

Bharat Heavy Electricals Ltd
Electronics Division
Mysore Road, Bangalore – 560 026

Tender Document for "UPS to Udangudi project"

TENDER REFERENCE	SBA0000609
TENDER DOCUMENT AVAILABLE FROM	As per https://eprocurebhel.co.in website
LAST DATE AND TIME FOR SUBMISSION OF TENDER	
DATE AND TIME FOR TENDER OPENING	
SUBMISSION OF TENDER	The bidder should submit their offer in e-Procurement portal only : https://eprocurebhel.co.in
Note: Bidder to refer E-procurement portal(https://eprocurebhel.co.in) for any corrigendum, due date extension, etc.	

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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:001- Rev 04

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 04), General Conditions of Contract (document reference: CE: PR: 002 - Rev 02) 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-X 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 file 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.

6. 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.

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.

g. Erection and Commissioning:

Evaluation methodology: Unless and otherwise specified in SCC, E&C charges should not be less than 10% of the main supply value. In case the quoted total E&C value is less than 10% 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, E&C charges should not be less than 5% of the main supply value. In case the quoted total E&C value is less than 5% 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.

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 (APPLICABLE FOR IMPORT PROCUREMENT ONLY):

- 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 payment term with credit period of less than 45 days for indigenous supply/HSS and 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 may opt to quote with payment through Letter of Credit with usance period of 120 days. Bank charges of seller's bank shall be to seller's account and bank charges of BHEL's bank other than bill collection charges shall be to BHEL'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 bank guarantee (PBG):

Performance bank guarantee (PBG) will be applicable as called in the tender documents. Unless otherwise specified in the SCC, the PBG against performance of the contract shall be valid for a period of 18 months from the date of dispatch of goods + claim period of 03 months, for a value equal to 10 % of the basic value of the purchase order which will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable).

1. The BG issued in Indian Rupees by Banks in India is to be executed on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Bank issuing the guarantee.
2. No deviation for the duration and value of PBG will be permitted.
3. PBG shall be from any of the BHEL consortium of bankers (**refer Annexure VI**).

4. PBGs from nationalized banks are also acceptable.
5. PBG should be sent directly by the bank to the dealing executive mentioned in the purchase order located at the address mentioned in the purchase order.
6. PBG should be in the format specified (**refer Annexure VII**). No deviation to this format will be allowed. However in case BHEL changes the PBG format, bidder shall honor the same.
7. Bank Guarantee should be enforceable in Bangalore.
8. In Case of Bank Guarantees submitted by Foreign Vendors-
 - a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in Bangalore.
 - b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)
 - b.1 Please note that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter-Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It shall be noted that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor.
 - b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 is required to be followed.
 - b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).
9. Expired PBGs will be returned only after expiry of the claim period.
10. PBG shall not be applicable for spares.

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 Splittable: 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.

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."*

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.



ELECTRONICS DIVISION, BANGALORE

Annexure-VI

BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)

Bank Guarantee (BG) shall be issued from the following banks only:

Sl. No.	Nationalised Banks	Sl. No.	Public Sector Banks
1	Allahabad Bank	18	IDBI
2	Andhra Bank		
3	Bank of Baroda	Sl. No.	Foreign Banks
4	Canara Bank	19	CITI Bank N.A
5	Corporation Bank	20	Deutsche Bank AG
6	Central Bank	21	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
7	Indian Bank	22	Standard Chartered Bank
8	Indian Overseas Bank	23	J P Morgan
9	Oriental Bank of Commerce		
10	Punjab National Bank	Sl. No.	Private Banks
11	Punjab & Sindh Bank	24	Axis Bank
12	State Bank of India	25	The Federal Bank Limited
13	Syndicate Bank	26	HDFC Bank
14	UCO Bank	27	Kotak Mahindra Bank Ltd
15	Union Bank of India	28	ICICI Bank
16	United Bank of India	29	IndusInd Bank
17	Vijaya Bank	30	Yes Bank

Note:

- All BGs must be issued from BHEL consortium banks listed above.
- This list is subject to changes. Hence vendors are requested to check this list every time before issuing BGs.
- Bank Guarantees issued by Co-operative Banks/Financial Institutions cannot be accepted under any circumstance.

Annexure-VII

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 the⁸ 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

Annexure-VIII

Certificate by Chartered Accountant on letterhead

This is to certify that M/s _____
(hereinafter referred to as 'enterprise') having P A N Number _____ and
UDYAM Registration Number _____, registered office at _____
_____ is falling under the category
_____ (Micro / Small / Medium) under MSMED Act 2006. (Copy of UDYAM Registration
Certificate to be enclosed).

The said classification of _____ (Micro / Small / Medium) is arrived at based on the
Notifications / guidelines / clarifications issued under Micro, Small and Medium Enterprises
Development Act, 2006 including the notification S.O.2119 (E) dated 26th June 2020.

The Investment of the enterprise in Plant and Machinery or Equipment as at 31st March
2020 as per Clause 4 of the Notification is _____ (Rupees in Lakhs).

The turnover of the Enterprise for the period ending 31st March 2020 as per Clause 5
of the Notification is _____ (Rupees in Lakhs).

Date:

(Signature) Name-
Membership number-

Seal of Chartered Accountant with UDIN reference

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 _____

RFQ No.SBA0000609- UPS to Udangudi

_____ (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.

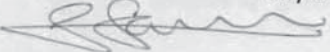
- 2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit 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.



ಎ. ಸರವಣ ಬಾಬು, ವ್ಯವಸ್ಥಾಪಕ ನಿ.ನಿ. - ಎಂ.ಎಂ. - ಪಿ.ಆರ್.
ए. सरवण बाबु, प्रबंधक/सी.ई.-एम.एम.-पी.आर.
A. SARAVANA BABU, MANAGER/CE-MM-PR
BHEL-EDN, MYSURU ROAD, BENGALURU-560026

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.



ಎ. ಸರವಣ ಬಾಬು, ಮುಖ್ಯಸ್ಥರು/ ನಿ.ಉ.-ಎಂ.ಎಂ.-ಪಿ.ಆರ್.
ए. सरवण बाबु, प्रबंधक/सी.ई.-एम.एम.-पी.आर.
A. SARAVANA BABU, MANAGER/CE-MM-PR
BHEL-EDN, MYSURU ROAD, BENGALURU-560026

- 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.

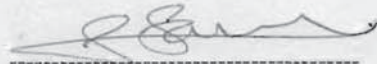
Section 9 - Pact Duration

- 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.

ಎ. ಸರವಣ ಬಾಬು, ವ್ಯವಸ್ಥಾಪಕರು/ ನಿ.ಉ -ಎಂ.ಎಂ-ಪಿ.ಆರ್.
ಎ. ಸರವಣ ಬಾಬು, ಪ್ರबंधक/सी.ई.-एम.एम.-पी.आर.
A. SARAVANA BABU, MANAGER/CE-MM-PR
BHEL-EDN, MYSURU ROAD, BENGALURU-560026

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.



For & On behalf of the Principal
(Office Seal)

Place ಎ. ಸರವಣ ಬಾಬು, ವ್ಯವಸ್ಥಾಪಕರು/ನಿ.ಉ.-ಎಂ.ಎಂ.-ಪಿ.ಆರ್.
ಎ. ಸರವಣ ಬಾಬು, ಪ್ರबंधक/सी.ई.-एम.एम.-पी.आर.

Date A. SARAVANA BABU, MANAGER/CE-MM-PR
BHEL-EDN, MYSURU ROAD, BENGALURU-560026

Witness: [Signature]
(Name & Address) MOUJISHA G
BHEL-EDN, Bangalore-26.

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

Witness: _____
(Name & Address) _____

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. GST as applicable will be recovered along with penalty amount.

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. Inspection: Prior written notice of at least 10 days shall be given along with internal test certificates/COC and applicable test certificates. Materials will be inspected by BHEL-EDN-QS/CQS or BHEL nominated Third Party Inspection Agency (TPIA) or BHEL authorized Inspection Agency or Customer / Consultant or jointly by BHEL & Customer / consultant. 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. BHEL reserves the right for conducting repeat test, if required.
All costs related to inspections & re-inspections 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, fuels, 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.
Imported 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.
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. 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. Risk Purchase Clause: In case of failure of supplier, BHEL at its discretion may make purchase of the materials / services not supplied / rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase.

In case of items demanding services at site like erection and commissioning, vendor should send his servicemen/representatives within 7 days from the service call. In case a vendor fails to attend to the service call, BHEL at its discretion may also make arrangements to attend such service by other parties at the **RISK & COST** of the supplier. Under such situation the supplier who fails to attend the service shall be wholly liable to make good to BHEL any loss due to risk purchase/service including additional handling charges due to the change.

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: Notwithstanding anything contained in the purchase order or any other document relevant thereto, neither party shall be liable for any failure or delay in performance to the extent said failures or delays are caused by the "Act of God" and occurring without its fault or negligence, provided that, force majeure will apply only if the failure to perform could not be avoided by the exercise of due care and vendor doing everything reasonably possible to resume its performance.

A party affected by an event of force majeure which may include fire, tempest, floods, earthquake, riot, war, damage by aircraft etc., shall give the other party written notice, with full details as soon as possible and in any event not later than seven (7) calendar days of the occurrence of the cause relied upon. 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.



ಭಾರತ್ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड

Page 1 of 4

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

CE: PR: 003- Rev 02

PB 2606 , Mysore Road Bangalore , 560026 INDIA

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 04) 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.

RFQ No. : **SBA0000609**
RFQ Date : As per E-procurement website
RFQ Due Date : As per E-procurement website
Customer/Project : **Udangudi**
Scope Description : **UPS**

Kindly submit your quotation as **two part bid** (Pre-Qualification Criteria & Techno-Commercial bid-1st part & Price bid-2nd Part) in E-Procurement System portal: <https://eprocurebhel.co.in> within the Due- Date of ____ As per E-procurement website ____ before ____ As per E-procurement website ____ hours IST and note that tenders will be opened on the same day at ____ As per E-procurement website ____ hours IST.

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

saravanababu@bhel.in and sathishkumars@bhel.in

Splitting of tendered quantity to MSE vendors for Purchase preference: Non-Splitable

Destination: For Indigenous scope of supply, items are to be directly despatched to BHEL site office/stores located at ____ Udangudi _TPP in _Tamil Nadu state , India. Detailed Consignee details will be issued by BHEL along with Despatch Clearance.

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 & services:

a. GeM Seller ID mandatorily required for PO placement: _____

b. MSE vendor : Yes-MSE supporting documents enclosed/No
(If MSE, supporting documents such as Udyam certificate to be enclosed)

The credentials of non-approved vendor of M/s TANGEDCO will be sent to M/s TANGEDCO for vendor approval. On vendor approval by M/s TANGEDCO, BHEL will proceed ahead with opening of price bid offer else the vendor offer will be rejected.

