart the system in case of voltage dip over 20% or power interrupter for less than 2 seconds, with recovery of the voltage to its normal value. The drive shall have the facility to block this feature, if required by operator. Upon restart the converter shall be capable of synchronizing onto a rotating motor and develop full acceleration torque within 10 seconds.
- 5.04.00 The power controller shall be controlled to always start the motor in the forward direction. Logic shall be provided to prevent the motor from being started in the reverse direction.
- 5.05.00 The drive motor shall be speed controlled corresponding to 4-20mA or 0-10V reference input signal. Unless otherwise specified, upon complete loss of the users speed reference signal, the drive shall automatically run at constant speed as at 8-100% of the last speed reference available prior to the loss of signal.

- 5.06.00 It shall be possible to vary the speed of the drive in either manual or auto mode.
- Auto/manual selection shall be from VFD panel unless otherwise specified.
- With the selector switch in “manual” mode, the operator shall be able to set the speed through keypad, mounted on front of the drive panel or from speed increase/decrease push buttons from the field. Motor operated potentiometer shall be provided as a speed set point device.
 - With selector switch in “auto” mode, speed of the motor shall be controlled from a 4-20mA signal, from PLC/DDCMIS system. Necessary equipment like protocol converter as required for interfacing with PLC/DDCMIS shall also be provided in the drive panel.
- 5.07.00 The required provision for the interface with remote DDCMIS located at control room shall be either through hardwired connection (with potential free contacts and transducers as described elsewhere in this specification) or serial link.
- 5.08.00 Drive system shall have provision for interface with upper level automation such as substation monitoring system or electrical control system.
- 5.09.00 The closed loop control feedback for the drive system having output transformer shall be tapped from the secondary side of the output transformer.
- 6.00.00 **PANEL CONSTRUCTION**
- 6.01.00 The panel shall include suitable semi conducting power devices (line commuted thyristors/Diodes/IGBT). Modules with protective devices, reactors (if required), filters (if required), control circuit, control accessories, indication and annunciation etc, the construction of the panel shall provide effective protection against electromagnetic emissions and shall meet design requirement of integrated standards
- 6.02.00 Upstream breaker “ON/OFF/TRIP” indications and remote breaker closing and trip push button shall be provided on the front door.
- 6.03.00 Safety Interlock shall be provided so that power cabinet can't be opened unless the up stream breaker is disconnected, safety-grounding switch is closed and DC link capacitor is discharged. Power source breaker can only be closed once the earthing switch is open and panel door is closed with lock defeat facility.
- 6.04.00 Duplicate control supply with automatic changeover shall be provided. Protection shall be provided against AC/DC transients, voltage surge etc. of power and control device.
- 6.05.00 The drive shall be housed in sheet steel panels fabricated with 2mm thick cold rolled sheet steel. The panel shall be suitable for indoor installation, if not otherwise specified. The panel shall be free standing with degree of enclosure