I. Bidders to mandatorily provide confirmation/compliance for the under-mentioned terms:

SL NO	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	REMARKS,if any
01	Reverse Auction (RA)	Not applicable		
03	Delivery Period	Within <u>14</u> 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. Staggered manufacturing clearance for below spares will be provide later as per site delivery schedule. Present delivery schedule is Mar'25.	AGREE weeks	
04	Terms of Payment at the time of material supply	Refer Clause "F" of Instructions to Bidder for BHEL standard Payment terms and loading factors applicable for non-compliance against payment terms: Indigenous Scope : a)Supply with Service(s) Spares : b)Supply Only	AGREE	
05	Declaration of local content : The 'Class-I local supplier' shall be required to indicate percentage of local content and provide certification that the item offered meets the local content requirement for 'Class-I local supplier'.	'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. { '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. 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}.' (Refer Clause 'A' Sl. No. 12 of Instructions to Bidders). Note: Non Local suppliers are eligible to participate in the tender	Percentage of local content : _____% Details of the Location(s) at which the local value addition is made : _____	
06	Declaration as Compliance of Restrictions under Rule 144 (xi) of GFR	The below declaration is to be submitted on Company Letter head duly signed and sealed by authorised signatory, for ascertaining the eligibility of offer in the tender. "I have read the clause regarding restrictions on procurement from a bidder of a country which		

	2017 as per DOE Order (Public Procurement No.4) dated 23.02.2023 (as amended from time to time)	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.” (Refer Clause ‘A’ Sl. No. 13 of Instructions to Bidders).		
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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 shall be liable for rejection:

- (1) **Submission of documents post PO viz., drawings /data sheet etc. as indicated in Cl: 04 of GCC:** Within _03_ weeks from the date of receipt of Purchase Order. Delay in submission of complete set of specified documents in NIT, will attract Penalty as per GCC Clause no.:04.a.
- (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:** _24_ months from the date of dispatch of goods (or) _18_ months from the date of commissioning, whichever is earlier.
- (4) **Performance Bank Guarantee (PBG):** PBG will be applicable for a period of _24_ months from the date of dispatch of goods + claim period of 03 months, for a value equal to 10% of the basic value of purchase order. It shall however be noted that PBG is not applicable against supply of Mandatory Spares.

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.

Note: In case PBG is not furnished, the 10% basic amount will be withheld from the supply invoice. This withheld amount will be paid either against submission of supplementary invoice & Original PBG (or) against supplementary invoice without PBG after expiry of Warranty period.

- (5) **Despatch Documents:** Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to Purchase Executive/BHEL directly. Depending upon the project/customer demands, Despatch documents may include one (or) more documents from the following:

Invoice (01 original and 01 copy with original sign & seal / digitally signed invoice), Lorry Receipt (L/R), Packing List, NIL Short-Shipment Certificate, insurance intimation letter, E-way bill, original Performance Bank Guarantee (directly from issuing bank to BHEL) and original POD (Proof of Delivery) on L/R.

The precise list of despatch documents needed for the project will be specified in the Purchase Order.

One set of Invoice, Packing List, Lorry Receipt shall be e-mailed immediately to BHEL-EDN at the time of despatch.

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

- (6) **Freight Charges (for indigenous scope of supply):** Freight charges shall be to vendor's account. Bidder to quote reasonable Freight charges along with applicable tax, in price bid.
- (7) **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 a combined package basis.
- (8) **Erection and Commissioning charges:** Not applicable
- (9) **Erection Supervision and Commissioning charges:**

Range of procurement value	Minimum percentage of basic material value proposed for Erection Supervision & Commissioning charges
Up to Rs. 2.50 crs.	05%
Greater than Rs. 2.50 crs. and lesser than Rs. 10 crs.	03% (or) Rs.12.50 lakhs, whichever is higher.
Greater than Rs. 10 crs. and lesser than Rs. 20 crs.	02% (or) Rs.30 lakhs, whichever is higher.
Greater than Rs. 20 crs.	01.50% (or) Rs.40 lakhs, whichever is higher.

Depending on the material quotation value, the bidder will have to quote the corresponding Erection Supervision & Commissioning charges for the respective slab/range as per above table. In case the quoted total Erection Supervision & Commissioning value is less than above stipulated charges, BHEL shall evaluate & order, Bidders Price deducting differential amount from main supply price and apportioning towards Erection Supervision & Commissioning charges.

Refer Sl. no. 'h' under Clause 'F' of Instructions to Bidders for Payment terms of Erection Supervision & Commissioning charges.

Note: Wherever bidders doesn't agree for such apportioning, the differential charges shall be retained from main supply price and retention amount will be paid after successful completion of Erection & Commissioning.

- (10) **Comprehensive Annual Maintenance Contract:** Not applicable
- (11) **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 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.

With this, we hereby confirm that all the terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 04) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 03) are accepted without any deviation.

Vendor's Signature with Seal



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CE/416/UDANG/UPS

REV 00

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PROJECT : 2x660 MW UDANGUDI STPP, STAGE-1

CUSTOMER : M/s TANGEDCO

CONSULTANT : M/s TCE, BENGALURU

SPECIFICATION FOR UNINTERRUPTIBLE POWER SUPPLY SYSTEM(UPS)

REVISION:00

APPROVED

AMIT KUMAR SHARMA

PREPARED

ISSUED

DATE

SATHISH

416

27/09/2023



A4-11

CE/416/UDANG/UPS

REV 00

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Sl. No.	Description	Reference.
1.	Scope of Supply	CE/416/UDANG/UPS/SOS, Rev.00
2.	Technical Requirements	CE/416/UDANG/UPS/TR, Rev.00
3.	Feeder List	CE/416/UDANG/UPS/FL, Rev.00
4.	Battery Sizing Calculation	CE/416/UDANG/UPS/BSC, Rev.00
5.	Single Line Diagram	CE/416/UDANG/UPS/SLD, Rev 00

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COPY RIGHT AND CONFIDENTIAL THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED. IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.		PROJECT : 2x660 MW UDANGUDI STPP, STAGE-1 CUSTOMER : M/s TANGEDCO CONSULTANT : M/s TCE, BENGALURU SCOPE OF SUPPLY				
		REVISION:00	APPROVED  AMIT KUMAR SHARMA			
			PREPARED  SATHISH	ISSUED 416	DATE 27/09/2023	



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SCOPE OF SUPPLY

Following UPS shall be as per Technical Requirement Ref: CE/416/UDANG/UPS/TR and detailed Scope of Supply.

A. To be offered by UPS Manufacturer

S.NO	LOCATION	UPS RATING	ACDB-1 FEEDERS	ACDB-2 FEEDERS	QTY	E&C QTY
1	MAIN PLANT U-1	2 x 170 kVA	153 Nos	153 Nos	1 Set	1 Set
2	MAIN PLANT U-2	2 x 170 kVA	153 Nos	153 Nos	1 Set	1 Set
3	COMMON FOR U-1,2	2 x 90 kVA	26 Nos	26 Nos	1 Set	1 Set

B. “1 Set” of UPS system comprises of the following: -

- | | |
|---|-----------|
| 01. 100% capacity static Inverter banks | 2 Nos |
| 02. 100% capacity static switches | 2 Nos |
| 03. Manual Bypass Switch/breaker | 1 No |
| 04. 100% capacity float cum boost chargers | 2 Nos |
| 05. 100% load capacity UPS System Battery banks | 2 Sets * |
| 06. UPS Input isolation transformer 3 Ph-3 Ph | 2 Nos |
| 07. Inverter Output isolation transformer 1 Ph-1 Ph | 2 Nos |
| 08. Three(3) Phase to Single Phase Transformer with associated Voltage stabilizer and backup source static switch | 1 No |
| 09. UPS AC power Distribution boards | 2 Sets |
| 10. Online Battery Health Monitoring System | 2 Sets ** |
| 11. Battery MCCB Box | 2 Sets |
| 12. Any other equipment necessary for completion of the system shall be provided by Bidder including suitable cable glands, lugs (for interconnection cables between UPS, Battery, ACDB and at UPS incomer), Base Frame, Anti-Vibration Pad, etc. | |

** Battery being procured by BHEL separately.*

***BHMS shall be provided by UPS Manufacturer including interconnecting cables, lugs and other accessories. Cable Route length from each individual cells to BHMS Module shall be min 30 meters.*

All equipment, enclosures and accessories for UPS System shall be designed, arranged, assembled and connected in accordance with the requirements of this specification.

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C. INTERCONNECTION CABLE DETAILS:

S. N O	LOCATION	CABLE ROUTING DISTANCE PER RUN *		TOTAL MODBUS CABLE QTY (mtrs)*
		UPS to BATTERY / pole	UPS to ACDB / pole	
1	MAIN PLANT U-1	100	30	100
2	MAIN PLANT U-2	100	30	100
3	COMMON FOR U-1,2	100	30	100

* UPS Manufacturer has to calculate the cable cross-section of Uni-nyvin cable considering 4V drop between UPS & Battery, 2V drop between UPS & ACDB considering above mentioned cable routing distance. Please note that above mentioned BOQ of Uninyvin cable and MODBUS cable shall be supplied in a roll/drum (without cutting) as per maximum length required above & available with Cable Manufacturer

D. MANDATORY SPARES for UPS System – 1 Lot.

a)	HRC Fuses of each type and rating	Nos.	5
b)	Semiconductor fuses of each rating	Nos.	5
c)	Electronic cards and modules of each type	Nos.	2
d)	Thyristors /Power transistors / power diodes of each rating	Nos.	5
e)	Filter capacitors & Chokes of each rating	Nos.	5
f)	Static transfer switch	Nos.	5
g)	Maintenance by pass switch for each type and rating	Nos.	2
h)	MCCB for each type and rating	Nos.	10 % of total population
i)	CTs of each type and rating	Set*	1
j)	Rectifier cards	Set*	1
k)	MFM for each type and rating	Nos.	1
l)	Rectifier transformer for each type and rating	Nos.	1

Note for Mandatory Spares:

- 1) % mentioned above refers to total quantity used in both limbs of UPS System & Stabilizer of both units.
- 2) *Set mentioned above refers to total quantity used in both limbs of UPS System & Stabilizer of both units.
- 3) No/Nos refers to the minimum quantity offered.



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1.0 GENERAL TECHNICAL REQUIREMENTS

- 1.1 Only the site-proven & type tested, electronic modules (in case of UPS System) will be acceptable unless otherwise decided by the purchaser in special circumstances.
- 1.2 For UPS, the type test shall be as per IEC-146, Degree of Protection test as per IS-2147 and the same are not to be specifically conducted for the projects if conducted on similar type/rating or similar type/higher rating UPS. If type tests are not available with supplier, then type tests has to be conducted and reports has to be submitted without any price implication to BHEL.
- 1.3 Erection supervision & commissioning of Battery with overall integration of complete system is responsibility of UPS vendor.
- 1.4 In case, there is any contradiction in any parameter/specification, the most stringent shall be considered as final and shall be offered accordingly.
- 1.5 In UPS System, the voltage window of inverter shall be suitably designed for 1.85V End Cell Voltage, 2.7V Boost Voltage considering 180 cells for Lead Acid Plante Battery.

2.0 DOCUMENTS TO BE FURNISHED

- 2.1.1. **After Inspection but 1 week before dispatch:** For BHEL/CUSTOMER approval, vendor must send following documents in soft copy.

01. Preliminary Instruction /O&M Manual

- 2.1.2. **Along with the materials being dispatched:** Vendor must send five (5) sets of the following “As Built & Approved” status documents four (4) in hard copies & one (1) in soft copy.

- (a) Instruction/O&M Manual
- (b) Bill of Material
- (c) Data Sheets
- (d) Technical literatures/Catalogs
- (e) Drawings GA/layout/wiring/interconnection/schematic, etc.)

- 2.1.3. **After despatch of material within 1 week :** Vendor must send the following documents in soft copy directly to Site.

- (a) Instruction/O&M Manual
- (b) “As built & Approved drawings”.

NOTE: One (01) set soft copy of Final document shall also be provided to BHEL. The soft copy shall be in CD-ROM media and shall be in Acrobat (pdf) formats.

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			PREPARED SATHISH	ISSUED 416	DATE 27/09/2023



SECTION-3.15: UNINTERRUPTED POWER SUPPLY SYSTEM

1.0.0 INTENT OF SPECIFICATION

This section covers the requirements of 230 V UPS system.