- protection as IP-41. The maximum operating height shall be 1800mm approximately.
- 6.06.00 Bolted un-drilled gland plate shall be provided at bottom. Clamp type terminals shall be used for connection of all wires up to 10mm² and terminal for higher sizes shall be bolted type suitable for cable lugs. Minimum space for power cable termination shall be 600mm clear from bottom of the cable gland plate.
- 6.07.00 Bus bars shall be of electrolytic copper, color coded separately for AC and DC system. All the live parts shall be sleeved/ shrouded to ensure complete safety to personnel intending to carry out routine inspection by opening the panel doors. All the equipment inside the panel and on the doors shall be provided with suitable nameplate.
- 6.08.00 All the switches, component and accessories which are essential for normal and emergency operation shall be mounted on the door and shall be operable externally. All the analog instruments, where provided, shall be switchboard type, back connected; 72x72mm. Scale shall have red mark indicating maximum permissible operating rating.
- 6.09.00 Each panel shall be provided with illuminating lamp/11W CFL with switch and fuse. 5/15A, 240V power socket with switch and fuse shall be provided. Each panel shall have space heater with switch fuse and variable setting thermostat.
- 6.10.00 Copper earth bus of min. 50x6 mm size shall be provided in the panel with provision for connection to purchaser's plant earth grid. All the non-metallic components/parts shall be connected to the main earth bus bar. Separate earth bus bar and stud for electronic control system as required shall be provided.
- 6.11.00 All the metal parts shall be treated so as to ensure efficient anti-corrosive protection. Hard wares shall be zinc passivated or electrogalvanised. Panel enclosure and structure supports shall be thoroughly cleaned and degreased to remove mill scale and rust etc. Paint shade of external surface shall be as per Section-X of Volume – IIA: Lead Specification.
- 6.12.00 All panels shall be of same height so as to form a uniform line-up, to give good aesthetic appearance.
- 6.13.00 All the control wiring shall be enclosed in plastic/metal channel. Each wire shall be identified at both ends by self-sticking wire marker tapes of PVC ferrules. Power and control wiring inside the panel shall be done with BIS approved, PVC insulated, fire retardant, copper conductor wire. 1.5mm² size wire shall normally be used provided the control fuse rating is 10 Amps or less and 2.5mm² size for control fuse rating above 16A for electrical circuits and 0.7 mm² for electronic circuits. All wires shall be ferruled and terminals shall be properly numbered, minimum 20% spare terminal shall be provided.

- 6.14.00 All electronic modules and components shall be accessible from front of panel only. Modular assemblies for both the system control electronic equipment and power electronic equipments shall be used.
- 6.15.00 All low voltage compartment and cabling shall be electrically and physically separated from the high voltage compartment.
- 6.16.00 DC link capacitor and pre charging and discharging circuit shall be preferably mounted in the rear of the panel.
- 6.17.00 Suitable removable type hooks shall be provided for lifting the panel.
- 6.18.00 Perspex type transparent insulating material shall be used for covering live compartments.
- 6.19.00 Drive keypad, operator control panel required for control, monitoring and measurements shall be supplied and installed outside the panel on the front door. It shall be accessible for operation without opening the front door and shall be non-removable type.
- 6.20.00 All the equipment shall be complete with cable glands, lugs etc. and cable glands shall be single or double compression type for indoor and outdoor equipment respectively.
- 7.00.00 **COOLING**
- 7.01.00 The drive panel shall be naturally cooled type as per manufacturer's standards. If unavoidable, forced type cooling system shall be provided. Cooling system shall include well-dimensioned panel, adequate cooling airflow path, module cooling fan and if necessary, panel-cooling fan shall be considered. Vendor shall ensure that the panel dimensions and the flowpaths have been designed for continuous running at the specified ambient without overheating. For fan cooled drives, redundant ventilating fans (N+1) shall be provided. The VFD panels shall be located in an air-conditioned room.
- 7.02.00 Necessary starters shall be provided within the VFD panels for the ventilation fans, any other auxiliary motor etc. The system provided shall be interfaced with drive starting and shut down such that safety interlocks such as start permit from cooling system to drive and trip signal from cooling system to drive in case of cooling system failure etc., shall be incorporated in the overall sequence logic.
- 7.03.00 MCB for motor space heater, auxiliary power supply if required for local panel, drive panel space etc. shall be included and mounted in easy accessible location.
- 8.00.00 **EQUIPMENT/COMPONENT SPECIFICATION**
- 8.01.00 **Motor**
- i) The motor shall be suitable for operation with a solid-state power supply consisting of an adjustable frequency inverter for speed control.