2.0.0 SCOPE OF WORK

The scope of work shall include supply, installation, testing and commissioning of the parallel redundant UPS with voltage stabilizer

3.0.0 CODES AND STANDARDS

The equipment to be furnished under this specification shall be in accordance with the applicable section of the latest version of the following Indian Standards, except where modified and /or supplemented by this specification.

- | | |
|----------------|---|
| a) IEC : 62040 | Uninterruptible Power Systems (UPS) |
| b) IS: 3895 | Mono crystalline semiconductor rectifier cells and stacks. |
| c) IS: 4540 | Mono crystalline semiconductor rectifier assemblies and equipment. |
| d) IS: 6619 | Safety code for semiconductor rectifier equipment. |
| e) IS 6297 | Transformer and inductors for electronic equipment |
| f) IS 13947 | LV switchgear and control gear |
| g) IS 6553 | Environmental requirements for semi-conductor devices and integrated circuits |
| h) IS 9000 | Basic Environmental Testing Procedures for Electronic and Electrical Items |

4.0.0 DESIGN REQUIREMENTS

- 4.1.0 UPS system shall be Digital type. It shall provide uninterrupted power supply to critical AC loads such as Control & Instrumentation system, DCS system, Respective control system, etc.



4.3.0 Each UPS shall be parallel redundant UPS system consisting of 2X100% chargers, 2X100% inverters, 2X100% Battery, Solid State voltage stabiliser, Static bypass and Maintenance bypass, UPS DB, MCCB box for battery, interconnecting cables among UPS & voltage stabiliser etc.

4.4.0 **Single Line Diagram for UPS Distribution is enclosed in Section-7 of Volume-II.**

4.5.0 UPS shall be located in Air conditioned room.

4.8.0 UPS shall have following features:

- Digital Technology
- True on-line double conversion
- High frequency PWM design
- Programmable power walk-in
- High efficiency
- High input power factor
- Constant voltage & frequency
- Pure sine wave output power with no break output during normal to battery operation
- Wide frequency synchronizing range
- Wide input range
- Soft start capability
- 100% nonlinear load handling capability
- LED mimic
- LCD Display
- RS 232 /RS 485 Interface complete with Communication software
- Permissible harmonics at rated continuous load +/- 2% for linear loads & 3% for non-linear loads.

4.9.0 UPS shall be suitable for connecting to a 415 V, 3 phase, 4 wire, 50 Hz system with a symmetrical fault level of 50 kA rms. Nominal voltage output shall be 230 V, 50 Hz, Single phase with +/- 1% resolution.

4.10.0 Variation in inverter output voltage and frequency shall not exceed specified limits for the load variation between zero and the rated output of the UPS and also for the following input supply variation.

- For the input power supply condition of 415 V +/- 10% and 50 Hz +3%, -5%
- For the DC input voltage over the range corresponding to battery float / boost charge operation and battery operation and battery discharge operation up to battery end cell voltage.

4.11.0 The changeover from inverter to by-pass transformer shall not be more than 5 m.second.

4.12.0 The design shall provide for high availability of equipment by ensuring high mean - time - between failures (MTBF) and low mean-time-to-repair (MTTR).

4.13.0 The UPS shall have an over load capacity of 125 % rated capacity for 10 minutes and 150 % rated capacity for 10 sec. The inverter shall have sufficient I^2t capability to clear fault in the maximum rated branch circuit. The sizing of UPS shall be based on the power factor of the loads being fed subject to a maximum of 0.8.



- 4.14.0 On failure of one UPS, the other UPS shall take over the 100% load automatically without any interruption and on failure of both UPS, voltage stabiliser shall take over the power supply distribution and shall supply the power without any interruption.

5.0.0 TECHNICAL REQUIREMENTS

- 5.1.0 The UPS system including the stabilized bypass shall be galvanically isolated from input power supply system by providing double wound Isolation transformers. A rectifier shall have a double wound transformer at its input.
- 5.2.0 Transient / surge protection circuit shall be provided in the input circuit to rectifiers to protect the UPS from surge & voltage spikes.
- 5.3.0 The UPS shall be provided with automatic sequence and power walk in circuits with adjustable time delay such that the rectifiers and inverters can start operating automatically when incoming AC power is restored allowing the UPS to be loaded automatically.
- 5.4.0 The inverters shall operate satisfactorily for variation of DC bus voltage from fully discharged condition of the battery to rapid charge voltage of the battery and inverter output load current waveform having a relative harmonic.
- 5.5.0 It shall be possible to vary the inverter output voltage steplessly within $\pm 5\%$ of the specified output voltage. This adjustment shall be possible to be made when the inverter is in operation.
- 5.6.0 UPS shall be provided with current limit circuit to avoid excessive loading beyond its permissible overload withstand capability. The UPS shall be designed to permit ready access to power switching and control modules and PCBs. The locations of components, test points and terminals shall be such that they are accessible for circuit checking adjustment, trouble shooting, and maintenance from the UPS without removal of any adjacent module or assembly.
- 5.7.0 The stabilized bypass supply shall have a continuous current rating equivalent to the rated output of the UPS unit and be capable of conducting a current ten times the rated output for the duration more than the fault clearing time of the type of fuse provided. The load transfer devices shall comprise of continuous rated elements in both inverter and stabilized bypass supply.
- 5.8.0 The inverters shall be phase locked to the stabilized bypass power supply as long as stabilized bypass supply frequency remain within $+ 3\%$ to $- 5\%$ of nominal. When bypass supply frequency variation exceeds the above limits, the inverters shall be delinked from mains. Free running frequency tolerance limit shall not exceed $\pm 1\%$. Facility shall also be provided for adjustment of synchronizing frequency from 1% to 5% in the steps of 0.5%.
- 5.9.0 All electronic power devices including thyristors, transistors, diodes etc., shall be rated under operating conditions for approximately 200% of the maximum current carried by the device. All other electrical components such as transformers, reactors, breakers, contactors, switches, bus bars etc., shall be rated for atleast 125% of the maximum required rating. No electronic device shall be subjected to PIV greater than 50% of the rated value.
- 5.10.0 All the thyristors, diodes and other electronic devices of UPS shall be protected with high speed semiconductor fuses. It co-ordination characteristics between fuse and semi-conducting power devices shall be furnished.
- 5.11.0 Radio Frequency Filters shall be provided at the input and output of UPS to reduce radio frequency interference.
- 5.12.0 All PCBs shall be provided with a transparent epoxy coating for environmental protection and tropicalisation. They shall be suitably located away from heat sources.



5.13.0 Maximum noise level from UPS system at 1 metre distance, under rated load with all normal cooling fans shall not exceed 65 dBA.

5.14.0 MCCB shall be TPN type for incoming supply to Rectifier circuit & Standby source, DP type for battery & ACDB incomer/outgoing. It shall be quick make, quick break, and independent manual type with trip free feature. All MCCB shall have the following :

- Short circuit release
- ON/OFF Trip position indicators
- Test trip push button

5.15.0 Copper cable shall be used for interconnection among UPS & voltage stabiliser. (Uninyvin type)

6.0.0 MODE OF OPERATION

6.1.0 Normal Mode

- During the normal operation the UPS shall be used to provide power to the critical loads. Under normal conditions, the loads shall be supplied by the inverters. The Rectifier shall derive power from normal/primary AC source and supply DC Power to the inverters. Two nos. Chargers shall feed regulated DC power to their individual inverter banks and simultaneously float charge the backup batteries.
- The individual inverters shall operate in parallel and shall share the load equally. The inverters shall be connected to load side through electronic switches. Outputs of the inverters are paralleled after the electronic switches and connected to load bus.

6.2.0 Emergency Mode

- Upon failure of the normal AC source, the loads shall continue to be supplied by inverters which, without any switching shall obtain their power from storage battery. In case of failure of the main supply, battery shall supply back up DC power to UPS system for duration of sixty (60) minutes.
- Upon restoration of the normal AC source, the rectifier/battery chargers shall power the inverters and simultaneously recharge the battery. This shall be automatic causing no interruption to critical loads.
- On failure of an inverter due to any one of the following faults the entire load shall be automatically transferred to the other inverter.
 - Excess inverter output voltage
 - Very low inverter output voltage
 - Failure of inverter.
- On failure of one inverter, the faulty one shall be isolated from load instantaneously and the other inverter shall continue to feed the load. In case, the other inverter also fails, automatic change over to standby transformer shall be effected through electronic switches.
- Parallel operation (load sharing) shall start automatically when the fault condition clears. If the transfer was due to the inverter failure the retransfer (parallel operation) shall be manually initiated.
- The entire load shall be automatically transferred to the alternate AC source through electronic switch within a maximum of four (5) milliseconds under the following conditions :



- Battery discharged completely
 - Initiation of manual control switch.
 - Failures of both the inverters
 - Inverter output voltage is more than +/- 5 % of the rated value
 - The load current exceeds specified over load rating and time.
- g) In case of failure of both inverters, electronic transfer switch shall changeover within five (5) milliseconds to connect the alternate AC source to the load. On restoration, the retransfer shall be manually initiated.
- h) Retransfer of load shall be accomplished automatically by synchronizing the inverter to the alternate source and allowing the inverter to ramp into the load and then disconnecting the alternate source.
- i) Manual transfer facility through electronic transfer switches shall be provided in either direction.
- j) In case of maintenance requirement, it shall be possible to isolate inverters and electronic bypass switches from load and connect alternate AC source to the load through manually operated, make before break manual transfer switch.

7.0.0 EQUIPMENT DETAILS

7.1.0 Charger

7.1.1 Charger shall have following features:

- Switch mode rectifier/Phase controlled rectifier
- DC constant voltage, Constant current
- IGBT/SCR power device
- Advanced electronic protection device backed-up with MCCBs and fast acting fuses
- Soft start
- Built in Harmonic suppression
- Active power factor correction

7.1.2 These chargers shall be of static type and shall be provided with suitable full wave thyristorised rectifiers, transformers, filter circuits, DC & AC Switchgear. Chargers shall share automatically the load during parallel operation of the inverter system and shall maintain output voltage within plus or minus one percent of the nominal value from no load to full load.

7.1.3 The rectifiers / chargers shall be designed to completely charge the battery in a maximum time of 8 hours for lead acid batteries, after complete discharge. Facilities shall be provided to initiate battery rapid charge operation by Manual & Automatic means. An auto charging sequence should be provided for the boost and float charging based on current sensing. In addition to above, the charging shall be transferred from boost to float mode after preset time adjustable through 0-24 hour's timer. Rectifier shall have protection & interlocking against single phase input & reverse phase sequencing.

7.1.4 Facility shall be provided to enable testing of rectifier independently without disconnection of inverter.

7.1.5 Facility for initial charging of batteries shall also be provided. The inverters shall be disconnected during initial charging of the battery.

7.1.6 The rectifiers shall be sized based on the maximum inverter input load when inverter is delivering its rated output at 0.8 PF lagging and recharge the battery to nominal rated capacity



of the battery. The DC load imposed by the inverters shall be considered under the worst case where only one rectifier is operating but the UPS load is equally shared by all the inverters.

- 7.1.7 The DC rectifiers shall sense the battery charging current and adjust the DC bus voltage to maintain the charging current to preset level. A separate current limit circuit shall also be provided for adjustment of battery current. The rectifiers shall be protected against reverse battery connection at DC link voltage bus. Subsequent to a discharge cycle when battery is connected to rectifier, the battery current shall be monitored, controlled and limited to set value automatically irrespective of the inverter input current.
- 7.1.8 The battery may be taken out of service for maintenance, during which period it shall be possible for the inverter to continue operation by drawing power from the rectifier. Ripple content shall not exceed 1.5%. Ripple current relay shall be provided to indicate the charger capacity failure.
- 7.1.9 Battery shall be provided with a sensitive earth leakage protection.
- 7.1.10 The chargers shall be current limiting and shall be provided with surge suppression networks for both float and boost charging. All equipment and devices required to protect the chargers from short circuits e.g. fast acting semiconductor fuses, trip fuses and micro switch with alarm contacts etc., shall be provided. Rectifier shall have protection & interlocking against single phase input & reverse phase sequencing.