- ii) The motor shall be suitable for the current waveforms produced by the power supply including the harmonics generated by the drive.
- iii) The Motor shall be designed to operate continuously at any speed over the range 20-100 % of rated speed.
- iv) The permitted voltage variation should take into account the steady state voltage drop across the AC drive and all other system components upstream of the motor.
- v) Motors required to be transferred to DOL, by-pass mode shall be rated for specified variations in system line voltage and frequency. Starting current of motor in DOL, bypass mode shall be limited to value in motor specifications.
- vi) The motor shall be constructed to withstand torque pulsations resulting from harmonics generated by the solid-state power supply.
- vii) The motor insulation shall be designed to accept the applied voltage waveform, within the Vpeak and dv/dt limits as per IEC-61800-4.
- viii) The drive manufacturer shall be solely responsible for proper selection of the motor for the given load application and the output characteristics of the drive.

Other details shall be as given in specification of Electric motors.

9.00.00 POWER TRANSFORMER

Indoor dry type and shall be suitable for rating complying with system details. Other details as given in sub-section of LT Aux. Transformer specification.

10.00.00 POWER CONVERTER

- i) The static power shall consist of a line side power converter for operation as a rectifier and a load side power converter for operation as a fully controlled inverter. Power converter shall be fast switching, most efficient and low loss type.
- ii) Adequate short circuit and over voltage protection shall be provided for the converter and inverter system.
- iii) All power converter devices shall include protective devices, snubber networks and dv/dt networks as required.
- iv) The current rating of the converter's semi-conductor components shall not be less than 120% of the nominal current flowing through the elements at full load of the VFD through the whole speed range.
- v) All power diodes shall be of silicon type with minimum Vbo rating as 2.5 times the rated operating voltage.

- vi) The power converter circuit shall be designed so that motor can be powered at its full nameplate rating continuously without exceeding its rated temperature rise due to harmonic currents generated by the inverter operation.
- vii) The conversion devices and associated heat sinks shall be assembled such that individual devices can be replaced without requiring the use of any special precautions/tools.
- viii) The cooling system of the electronic components, if provided, shall be monitored and necessary alarms shall be provided to prevent any consequential damage to the power control devices.
- ix) Offered system shall also take in account the distance between drive panel and motor and system shall include all material and accessories to make system suitable for a distance of 350m.

11.00.00 DC LINK REACTOR

- i) Smoothing reactors for the DC link shall be designed to sufficiently decouple the rectifier and inverter portion of the converter and to limit fault currents in this circuit.
- ii) Reactor shall be air-core type, natural cooling and housed in a separate enclosure in ventilated room.
- iii) Reactor shall be suitable for withstanding earth fault continuously and for operation with the non-sinusoidal current wave shapes and DC components under all operational conditions of the system without exceeding its temperature limits.
- iv) Noise level shall not exceed value specified in NEMA TR-1

12.00.00 OUTPUT FILTER

VFD output current waveform should be inherently sinusoidal at all speeds, with harmonic limits as specified in this specification. Output filter shall be provided if required. Output filter capacitors shall be provided with discharge circuits to ensure that all residual stored charge is reduced to less than 50 V DC within 300 seconds after a loss of AC voltage. All capacitor shall be maintenance free and self-healing type.

The VFD system shall inherently protect motor from high voltage dv/dt stress, independent of cable length to motor. Output filter shall be an integral part of the VFD system and included within the VFD enclosure.

13.00.00 BYPASS FEATURE

- i) Bypass breaker / contactor-HRC fuse complete with protection, annunciation and metering shall be provided.

- ii) All Variable frequency drives (VFD) having bypass feature shall have motor protection relay along with necessary control and metering etc. Switching scheme shall be such that in case of drive mal-operation, the motor could be taken on bypass control manually, while the drive could be attended by opening its isolation devices.
- iii) Safety interlock between inverter and bypass breaker/contactors shall be provided such that closing of healthy device is inhibited in case of external fault.

14.00.00 CT/PT/METERS

As required for the system offered and shall be suitable for variable frequency operation.