7.2.0 Inverter

- 7.2.1 Inverters shall have following features:

- Digital PWM IGBT design
- Advanced electronic protection device backed-up with MCCBs and fast acting fuses.
- High speed pulse balancing electronic over voltage/under voltage protection
- Electronic overcurrent trip with reset.

- 7.2.2 Inverters shall be PWM controlled IGBT (Insulated gate bipolar transistor), filters, necessary oscillators, voltage regulators, current limiting and surge suppression networks. Two nos. 100% capacity Inverters shall be provided. In addition the inverters shall have features of soft start, wave shaping, transient recovery etc. Any other equipment required for normal operation of the inverter shall be included irrespective of whether specified or not.
- 7.2.3 The inverter input voltage shall match with the battery and rectifier charger output voltages and shall be designed to operate over the entire range of variation of input DC voltage to accommodate decrease in battery voltage during discharge and to accept voltage increase under battery boost charge or equalizing charge conditions. The output from the inverter shall be 230 V AC, sine wave 1 phase.
- 7.2.4 The inverters shall always work on their internal oscillators or frequency variations with plant AC electrical system. Output voltage frequency shall be controlled simultaneously for both the inverters through common control bus. The plant AC electrical system shall provide a signal to each inverter to control the frequency and phase relationship of its output during normal operations. When this signal to an inverter deviates more than one hertz from the desired 50 Hz frequency, the inverter shall transfer automatically to its internal oscillator which shall maintain inverter frequency at 50 Hz. Within 0.5%. During operation on its internal frequency signal source, an inverter shall continuously monitor the frequency of the plant auxiliary AC electrical system.
- 7.2.5 Upon restoration of the plant auxiliary AC electrical system to 50 Hz. operations, inverter shall automatically adjust the phase relationship between its output and the plant auxiliary AC electrical system and return to the plant auxiliary AC electrical system as its output frequency



and phase relationship signal source. During operation on its internal oscillator and inverter shall inhibit transfer of the electronic transfer switch to the alternate source. The automatic adjustment of the phase relationship between the inverter output and plant auxiliary AC system shall be accomplished at a controlled rate which shall not exceed one hertz per second. The inverters shall include a separate voltage distribution and voltage monitoring system for all command and interlock logic.

- 7.2.6 Selective protection shall be provided for each individual drive card and its associated interlock logic. The two inverters shall be designed for normal continuous parallel operation. To maintain specified output at maximum ambient temperature, inverters may be provided with cooling air fans as required. Fan cooling, if envisaged, shall be achieved with 2 x 100% cooling banks. One cooling fan bank shall be in operation while the other shall remain on standby. In case of failure of running bank / one fan, the standby bank shall start automatically. The power supply for the fans shall be tapped from the inverter output.
- 7.2.7 All the fuses used in inverter power and control circuits shall be fast acting semiconductor type, operating in less than 5 m.second. Indications and alarms shall be provided to enable fault to be located and rectified at the earliest. Lamps to indicate fault / trouble / failure of each sub group shall be provided on the cubicle front and lamps for each logic card shall be provided on the card itself.

7.3.0 Electronic Transfer Switch

- 7.3.1 The electronic transfer switches shall use SCRs and other electronic devices, for automatic transfer of load from the Normal source to the Alternate source. The transition shall be "make before break" in both directions. The continuous capacity of each electronic switch shall be equal to the full load capacity of one inverter. Maximum transfer time including sensing shall not be more than ¼ cycle. The voltage failure shall be sensed at the output of the electronic switch. Failure shall cause the electronic switch to transfer. The load from the working inverter shall be transferred to the alternate source, i.e. second inverter or auxiliary power supply source by electronic switches, whenever the output voltage of the inverter deviates more than +10% from nominal. However transfer shall not be made to the alternate source on over current conditions. Transfer shall be permitted only if voltage of the alternate source is within $\pm 2\%$ of nominal. .
- 7.3.2 The electronic switch shall be provided with fuses in both 'normal' and 'alternate' power source. Provision for annunciation of failure of fuse or failure of alternate source shall be made. The switch shall be provided with surge suppression networks and shall also be rated to withstand transient voltages up to 150% of rated voltage. The short time rating of the switch shall be 150% of the rated full load current for two minutes.

7.4.0 Bypass Switch

Make before break type manually operated bypass switch of 100% UPS rated capacity shall be provided in the back up supply circuit to isolate electronic switch and inverter from its load and supply alternate power to load without interruption. Power supply to the loads is continuous during switch operations. Necessary isolators shall be provided to isolate both UPS system completely from back up supply circuit when the UPS loads are fed by back up source through bypass switch.

7.5.0 Transformer and Voltage Stabiliser

Transformers shall be provided at input and as well as output side of UPS.

The transformer shall be dry type, double wound, Class F insulated with copper conductor limiting temperature rise to class B limits, enclosed in CRCA sheet steel panel 2 mm thick. The cooling shall be by means of natural convection. Transformer connection shall also be



considered, provided the connection has minimum unbalance on the primary side. The transformer shall be adequately rated for the duty involved. The actual value may be slightly increased to take care of any losses in the voltage stabilizer.

Voltage stabilizer shall employ **static** controlled circuitry and shall maintain the specified output voltage for 0 to 100% load, with maximum input voltage variation.

7.6.0 UPS Enclosure & Accessories

UPS shall be metal enclosed, fixed type, suitable for indoor mounting on floor. Panel shall be fabricated using cold rolled sheet steel of thickness not less than 2.0 mm for load bearing members and 1.6 mm for non-load bearing members. Suitable synthetic rubber gaskets shall be provided to achieve a degree of protection of IP-31. At bottom removable gland plates of atleast 3 mm thick shall be provided. All incoming and outgoing cables shall be terminated on suitable terminal blocks.

7.7.0 Metering & Protection

Voltage, current, frequency at input and output shall be measured either through LCD display or separate meters in UPS panel front. For remote metering of essential parameters, 4-20 mA transducer outputs shall be provided. For remote indication/ annunciation, potential free contact shall be provided along with RS485 port. LED status indications and alarm indications shall be provided on the mimic on the panel. The following protections shall be provided.

- MCCB at each input supply
- DC MCCB at Battery supply
- Filter at input
- Surge suppressor across transformer secondary
- Semiconductor fuses for SCR bridges
- HRC fuses for filter capacitors
- DC over voltage protection
- Charger input current limit
- Battery current limit
- Under voltage on input side
- Negative sequence current protection on input side
- Overload on inverter
- DC ground fault protection
- HRC fuses in control circuit
- Under voltage / Over voltage protection
- Any other protection required for safe operation of the UPS.

Isolated 4-20 mA signals AC input voltage, current, AC output voltage, current, DC battery voltage, current and Alarms such as AC I/P supply failure, AC O/P (UPS output) supply failure, Inverter trouble etc., shall be considered for remote connection to DCS/EMS/SAS.

7.8.0 UPS AC Distribution Board

7.8.1 AC distribution board shall be metal enclosed, fixed type, suitable for indoor mounting on floor, bottom cable entry. The distribution board shall be single front having horizontal and vertical bus bars. All bus bars shall be PVC sleeved.

7.8.2 The distribution board shall be fabricated using cold rolled sheet steel of thickness shall be 2.0 mm minimum for load bearing and 1.6 mm for other members and enclosure shall be IP 52. Earthing bus bar shall run in the bottom chamber through the length of the panel. Suitable synthetic rubber gaskets shall be provided to make boards completely dust and vermin proof. Two separate grounding pads shall be provided for each panel.



7.8.3 MCCBs shall be of triple pole construction for panel mounting, operating mechanism shall be trip free, quick make quick break type. MCCB should be current limiting type only. The MCCBs shall be provided with front operating handles & mechanical ON/OFF indicators. MCCBs shall be provided with overload releases setting range of 80% to 100% of rated current and adjustable short circuit magnetic releases from 5-10 times rated current. MCCBs shall have following accessories & features:

- Shunt trip release
- Auxiliary contact set of 1 NO + 1NC
- Fault signalling contact set of 1 NO + 1NC
- Insulation shields to isolate the connection between each pole.
- Finger protection plate to prevent accidental contact.
- The compartment door shall be interlocked with handle of MCCB

7.8.4 MCB shall be rated for 10 kA short circuit rating. It shall be quick make, quick break, and independent manual type with trip free feature. MCB shall have the following :

- Over current protection
- ON/OFF Trip position indicators
- Auxiliary contact block

7.8.5 Painting

The fabricated parts shall undergo a treatment of degreasing, pickling and two coats of primer before being given the epoxy finish. Two coats of final paint shall be applied. The external and internal surface of the board shall be powder coated epoxy finish of gray shade RAL 7035. The final thickness of paint film on steel shall not be less than 50 microns.

8.0.0 TESTING & INSPECTION

8.1.0 Equipment offered shall be of type tested and proven type. Type test certificates for test conducted earlier on similar rating shall be furnished. The Owner shall review the type tests certificates furnished by the bidder at contract stage. Routine tests, functional tests and system tests shall be carried out as per applicable standard. Copies of certified reports of all tests carried out at the works shall be furnished.

8.2.0 Following tests shall constitute functional tests for the panel as per IS:4540 & IS:9000

- Voltage regulation
- Ripple content at different loads and noise measurement
- Insulation resistance test
- General operation
- Voltage/current stability test
- High voltage test
- Measurement of surface temperature of charger panel
- Current limiting features.
- Efficiency & PF measurement
- Temperature Rise test
- Short circuit at full load
- Short circuit at No load
- Connection checking of Rectifier assembly.

8.3.0 Following tests shall constitute type tests on the panel.

- Degree of protection Test for Panel
- Vibration Test of the Electronic Card Rack/Panel



- Environmental Tests on the Electronic Cards
- RFI Test
- Surge Withstand capability Test

8.4.0 System tests shall be performed on the completely assembled UPS system at Manufacturer's works. System tests shall include the following:

- Frequency regulation
- Voltage regulation
- Current limiting feature
- Voltage & frequency control of inverters for synchronisation
- Harmonic content tests
- Transfer of load through electronic switch due to inverter failure
- Loss on inverter output
- Under voltage
- Load overcurrent
- Manual transfer/Retransfer
- Mains failure/restoration
- Tests on alarms/indications
- Availability test

8.5.0 Site tests shall include the following:

- a) Check name plate details according to the specification
- b) Check for physical damage
- c) Check tightness of all bolts, clamps, joints and connecting terminals
- d) Check earth connection and earth continuity
- e) Check for polarity
- f) Functionally check all control circuits
- g) Check connections and wiring
- h) Megger all terminals to body
- i) Test relay cards
- j) Test CTs and VTs
- k) Test rectifier transformer

9.0.0 DRAWINGS & DOCUMENTS

The following drawings and documents shall be submitted for approval during detail engineering stage.