15.00.00 LOCAL MOTOR CONTROL STATION

- i) The local motor control station is to be installed in the field near the motor. Components and accessories that are required in the local motor control station may be mounted on the local field mounted panel envisaged for the driven equipment.
- ii) Meters in the local control station shall be suitable for 4-20mA transducer outputs and shall be calibrated for the actual motor current. Further, the drives with bypass facility, the meters shall be capable of reading bypass full load and starting currents, as well as the drive current.

16.00.00 PROTECTION, CONTROL, METERING, INDICATION & ANNUNCIATION

16.01.00 The system vendor shall provide all the necessary system control, protection; alarm equipment and metering for the entire drive system and its auxiliary equipment.

16.02.00 Automatic sequence control shall include start-up of cooling system, auxiliary system of the motor, interlock checking, automatic start and run-up of drive, planned and emergency shutdown. The same shall be processed through microprocessor-based system.

17.00.00 OPERATOR CONTROL PANEL

- i) Each drive shall be equipped with a front mounted operator control panel consisting of a backlit alphanumeric display and a keypad with keys for parameterization and adjusting parameter which shall be limited to Start/Stop, Local/Remote, Auto/Manual, Increase/Decrease, menu navigation and protection and measurement parameter selection, etc. Also local operation during maintenance should be possible & the same shall be provided inside the panel.
- ii) All parameter names, fault messages, warnings and other information shall be displayed in complete English words or Standard English abbreviations to allow the user to understand what is being displayed without the use of a manual or cross-reference table. This shall also

be used for the modification of all electrical values, configuration parameters, drive menu parameters, application and activity function access, faults, local control, adjustment storage, self test and diagnostics. Keypad shall be operable with password for changing the protection setting, safety interlock etc. However the parameters such as measurements, setting, and mode of drive etc. Shall be allowed to be viewed without any password.

- iii) Operator console shall have facility / port to connect external hardware such as Lap-Top etc. Console shall have facility for upload and download of all parameter settings from one drive to another identical drive for start up and operation.
- iv) Drive system control also have facility to receive tripping signal from up stream breaker for tripping and also provision for closing upstream breaker after all required process parameters are achieved.
- v) User-friendly software for operation and fault diagnostic shall be loaded in the drive system panel before commissioning.

18.00.00 PROTECTIVE FEATURES

The system offered shall incorporate adequate features, properly coordinated for the drive control and for motor but not limited to the following :

- i) Incoming line surge protection.
- ii) Under / Over voltage protection.
- iii) Phase loss, phase reversal protection.
- iv) Programmable Over current Protection and under load protection.
- v) Inverter fault.
- vi) Over frequency operation.
- vii) Ventilation loss.
- viii) Over temperature of equipment.
- ix) Over speed of motor.
- x) Specific motor protection, including motor winding, bearing temperatures, over current, Overload, negative phase sequence, locked rotor and earth fault protections etc.
- xi) System Earth fault protection.
- xii) Over and under frequency, rotor earth fault, field failure protection for synchronous motor
- xiii) Additional protection for drive system

19.00.00 CONTROL

The following controls shall be provided as a part of the operators control Panel or through separate switches.

- i) Start/Stop
- ii) Speed Control (Raise/lower)
- iii) Auto/Manual/Test mode
- iv) Local/Remote
- v) Emergency Stop
- vi) Start/Stop for by pass starter (where specified)
- vii) Trip-Remote Breaker
- viii) Sequential switching of filters

20.00.00 INDICATORS

Vendor shall provide indications as required for normal operation and for easy maintenance, which shall be limited to the following indications :

- i) Motor running
- ii) Motor stopped
- iii) VFD System Fault
- iv) System ready to start
- v) AC mains ON
- vi) Motor over speed
- vii) Rectifier output 'ON'
- viii) Motor zero speed
- ix) Rectifier breaker trip

Above indications may be provided as a part of the operator control panel, i.e., door mounted keypad or through hardwired indicating lamps/LEDs.

Potential free contacts of items i-iv shall be wired separately for remote indications in PLC/DDCMIS system.

21.00.00 METERING

Digital display of the following parameters shall be as a part of the Operator Control Panel, selected by the operator.

- i) Input AC voltage
- ii) Input AC frequency
- iii) Input AC current
- iv) Output voltage
- v) Output current VFD / Bypass
- vi) Output frequency
- vii) Motor thermal state
- viii) Drive thermal state
- ix) Motor speed
- x) Motor energy meter
- xi) DC Link voltage
- xii) Hour Run

Necessary transducer shall be provided with 4-20mA output for indicating motor speed and motor current in PLC/DDCMIS unless otherwise specified for other parameters.

22.00.00 AUDIO-VISUAL ANNUNCIATIONS

- i) The system shall incorporate audio-visual annunciations for protection, for various fault conditions, for the Drive motor, Supply cables, DC Reactor and the Converter, output transformer etc.
- ii) Alarms shall also be included for the failure of various auxiliaries together with identifications of the failing unit, loss of cooling system, various protections devices provided for converter transformer etc.
- iii) Audio-visual window annunciations shall be provided on the front of the panel. All annunciations as required for normal and satisfactorily operation of the drive system shall be included as per vendor standards. These annunciations can be part of operator console panel or separately mounted type.
- iv) Vendor shall include audio-visual alarm as required for normal operations and maintenance of the system but not limited to the following :

1. Rectifier fuse failure
2. Main AC failure
3. Inverter fuse failure
4. Inverter overload
5. Inverter high temperature
6. Cooling system failure
7. Motor failed to start
8. Transformer failure
9. Battery monitoring healthiness
10. Communication and measurement system unhealthy
11. Motor temperature high
12. Harmonic filters monitoring

Common potential free contacts shall be provided for above annunciations and these shall be wired up to terminal block for remote alarm and monitoring.

23.00.00 FAULT DIAGNOSTIC

Fault diagnostic shall be built into the system to supervise the operation and failure of the system. The information regarding failure of any of the system including shut down of the system shall be available for a period of minimum 4 days (96 hours) after a shut down even though no supply would be available to the system. The system may be totally de-energized for maintenance or otherwise. It shall be possible to retrieve the record of events prior to tripping of the system or de-energisation. Auxiliary supply to the system components or to the electronics (firmware) for the diagnostics / display shall be taken care by the manufacturer for this purpose.

24.00.00 EXTERNAL POWER SUPPLY FOR AUXILIARY AND CONTROL CIRCUIT

Auxiliary power supply for devices external to VFD module, space heater supply for Motor, VFD panel space heater, auxiliary power supply for transformers, cubicle 11W CFL lamps etc. shall operate on 240 volts single phase AC provided by purchaser.

All control circuit shall operate at maximum voltage of 240V AC.

Vendor shall include supply of all control transformers, protective devices, required accessories etc. and any other control supply voltage as required for the system shall be derived from the power supply made available by other.

25.00.00 RELIABILITY FEATURES

The expected lifetime of the drive system shall be 25 years. The system including all individual components forming part of the system shall have a minimum MTBF of 4 years.

26.00.00 MAINTENANCE FEATURES

The controller design shall incorporate the following maintenance features :

- Modular construction
- All components shall be easily accessible

Standard diagnostics to aid maintenance personnel. These shall include LED or alphanumeric displays, test or measurement points.

27.00.00 PAINTING

27.01.00 All metal surfaces shall be thoroughly cleaned and de-greased to remove mill scale, rust, grease and dirt. Fabricated structures shall be pickled and then rinsed to remove any trace of acid. The under-surface shall be prepared by applying a coat of phosphate paint and a coat of yellow zinc chromate primer. The under-surface shall be made free from all imperfections before undertaking the finishing coat.