- UPS sizing calculation
- Technical data sheet
- Dimensional general arrangement drawing of UPS.
- Dimensional general arrangement for distribution board.
- Schematic & wiring diagram for UPS.
- Single line diagrams
- Sizing calculation for battery
- Cable schedule/ Interconnection diagram.
- Erection and commissioning procedures
- Operation and maintenance manual
- Test reports
- Sub-vendor list
- Manufacturing quality plan
- Field quality plan



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BASIC POINTS TO BE COMPLIED WITH: -

- a) 4-20 mA Battery Current & Voltage Transducers shall be provided.
- b) Anti-Vibration Pad shall be provided.
- c) Cable Glands & Lugs shall be provided for Input Cables at UPS and SCVS as per manufacturer recommended cable size, for Interconnection cables between UPS and ACDB & Interconnection cables between UPS and Battery.
- d) Fuses in ACDB shall be provided in both Phase & Neutral Line
- e) Electronic Earth Busbar and Zero Potential shall be provided in addition to Phase, Neutral & Earth Busbar considered in UPS by default. Kindly note that Busbar conductor shall be Copper.
- f) Battery earth fault protection shall be considered.
- g) In case, if provision for setting Float/Boost charging the battery is not available at Electronic Module, then necessary software and Laptop has to be provided by UPS Manufacturer for maintenance at site.
- h) Rectifier and Transformer to be sized for 100% capacity considering 2.7V Boost Voltage & feeding 100% load of Inverter Capacity. Calculation to be submitted along with technical offer for review.

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PROJECT : 2x660 MW UDANGUDI STPP, STAGE-1

CUSTOMER : M/s TANGEDCO

CONSULTANT : M/s TCE, BENGALURU

FEEDER LIST

REVISION:00

APPROVED

Спикер:

AMIT KUMAR SHARMA

PREPARED

ISSUED

DATE _____

[Signature]

SATHISH

416

27/09/2023

2 x 660 MW UDANGUDI TPS TANGEDCO, 230V AC UPS FEEDER/LOAD LIST													
MAIN PLANT UPS SYSTEM UNIT-1													
A. SG PACKAGE													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	FSSS MFT-1 (CJF01)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
2	FSSS MFT-2, RELAY-1 (CJF02, 03)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
3	FSSS MFT-3, RELAY-2 (CJF04, 05)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
4	FSSS UNIT & SADC-1,2,3,4 (CJF 06,07,08)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
5	FSSS OIL AB, COAL-A-1,2,3,4 (CJF 11,12,13,14)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
6	FSSS OIL BC, COAL-B&C-1,2,3,4 (CJF 16,17,18,19)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
7	FSSS OIL DE, COAL-D&E-1,2,3,4 (CJF 21,22,23,24)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
8	FSSS OIL FG, COAL-F&G-1,2,3,4 (CJF 26,27,28,29)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
9	FLAME SCANNER - 1 (CJF 49) (FLAME SCANNERS)	2	2	Continuous	2	0.37	0.8	1	0.46	4	0.92	6A	10A
10	FLAME SCANNER - 2 (CJF 50) (SOLENOIDS & HEA IGNITORS)	2	2	Continuous	6	1.10	0.8	1	1.38	12	2.76	10A	16A
11	SBC WB-1,2,3,4 (CJF 61,62,63,64)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
12	SBC LR & AH-1,2,3,4,5 (CJF 66,67,68,69,70)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
13	HPBP & APRDS-1,2,3 (CJF 97,98,99)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
SUB TOTAL		15	15							68	15.64		
B. TG PACKAGE													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	ATRS-1 (SGC TURBINE & HPCF) (CCA01,02,03) R1	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
2	ATRS-2 (SGC OIL, COND & EVAC) (CCA04,05,06) R1	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
3	GAMP (CCA10,11,12)	1	1	Continuous	4	0.74	0.8	1	0.92	4	0.92	6A	10A
4	UNIFIED HMI INTERFACE (CCA20)	1	1	Continuous	2	0.37	0.8	1	0.46	2	0.46	6A	10A
5	LPBP&PROT, GSPC & LOPS (CJ03,04,05)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
6	LMU & AUTO SYNCHRONIZER (CJ08)	1	1	Continuous	2	0.37	0.8	1	0.46	2	0.46	6A	10A
7	EHTC & CLCS FOR BFPDT-A (CJ1 20,21,22,23)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
8	EHTC & CLCS FOR BFPDT-B (CJ1 30,31,32,33)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
9	TSI FOR BFPDT-A & B (CW001)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
10	TSI FOR MAIN TURBINE (CJ41)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
11	A&D FOR MAIN TURBINE & BFPDT	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
SUB TOTAL		11	11							47	10.81		
C. BOP C&I PACKAGE													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	IDFA/FDFA/ESP-A,B/FP (CRE 01,02,03)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
2	IDFB/FDFB/ESP-C,D/A/F/FF/CMC (CRE 04,05,06)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
3	MILL-AB/AHA (CRE 07,08,09,10)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
4	MILL-CD/AHB/HFO-LFO (CRE 11,12,13,14)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
5	MILL-EF/PAFA/SCAPH-A/PA HDR PR (CRE 15,16,17)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
6	MILL-G/PAFB/SCAPH-B/ERV/ATM STM (CRE 18,19,20)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
7	SH/RH/BURNER TILT/RH PROTIN (CRE 21,22,23,24)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
8	FW/SEP/BCW/WARM-UP/FTDT/ECO FLOW (CRE 25,26,27)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
9	CEPA/SG,TG-DMCWA/GSC/HWL/DRN&VNT (CRE 28,29,30)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
10	CEPB/SG,TG-DMCWB/DEA/TGMISC/MTML (CRE 31,32,33)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
11	CEPC/TG DMCWC/MTM-R/AMM DOS (CRE 34,35,36)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
12	CWPA/ACWPA/HPH 7,8,9/NaOHDS/MTMR (CRE 37,38,39)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
13	CWP-B/ACWPB/LPH-1 TO 5/UPS-1 (CRE 40,41,42)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
14	CWP-C/MISC/COLTCS/SCS/O2,HYD DOS (CRE 43,44,45)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
15	MDBFP-C/MISC/SWAS/UPS-2 (CRE 46,47,48)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
16	ELECTRICAL EDMS-1 (CRE 60,61,62)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
17	ELECTRICAL EDMS-2 (CRE 63,64,65)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
18	ELECTRICAL EDMS-3 (CRE 66,67,68)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
19	INTERPOSING RELAY PANELS (CTE01)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
20	INTERPOSING RELAY PANELS (CTE02)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
21	T & AVT PANEL (CFA 01,02) R1	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
22	VMS FOR HT DRIVES IN CER (CJU 01,02,03)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
SUB TOTAL		22	22							81	18.63		
D. HMI PACKAGE R1													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	NETWORK CUM POWER DISTRIBUTION COMMON (CNP 33) R2	1	0	Continuous	42	7.73	0.8	1	9.66	42	9.66	63A MCCB	
		0	1	Continuous	42	7.73	0.8	1	9.66	42	9.66	63A MCCB	
2	NETWORK PANEL DCS-1 (CNP 11)	1	0	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
3	NETWORK PANEL DCS-2 (CNP 12)	1	0	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
SUB TOTAL		3	3							144	33.12		
E. MISCELLANEOUS													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	OXYGEN ANALYSER - LOW TEMPERATURE	0	8	Continuous	1.30	0.24	0.8	1	0.3	10.43	2.4	4A	6A
		7	0	Continuous	1.30	0.24	0.8	1	0.3	9.13	2.1	4A	6A
2	OXYGEN ANALYSER - HIGH TEMPERATURE	2	0	Continuous	1.30	0.24	0.8	1	0.3	2.61	0.6	4A	6A
		0	1	Continuous	1.30	0.24	0.8	1	0.3	1.30	0.3	4A	6A
3	CO AT APH INLET	3	0	Continuous	2.17	0.40	0.8	1	0.5	6.52	1.5	4A	6A
		0	3	Continuous	2.17	0.40	0.8	1	0.5	6.52	1.5	4A	6A
4	SWAS	1	1	Continuous	36.96	6.80	0.8	1	8.5	36.96	8.5	50A MCCB	
5	FLUE GAS ANALYSER SO _x / NO _x /CO ₂ at CHIMNEY	1	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
6	CO AT CHIMNEY	1	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
7	OPACITY MONITOR AT CHIMNEY	1	1	Continuous	5.65	1.04	0.8	1	1.3	5.65	1.3	10A	16A
8	CONDUCTIVITY TYPE LEVEL SWITCH	4	4	Continuous	0.07	0.01	0.8	1	0.015	0.26	0.06	4A	6A
9	CAPACITANCE TYPE LEVEL SWITCH	2	0	Continuous	0.07	0.01	0.8	1	0.015	0.13	0.03	4A	6A
		0	2	Continuous	0.07	0.01	0.8	1	0.015	0.13	0.03	4A	6A
10	MERCURY ANALYSER	1	1	Continuous	5.22	0.96	0.8	1	1.2	5.22	1.2	10A	16A
11	UCP	1	1	Continuous	6.00	1.10	0.8	1	1.38	6.00	1.38	10A	16A
12	ECP R1	1	1	Continuous	5.00	0.92	0.8	1	1.15	5.00	1.15	6A	10A
13	DAVR	1	1	Continuous	4.35	0.80	0.8	1	1	4.35	1	6A	10A
SUB TOTAL		26	26							104.57	24.05		
F. BHEL HARIDWAR													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	GEN EW VMS (MKY03)	1	1	Continuous	5.43	1.00	0.8	1	1.25	5.43	1.25	10A	16A
2	GEN. INST. CABINET (CXW01B)	1	1	Continuous	2.09	0.38	0.8	1	0.48	2.09	0.48	4A	6A
3	H2 GAS ANALYSER CAB-1,2 (MKG 31, 32)	1	1	Continuous	2.61	0.48	0.8	1	0.6	2.61	0.6	4A	6A
4	ALKALISER DOSING PUMP (MKF 36)	0	1	Continuous	1.04	0.19	0.8	1	0.24	1.04	0.24	4A	6A
5	GND BRUSH MON (MKY 02)	1	0	Continuous	5.43	1.00	0.8	1	1.25	5.43	1.25	10A	16A
6	MOISTURE MEAS EQUIP (MKG69)	0	1	Continuous	1.04	0.19	0.8	1	0.24	1.04	0.24	4A	6A
7	WIN TS PRTR (CKA03)	1	0	Continuous	3.48	0.64	0.8	1	0.8	3.48	0.8	6A	10A
8	OPTR ENG PC-1 (CRU03GJ201)	0	1	Continuous	2.87	0.53	0.8	1	0.66	2.87	0.66	4A	6A
9	SWAB OUT MON (CRU03GK401)	1	0	Continuous	0.65	0.12	0.8	1	0.15	0.65	0.15	4A	6A
10	LAN CAB PWR (CRY01)	1	1	Continuous	32.61	6.00	0.8	1	7.5	32.61	7.5	40A MCCB	
SUB TOTAL		7	7							57.26087	13.17		

G. BHEL TRICHY

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	GRAVIMETRIC FEEDER REMOTE CONTROL CABINET	4	0	Continuous	2.17	0.40	0.8	1	0.5	8.70	2.0	4A	6A
		0	3	Continuous	2.17	0.40	0.8	1	0.5	6.52	1.5	4A	6A
2	BHEL SONIC TUBE LEAK DETECTION SYSTEM PANEL	0	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
3	FURNACE FLAME VIEWING SYSTEM- CAMERA LOCAL UNIT	2	0	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.50	4A	6A
		0	2	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.50	4A	6A
4	FURNACE & FLAME VIEWING SYSTEM-WALL MOUNTED CABINET IN CONTROL ROOM	1	0	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
5	MASS FLOW METER - LFO	0	1	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
6	MASS FLOW METER - HFO	1	0	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
7	AH AIR MOTOR SOLENOID	1	0	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
		0	1	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
8	BOTTOM ASH HOPPER LOAD CELL SYSTEM	4	0	Continuous	0.43	0.08	0.8	1	0.1	1.74	0.4	6A	10A
		0	4	Continuous	0.43	0.08	0.8	1	0.1	1.74	0.4	6A	10A
9	HWL 1&2 AND MEF CONTROL VALVE PANEL-CONTROL SUPPLY	0	1	Continuous	6.96	1.28	0.8	1	1.6	6.96	1.6	10A	16A
10	PDB FOR APH AND ECONOMISER ASH LEVEL SWITCHES (32 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED AS PDB BY UPS MANUFACTURER)	1	1	Continuous	2.09	0.38	0.8	1	0.48	2.09	0.48	4A	6A
SUB TOTAL		14	14							37.04	8.52		

H. BHEL HYDERABAD

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	ELECTRONIC POWER POSITIONER OF BFP HYD COUPLING	1	0	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
		0	1	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
2	MAIN FIRE ALARM PANEL-1	1	0	Continuous	4.35	0.80	0.8	1	1	4.35	1	6A	10A
3	INERT GAS PANEL	0	1	Continuous	4.35	0.80	0.8	1	1	4.35	1	6A	10A
SUB TOTAL		2	2							8.87	2.04		

I. BHEL PEM

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	PC FOR ELECTRICAL SYSTEM, DATA CONCENTRATOR, ETC	0	1	Continuous	5.22	0.96	0.8	1	1.2	5.22	1.2	10A	16A
		1	0	Continuous	5.22	0.96	0.8	1	1.2	5.22	1.2	10A	16A
2	MDBFP WTR LEAKAGE DETECTOR	1	0	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
3	MDBFP WTR FLOW INDICATOR	0	1	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
4	ID FAN-A WTR LEAKAGE DETECTOR	1	0	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
5	ID FAN-B WTR LEAKAGE DETECTOR	0	1	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
6	ID FAN-A WTR FLOW INDICATOR	1	0	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
7	ID FAN-B WTR FLOW INDICATOR	0	1	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
8	MASS FLOW METER - LFO & HFO in Fuel Oil Transfer System	1	0	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
		0	1	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
9	PA System	1	1	Continuous	21.74	4.00	0.8	1	5	21.74	5	40A MCCB	
SUB TOTAL		6	6							41.22	9.48		

J. BHEL RANIPET

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	IOS PC, DATA LOGGER & PRINTER	1	0	Continuous	8.70	1.60	0.8	1	2	8.70	2	16A	20A
2	OPACITY MONITOR	2	0	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.5	4A	6A
		0	2	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.5	4A	6A
SUB TOTAL		3	2							13.04	3		

K. BHEL BHOPAL

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	WATER LEAK DETECTOR FOR MDBFP	1	1	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
2	PDB FOR HT MOTOR SPEED SWITCH (20 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED AS PDB BY UPS MANUFACTURER)	1	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	10A	16A
3	DATA CONCENTRATOR FOR HT SWITCHGEAR	6	6	Continuous	7.07	1.30	0.8	1	1.625	42.39	9.75	10A	16A
SUB TOTAL		8	8							44.65	10.27		

Total Load in Amps (SLNo A to K) 646.65 Amps
Total UPS kVA (SLNo A to K) 148.73 kVA
Total UPS kVA (SLNo A to K) + 10% Spare 163.603 kVA
UPS Rating selected 170 kVA at 50 deg C
ACDB DETAILS: -

Sl. No	Load Rating	ACDB-1	ACDB-2	With 20% Spare		With 20% Spare	
	MCB/ Fuse			ACDB-1	ACDB-2	ACDB-1	ACDB-2
1	4A/6A	42	43	51	52	51	52
2	6A/10A	42	41	51	50	51	51
3	10A/16A	31	31	38	38	38	38
4	16A/20A	3	2	4	3	4	4
5	40A MCCB	1	1	2	2	2	2
6	50A MCCB	1	1	2	2	2	2
7	63A MCCB	1	1	2	2	2	2
8	100A MCCB	1	1	2	2	2	2
Total		122	121	152	151	153	153

Note:

- 1.) 20% spare feeders of each rating are being provided in each ACDB further rounded off to 154 feeders cumulatively in ACDB-1 and ACDB-2 taking care of any exigency/contingency which may creep in later.
- 2.) UPS rating is 170 kVA at 50 deg C and each UPS System is being provided with 2 sets of Lead Acid Plante Type Battery considering 170 kVA load.
- 3.) UPS catalogs, Charger sizing calculation, Battery catalogs, graphs etc. will form part of Battery vendor specific datasheets/documentation and will be sent for approval separately after placement of order.
- 4.) Formula for calculating kW, $kW = (V \times I \times P.F.) / 1000$
- 5.) Outgoing feeder breaker rating upto 16 Amps will be with MCB/Fuse combination & above 16 Amps will be with MCCB.

2 x 660 MW UDANGUDI TPS TANGEDCO, 230V AC UPS FEEDER/LOAD LIST													
MAIN PLANT UPS SYSTEM UNIT-2													
A. SG PACKAGE													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	FSSS MFT-1 (CJF01)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
2	FSSS MFT-2, RELAY-1 (CJF02, 03)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
3	FSSS MFT-3, RELAY-2 (CJF04, 05)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
4	FSSS UNIT & SADC-1,2,3,4 (CJF 06,07,08)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
5	FSSS OIL AB, COAL-A-1,2,3,4 (CJF 11,12,13,14)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
6	FSSS OIL BC, COAL-B&C-1,2,3,4 (CJF 16,17,18,19)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
7	FSSS OIL DE, COAL-D&E-1,2,3,4 (CJF 21,22,23,24)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
8	FSSS OIL FG, COAL-F&G-1,2,3,4 (CJF 26,27,28,29)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
9	FLAME SCANNER - 1 (CJF 49) (FLAME SCANNERS)	2	2	Continuous	2	0.37	0.8	1	0.46	4	0.92	6A	10A
10	FLAME SCANNER - 2 (CJF 50) (SOLENOIDS & HEA IGNITORS)	2	2	Continuous	6	1.10	0.8	1	1.38	12	2.76	10A	16A
11	SBC WB-1,2,3,4 (CJF 61,62,63,64)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
12	SBC LR & AH-1,2,3,4,5 (CJF 66,67,68,69,70)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
13	HPBP & APRDS-1,2,3 (CJF 97,98,99)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
SUB TOTAL		15	15							68	15.64		
B. TG PACKAGE													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	ATRS-1 (SGC TURBINE & HPCF) (CCA01,02,03) R1	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
2	ATRS-2 (SGC OIL, COND & EVAC) (CCA04,05,06) R1	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
3	GAMP (CCA10,11,12)	1	1	Continuous	4	0.74	0.8	1	0.92	4	0.92	6A	10A
4	UNIFIED HMI INTERFACE (CCA20)	1	1	Continuous	2	0.37	0.8	1	0.46	2	0.46	6A	10A
5	LPBP&PROT, GSPC & LOPS (CJ03,04,05)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
6	LMU & AUTO SYNCHRONIZER (CJ08)	1	1	Continuous	2	0.37	0.8	1	0.46	2	0.46	6A	10A
7	EHTC & CLCS FOR BF PDT-A (CJ1 20,21,22,23)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
8	EHTC & CLCS FOR BF PDT-B (CJ1 30,31,32,33)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
9	TSI FOR BF PDT-A & B (CW001)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
10	TSI FOR MAIN TURBINE (CJ41)	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
11	A&D FOR MAIN TURBINE & BF PDT	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
SUB TOTAL		11	11							47	10.81		
C. BOP C&I PACKAGE													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	IDFA/FDFA/ESP-A,B/FP (CRE 01,02,03)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
2	IDFB/FDFB/ESP-C,D/AF/FF/CMC (CRE 04,05,06)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
3	MILL-AB/AHA (CRE 07,08,09,10)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
4	MILL-CD/AHB/HFO-LFO (CRE 11,12,13,14)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
5	MILL-EF/PAFA/SCAPH-A/PA HDR PR (CRE 15,16,17)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
6	MILL-G/PAFB/SCAPH-B/ERV/ATM STM (CRE 18,19,20)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
7	SH/RH/BURNER TILT/RH PROTIN (CRE 21,22,23,24)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
8	FW/SEP/BCW/WARM-UP/FTDT/ECO FLOW (CRE 25,26,27)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
9	CEPA/SG,TG-DMCWA/GSC/HWL/DRN&VNT (CRE 28,29,30)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
10	CEPB/SG,TG-DMCWB/DEA/TGMISC/MTML (CRE 31,32,33)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
11	CEPC/TG DMCWC/MTM-R/AMM DOS (CRE 34,35,36)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
12	CWPA/ACWPA/HPH 7,8,9/NaOHDS/MTMR (CRE 37,38,39)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
13	CWP-B/ACWPB/LPH-1 TO 5/UPS-1 (CRE 40,41,42)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
14	CWP-C/MISC/COLTCS/SCS/O2,HYD DOS (CRE 43,44,45)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
15	MDBFP-C/MISC/SWAS/UPS-2 (CRE 46,47,48)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
16	ELECTRICAL EDMS-1 (CRE 60,61,62)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
17	ELECTRICAL EDMS-2 (CRE 63,64,65)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
18	ELECTRICAL EDMS-3 (CRE 66,67,68)	1	1	Continuous	3	0.55	0.8	1	0.69	3	0.69	6A	10A
19	INTERPOSING RELAY PANELS (CTE01)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
20	INTERPOSING RELAY PANELS (CTE02)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
21	T & AVT PANEL (CFA 01,02) R1	1	1	Continuous	6	1.10	0.8	1	1.38	6	1.38	10A	16A
22	VMS FOR HT DRIVES IN CER (CJU 01,02,03)	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	10A	16A
SUB TOTAL		22	22							81	18.63		
D. HMI PACKAGE R1													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	NETWORK CUM POWER DISTRIBUTION COMMON (CNP 33) R2	1	0	Continuous	42	7.73	0.8	1	9.66	42	9.66	63A MCCB	
		0	1	Continuous	42	7.73	0.8	1	9.66	42	9.66	63A MCCB	
2	NETWORK PANEL DCS-1 (CNP 11)	1	0	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
3	NETWORK PANEL DCS-2 (CNP 12)	1	0	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	2.76	0.8	1	3.45	15	3.45	20A MCCB	
SUB TOTAL		3	3							144	33.12		
E. MISCELLANEOUS													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	OXYGEN ANALYSER - LOW TEMPERATURE	0	8	Continuous	1.30	0.24	0.8	1	0.3	10.43	2.4	4A	6A
		7	0	Continuous	1.30	0.24	0.8	1	0.3	9.13	2.1	4A	6A
2	OXYGEN ANALYSER - HIGH TEMPERATURE	2	0	Continuous	1.30	0.24	0.8	1	0.3	2.61	0.6	4A	6A
		0	1	Continuous	1.30	0.24	0.8	1	0.3	1.30	0.3	4A	6A
3	CO AT APH INLET	3	0	Continuous	2.17	0.40	0.8	1	0.5	6.52	1.5	4A	6A
		0	3	Continuous	2.17	0.40	0.8	1	0.5	6.52	1.5	4A	6A
4	SWAS	1	1	Continuous	36.96	6.80	0.8	1	8.5	36.96	8.5	50A MCCB	
5	FLUE GAS ANALYSER SO _x / NO _x /CO ₂ at CHIMNEY	1	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
6	CO AT CHIMNEY	1	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
7	OPACITY MONITOR AT CHIMNEY	1	1	Continuous	5.65	1.04	0.8	1	1.3	5.65	1.3	10A	16A
8	CONDUCTIVITY TYPE LEVEL SWITCH	4	4	Continuous	0.07	0.01	0.8	1	0.015	0.26	0.06	4A	6A
9	CAPACITANCE TYPE LEVEL SWITCH	2	0	Continuous	0.07	0.01	0.8	1	0.015	0.13	0.03	4A	6A
		0	2	Continuous	0.07	0.01	0.8	1	0.015	0.13	0.03	4A	6A
10	MERCURY ANALYSER	1	1	Continuous	5.22	0.96	0.8	1	1.2	5.22	1.2	10A	16A
11	UCP	1	1	Continuous	6.00	1.10	0.8	1	1.38	6.00	1.38	10A	16A
12	ECP R1	1	1	Continuous	5.00	0.92	0.8	1	1.15	5.00	1.15	6A	10A
13	DAVR	1	1	Continuous	4.35	0.80	0.8	1	1	4.35	1	6A	10A
SUB TOTAL		26	26							104.57	24.05		
F. BHEL HARIDWAR													
Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	GEN EW VMS (MKY03)	1	1	Continuous	5.43	1.00	0.8	1	1.25	5.43	1.25	10A	16A
2	GEN. INST. CABINET (CXW01B)	1	1	Continuous	2.09	0.38	0.8	1	0.48	2.09	0.48	4A	6A
3	H2 GAS ANALYSER CAB-1,2 (MKG 31, 32)	1	1	Continuous	2.61	0.48	0.8	1	0.6	2.61	0.6	4A	6A
4	ALKALISER DOSING PUMP (MKF 36)	0	1	Continuous	1.04	0.19	0.8	1	0.24	1.04	0.24	4A	6A
5	GND BRUSH MON (MKY 02)	1	0	Continuous	5.43	1.00	0.8	1	1.25	5.43	1.25	10A	16A
6	MOISTURE MEAS EQUIP (MKG69)	0	1	Continuous	1.04	0.19	0.8	1	0.24	1.04	0.24	4A	6A
7	WIN TS PRTR (CKA03)	1	0	Continuous	3.48	0.64	0.8	1	0.8	3.48	0.8	6A	10A
8	OPTR ENG PC-1 (CRU03GJ201)	0	1	Continuous	2.87	0.53	0.8	1	0.66	2.87	0.66	4A	6A
9	SWAB OUT MON (CRU03GK401)	1	0	Continuous	0.65	0.12	0.8	1	0.15	0.65	0.15	4A	6A
10	LAN CAB PWR (CRY01)	1	1	Continuous	32.61	6.00	0.8	1	7.5	32.61	7.5	40A MCCB	
SUB TOTAL		7	7							57.26087	13.17		