27.02.00 After preparation of the under surface, the panel shall be provided with epoxy based powder coating. Panel finish shall be free from imperfections like pinholes, orange peels, runoff painted.

27.03.00 All unpainted steel parts shall be zinc passivated, cadmium plated or suitably treated to prevent rust and corrosion. If these parts are moving elements, then these shall be greased.

27.04.00 For paint shade of finish coat, refer Section-X of Volume – IIA: Lead Specification.

28.00.00 INSPECTION, TESTING AND ACCEPTANCE

28.01.00 During fabrication, the drive shall be subject to inspection by owner, or by an agency authorized by the owner, to assess the progress of work, as well as to ascertain that only quality raw material is used. The manufacturer shall furnish all necessary information concerning the supply to owner's inspectors.

28.02.00 All tests shall be carried out at the manufacturer's works under his care and expense. The tests shall be witnessed by an inspector of the owner or an agency authorized by the owner. Prior notice of minimum of 4 weeks shall be given to the inspector for witnessing the test.

28.03.00 The routine test shall be conducted on all the drive system. However type test shall be performed on one system of each rating and type unless otherwise agreed between purchaser and manufacturer. For the purpose of testing, drive system shall include input/output transformer (where applicable), switchgears, converter, filters etc.

28.04.00 The routine and type tests to be performed on the drive system shall be as follows :

Routine Tests

a. Visual Inspection

It involves checking of the various equipments/components fault diagnostic unit, wiring, terminals, earthing ratings etc, in line with the approved drawings and visual inspection shall not be limited to the following;

- i) Dimensions and door layout Vis-à-vis the approved drawings
- ii) Degree of protection of cubicles
- iii) Simulation facility of control signals for testing purposes
- iv) Memory function of fault diagnostic
- v) Voltage/Current rating power semiconductor elements
- vi) Cable termination size and number of terminals, cable-supporting etc.
- vii) Accessibility of components
- viii) External signals and indication/alarm signals on converter
- ix) Earthing of cubicles and cubicle doors

b. Insulation Test

c. Light load and functional test

d. Load characteristics test

e. Load duty test

f. Checking of Auxiliary devices

g. Checking the properties of the control equipment

h. Checking the protective devices

i. Checking of control and functional requirements

j. High voltage test

k. Shaft current/bearing insulation

l. Automatic restart/re-acceleration

Type Tests

a. Allowable full load current versus speed

- b. Efficiency
- c. Temperature rise
- d. EM Immunity
- e. EM Emission
- f. Current sharing
- g. Voltage division
- h. Line side current distortion content
- i. Power factor
- j. Audible noise
- k. Torque pulsation
- l. Motor vibration
- m. Dynamic performance
- n. Current limit and current loop test
- o. Speed loop test capability to ride through voltage less than 80%
- p. Test capability to restart the system and resynchronize converter onto running motor after a voltage interruption

Type test certificate from independent testing agency for similar equipment can be accepted if it is carried out within 5 years from the date of inspection.

29.00.00 DRAWINGS, DATA & MANUALS

29.01.00 Drawings, Data & Manuals shall be submitted in triplicate with the bid and in quantities and procedures as specified in General Conditions of Contract and/or elsewhere in the specification for approval and subsequent distribution after the issue of 'Letter of Intent'.

29.02.00 To be submitted with the bid :-

- a. General arrangement drawings showing outline dimensions, cable entry openings, fixing/foundation details, weights and door openings.
- b. Bill of materials
- d. Type test reports
- f. General Technical Particulars

29.03.00 To be submitted for Owner / Purchaser's Approval and Distribution

All relevant drawings and data pertaining to the equipment like GTP, GA drawing, foundation plan, BOM, control & schematics, QAP, etc. shall be submitted by the Bidder for approval of Owner/Owner's consultant. ~~Also refer clause no. 1.19.02(u) of Section I of Volume V-A: Technical Specifications for Electrical Equipment & Accessories.~~