G. BHEL TRICHY

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	GRAVIMETRIC FEEDER REMOTE CONTROL CABINET	4	0	Continuous	2.17	0.40	0.8	1	0.5	8.70	2.0	4A	6A
		0	3	Continuous	2.17	0.40	0.8	1	0.5	6.52	1.5	4A	6A
2	BHEL SONIC TUBE LEAK DETECTION SYSTEM PANEL	0	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
3	FURNACE FLAME VIEWING SYSTEM- CAMERA LOCAL UNIT	2	0	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.50	4A	6A
		0	2	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.50	4A	6A
4	FURNACE & FLAME VIEWING SYSTEM-WALL MOUNTED CABINET IN CONTROL ROOM	1	0	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	4A	6A
5	MASS FLOW METER - LFO	0	1	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
6	MASS FLOW METER - HFO	1	0	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
8	AH AIR MOTOR SOLENOID	1	0	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
		0	1	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
9	BOTTOM ASH HOPPER LOAD CELL SYSTEM	4	0	Continuous	0.43	0.08	0.8	1	0.1	1.74	0.4	6A	10A
		0	4	Continuous	0.43	0.08	0.8	1	0.1	1.74	0.4	6A	10A
10	HWL 1&2 AND MEF CONTROL VALVE PANEL-CONTROL SUPPLY	0	1	Continuous	6.96	1.28	0.8	1	1.6	6.96	1.6	10A	16A
11	PDB FOR APH AND ECONOMISER ASH LEVEL SWITCHES (32 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED AS PDB BY UPS MANUFACTURER)	1	1	Continuous	2.09	0.38	0.8	1	0.48	2.09	0.48	4A	6A
SUB TOTAL		14	14							37.04	8.52		

H. BHEL HYDERABAD

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	ELECTRONIC POWER POSITIONER OF BFP HYD COUPLING	1	0	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
		0	1	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
2	MAIN FIRE ALARM PANEL-1	1	0	Continuous	4.35	0.80	0.8	1	1	4.35	1	6A	10A
3	INERT GAS PANEL	0	1	Continuous	4.35	0.80	0.8	1	1	4.35	1	6A	10A
SUB TOTAL		2	2							8.87	2.04		

I. BHEL PEM

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	PC FOR ELECTRICAL SYSTEM, DATA CONCENTRATOR, ETC.	0	1	Continuous	5.22	0.96	0.8	1	1.2	5.22	1.2	10A	16A
		1	0	Continuous	5.22	0.96	0.8	1	1.2	5.22	1.2	10A	16A
2	MDBFP WTR LEAKAGE DETECTOR	1	0	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
3	MDBFP WTR FLOW INDICATOR	0	1	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
4	ID FAN-A WTR LEAKAGE DETECTOR	1	0	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
5	ID FAN-B WTR LEAKAGE DETECTOR	0	1	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
6	ID FAN-A WTR FLOW INDICATOR	1	0	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
7	ID FAN-B WTR FLOW INDICATOR	0	1	Continuous	1.43	0.26	0.8	1	0.33	1.43	0.33	4A	6A
8	MASS FLOW METER - LFO & HFO in Fuel Oil Transfer System	1	0	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
		0	1	Continuous	0.22	0.04	0.8	1	0.05	0.22	0.05	4A	6A
9	PA System	1	1	Continuous	21.74	4.00	0.8	1	5	21.74	5	40A MCCB	
SUB TOTAL		6	6							41.22	9.48		

J. BHEL RANIPET

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	IOS PC, DATA LOGGER & PRINTER	1	0	Continuous	8.70	1.60	0.8	1	2	8.70	2	16A	20A
2	OPACITY MONITOR	2	0	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.5	4A	6A
		0	2	Continuous	1.09	0.20	0.8	1	0.25	2.17	0.5	4A	6A
SUB TOTAL		3	2							13.04	3		

K. BHEL BHOPAL

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	WATER LEAK DETECTOR FOR MDBFP	1	1	Continuous	0.09	0.02	0.8	1	0.02	0.09	0.02	4A	6A
2	PDB FOR HT MOTOR SPEED SWITCH (20 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED AS PDB BY UPS MANUFACTURER)	1	1	Continuous	2.17	0.40	0.8	1	0.5	2.17	0.5	10A	16A
3	DATA CONCENTRATOR FOR HT SWITCHGEAR	6	6	Continuous	7.07	1.30	0.8	1	1.625	42.39	9.75	10A	16A
SUB TOTAL		8	8							44.65	10.27		

Total Load in Amps (SLNo A to K) 646.65 Amps
Total UPS kVA (SLNo A to K) 148.73 kVA
Total UPS kVA (SLNo A to K) + 10% Spare 163.603 kVA
UPS Rating selected 170 kVA at 50 deg C
ACDB DETAILS: -

Sl. No	Load Rating	ACDB-1	ACDB-2	With 20% Spare		With 20% Spare	
	MCB/ Fuse			ACDB-1	ACDB-2	ACDB-1	ACDB-2
1	4A/6A	42	43	51	52	51	52
2	6A/10A	42	41	51	50	51	51
3	10A/16A	31	31	38	38	38	38
4	16A/20A	3	2	4	3	4	4
5	40A MCCB	1	1	2	2	2	2
6	50A MCCB	1	1	2	2	2	2
7	63A MCCB	1	1	2	2	2	2
8	100A MCCB	1	1	2	2	2	2
Total		122	121	152	151	153	153

Note:

- 1.) 20% spare feeders of each rating are being provided in each ACDB further rounded off to 152 feeders cummulative in ACDB-1 and ACDB-2 taking care of any exigency/contingency which may creep in later.
- 2.) UPS rating is 170 kVA at 50 deg C and each UPS System is being provided with 2 sets of Lead Acid Plante Type Battery considering 170 kVA load.
- 3.) UPS catalogs, Charger sizing calculation, Battery catalogs, graphs etc. will form part of Battery vendor specific datasheets/documentation and will be sent for approval separately after placement of order.
- 4.) Formula for calculating kW, $kW = (V \times I \times P.F.)/1000$
- 5.) Outgoing feeder breaker rating upto 16 Amps will be with MCB/Fuse combination & above 16 Amps will be with MCCB.

PDB details:			
Sl.No	Location / Description	No. of feeders in PDB	Quantity
A) UNIT-1			
1	PDB FOR APH AND ECONOMISER ASH LEVEL SWITCHES (32 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED) R1	40	1 Set
2	PDB FOR HT MOTOR SPEED SWITCH (20 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED AS PDB BY UPS MANUFACTURER)	24	1 Set
B) UNIT-2			
1	PDB FOR APH AND ECONOMISER ASH LEVEL SWITCHES (32 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED) R1	40	1 Set
2	PDB FOR HT MOTOR SPEED SWITCH (20 NOS 4A/6A MCB/FUSE FEEDERS FOR SWITCHES+ 4 NOS 4A/6A MCB/FUSE SPARE FEEDERS WILL BE PROVIDED AS PDB BY UPS MANUFACTURER)	24	1 Set

COMMON FOR BOTH UNITS (UNIT-1 & 2)

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	FOPH-1,2,3 (CJF 81,82,83) - COMMON FOR BOTH UNITS	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
2	AUX BLR-1,2,3 (CJF 91,92,93) - COMMON FOR BOTH UNITS	1	1	Continuous	5	0.92	0.8	1	1.15	5	1.15	6A	10A
	SUB TOTAL	2	2							10	2.3		

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	BLFP/HWMUP/MMUP/PTWP (CRE 81,82)	1	1	Continuous	3	0.92	0.8	1	0.69	3	0.69	6A	10A
2	COMMON ELECTRICAL EDMS-1 (CRE 83,84,85)	1	1	Continuous	3	0.92	0.8	1	0.69	3	0.69	6A	10A
3	COMMON ELECTRICAL EDMS-2 (CRE 86,87,88)	1	1	Continuous	3	0.92	0.8	1	0.69	3	0.69	6A	10A
4	COMMON ELECTRICAL EDMS-3 (CRE 89,90,91)	1	1	Continuous	3	0.92	0.8	1	0.69	3	0.69	6A	10A
	SUB TOTAL	4	4							12	2.76		

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	NETWORK PANEL STATION LAN-1 (CNP 51)	1	0	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
2	NETWORK PANEL STATION LAN-2 (CNP 52)	1	0	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
3	NETWORK PANEL COMMON-1 (CNP 31)	1	0	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
4	NETWORK PANEL COMMON-2 (CNP 32)	1	0	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
		0	1	Continuous	15	0.92	0.8	1	3.45	15	3.45	20A MCCB	
5	NETWORK PANEL POWER DISTBIN-1 (CNP 41)	1	0	Continuous	30	0.92	0.8	1	6.9	30	6.9	40A MCCB	
		0	1	Continuous	30	0.92	0.8	1	6.9	30	6.9	40A MCCB	
	SUB TOTAL	5	5							180	41.4		

Sl. No	Feeder Description	No of Feeders in ACDB-1	No of Feeders in ACDB-2	Duty Cycle	Load Rating in Amps	kW Rating of each feeder	Power Factor	Load Factor	kVA Rating of each feeder	Total Load in Amps	Total Load in kVA	MCB rating	FUSE rating
1	EMS (CYJ01)	1	1	Continuous	15	0.92	0.8	1	3.45	15	3.45	25A MCCB	
2	EMS (CYJ02)	1	1	Continuous	15	0.92	0.8	1	3.45	15	3.45	25A MCCB	
	SUB TOTAL	2	2							30	6.9		

[illegible]

Sl. No	Load Rating MCB / Fuse	ACDB-1	ACDB-2	With 20% Spare		Rounded-off to:	
				ACDB-1	ACDB-2	ACDB-1	ACDB-2
2	6A/10A	10	9	12	11	12	12
4	16A/20A	1	1	2	2	3	3
5	25A MCCB	3	3	4	4	5	5
6	40A MCCB	1	1	2	2	3	3
7	100A MCCB	1	1	2	2	3	3
	Total	16	15	22	21	26	26

- 1.) 20% spare feeders of each rating to be provided in each ACDB further rounded off to 26 feeders cumulatively in ACDB-1 and ACDB-2 taking care of any exigency/circumstance which may creep in later.
- 2.) UPS rating is 90 kVA at 50 deg C and each UPS System is being provided with 2 sets of Lead Acid Plant Type Battery considering 75 kVA load.
- 3.) UPS catalogs, Charger sizing calculation, Battery catalogs, graphs etc. will form part of Battery vendor specific datasheets/documentation and will be sent for approval separately after placement of order.
- 4.) Formula for calculating kW, $kW = (V \times I \times P.F.)/1000$
- 5.) Outgoing feeder breaker rating upto 16 Amps will be with MCB/Fuse combination & above 16 Amps will be with MCCB.



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27/09/2023



A4-11

CE/416/ UDANG /UPS/BSC

REV 00

PAGE 02 OF 02

Battery sizing calculation Methodology:

UPS full load considered = 'M' kVA

Max. Output load on UPS in watts = 'M' x 1000 x 0.8 (P.F)

= 'N' Watts

Inverter efficiency = 0.9 minimum

Type of Battery and Back up Time required = Lead Acid Plante, 100% load for 120 minutes

End cell voltage (ECV) = 1.85 Volts/cell.

Number of cells = 180 cells

Ageing factor = 1.0

Design Margin = 1.10

Temperature correction factor (at 17 deg. C based on IEEE 485: latest standard) = 'C' say

Capacity Factor at ECV of 1.85V for above back-up = 'D' say

$$\text{Then Battery Discharge Current required} = \frac{N}{1.85 \times 180 \times 0.9} = \text{'B' Amps}$$
$$\text{AH required} = \text{'B' x 'D'} = \text{'F' say}$$

Total Discharge Current considering the factors such as temperature correction factor, design margin & ageing factor is

$$= \text{'F' x 'C' x 1.0 x 1.1} = \text{'Z' say}$$

Battery AH to an End Cell Voltage of 1.85V/cell and suiting the above discharge current = 'Y' say

Hence, Battery selected = '180' cells of 'Y' "H type Battery" which can deliver 'Z' for 100% load for 120 minutes at ECV=1.85V/cell.

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		बि एच ई एल  A4-10		CE/416/ UDANG /UPS/SLD REV 00 PAGE 01 OF 04
		PROJECT : 2x660 MW UDANGUDI STPP, STAGE-1 CUSTOMER : M/s TANGEDCO CONSULTANT : M/s TCE, BENGALURU SINGLE LINE DIAGRAM		
COPY RIGHT AND CONFIDENTIAL THE INFORMATION ON THIS DOCUMENT IS THE PROPERTY OF BHARAT HEAVY ELECTRICALS LIMITED . IT MUST NOT BE USED DIRECTLY OR INDIRECTLY IN ANY WAY DETRIMENTAL TO THE INTEREST OF THE COMPANY.		REVISION:00	APPROVED  AMIT KUMAR SHARMA	
			PREPARED  SATHISH	ISSUED 416

UPS SCHEME

TATA CONSULTING ENGINEERS LIMITED VENDOR DRAWING STATUS

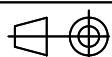
	CATEGORY	DESCRIPTION
☒	CAT-1	Drawing/documents approved for final distribution. BHEL will proceed with manufacturing/fabrication/construction.
☐	CAT-2	Drawing/documents cleared for manufacturing/fabrication/construction subject to incorporating the comments given. BHEL to resubmit the drawing for Approval in Category - 1. Comments will be marked on the drawing documents.
☐	CAT-3	Drawing document will be corrected as per comment and resubmitted by BHEL for further review/checking.
☐	CAT-4	Drawing document of this category are for information only and not for approval. Information furnished on the document is noted.
Note: It is mandatory to close documents with Code 2 & 3 to Code 1 in agreed contract period or 2 weeks, whichever is lower.		
2.	Any design changes / modification required to be carried out in Code 4 Drawings / Documents shall be the responsibility of BHEL. BHEL to resubmit reflecting the Design Changes for information.	

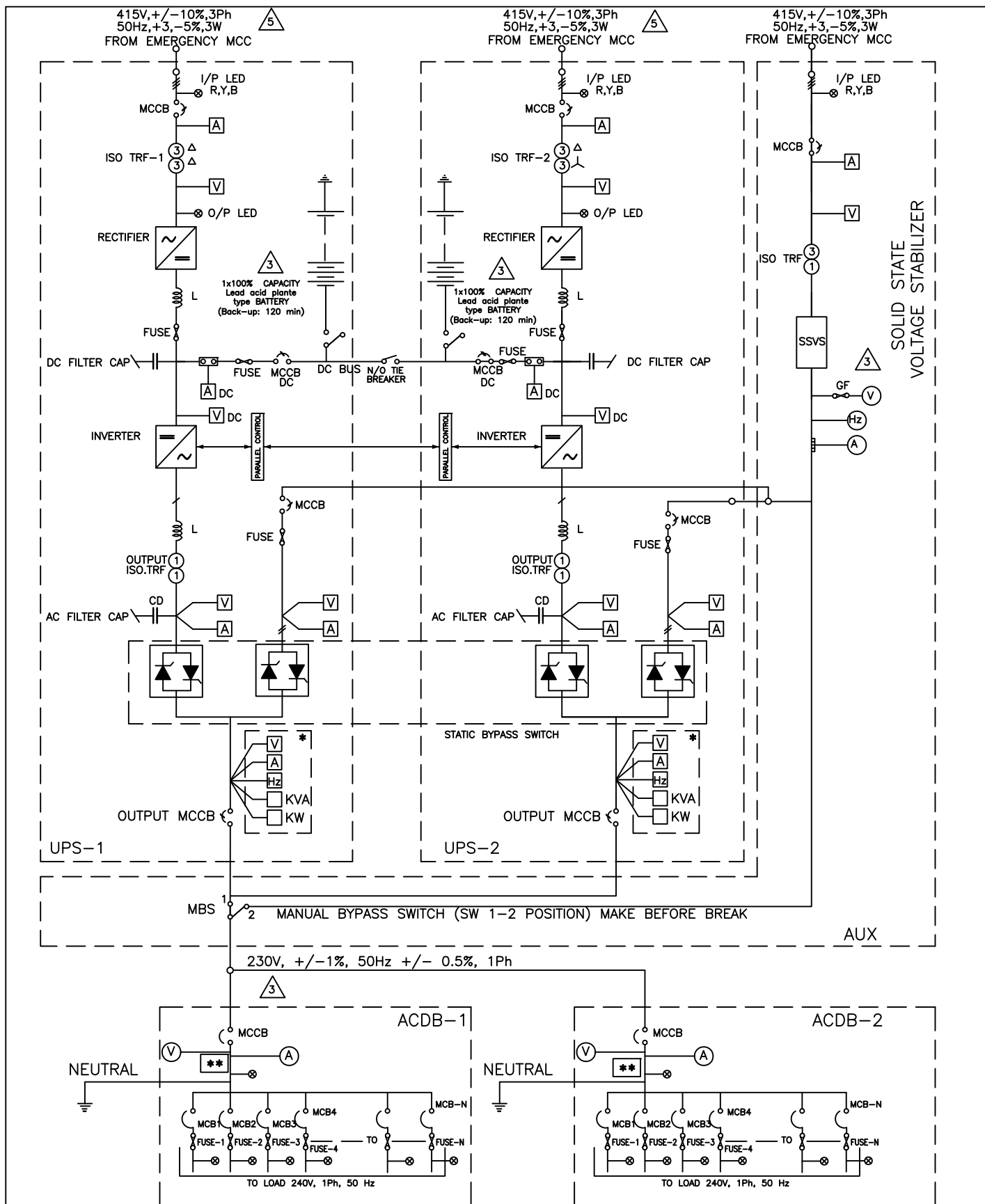
Approval conveyed herein neither relieves the Vendor/Contractor of his contractual obligations and his responsibilities for correctness of dimensions, materials of construction, weights, quantities, design details, assembly fits, performance requirements and conformity of supplies with the Indian Statutory Laws as may be applicable, nor does it limit the purchaser's rights under the contract.

Reviewed by S.S. SATISH Date 29.10.2019

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
08	28.10.19	AR	PJ	BS	07	16.09.19	-SD- AR	-SD- PJ	-SD- BS
REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. TCE.11403A-EL-VDT-285, dtd. 18.10.2019					REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. TCE.11403A-EL-VDT-232, dtd. 06.09.2019				

REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD	REV.	DATE	ALTD	CHD	APPD
06	03.09.19	-SD- AR	-SD- PJ	-SD- BS	05	01.08.19	-SD- AR	-SD- PJ	-SD- BS	03	05.01.19	-SD- AR	-SD- PJ	-SD- BS	02	10.10.18	-SD- AR	-SD- PJ	-SD- BS
REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. TCE.11403A-EL-VDT-194, dtd. 10.08.2019					REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. TCE.11403A-EL-VDT-139 dtd. 12.07.2019					REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. SE /C /UP /EE /E / F.2x660MW UTPP /D. 282 /18, dt. 24.12.2018					REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. SE /C /UP /EE /E / F.2x660MW UTPP /D. 185 /18, dt. 01.10.2018				

REV. 04	DATE 20.06.19	ALTD -SD- AR	CHD -SD- PJ	APPD -SD- BS	CUSTOMER	 TAMILNADU GENERATION & DISTRIBUTION CORPORATION LIMITED 5TH Floor, Western Wing, NPKRR Maaligai 144, Anna Salai, Chennai-600002.													
REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. TCE.11403A-EL-VDT-065 dtd. 27.05.19					CONSULTANT NAME	 TATA CONSULTING ENGINEERS LIMITED BENGALURU													
					PROJECT NAME	2X660 MW UDANGUDI TPP-STAGE I													
JOB NO. 435					 Maharatna Company	BHARAT HEAVY ELECTRICALS LTD POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NOIDA													
STATUS CONTRACT																			
DISTRIBUTION																			
					COPY RIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED it must not be used directly or indirectly in any way detrimental to the interest of the company.										DEPT CODE		NAME	SIGN	DATE
REV. 01	DATE 07.08.18	ALTD -SD- AR	CHD -SD- PJ	APPD -SD- BS	TITLE PARALLEL REDUNDANT UPS SCHEME										I	DRN	AR	--SD--	24.03.18
REVISED IN LINE WITH CUSTOMER COMMENTS VIDE LTR NO. SE /C /UP /EE /E / F.2x660MW UTPP /D. 86 /18, dt. 05.06.2018																DESN	AR	--SD--	24.03.18
																CHD	PJ	--SD--	24.03.18
										APPD	BS	--SD--	24.03.18						
					DEPT.	SCALE	1:100	DRAWING NO.		PE-DG-435-145-I004									
					SIGN		SHEET 1 OF 5		REV.							08			



* V, A, Hz, KVA, KW READINGS/VALUES SHALL BE READY ON THE MIMIC DISPLAY PROVIDED ON THE UPS PANEL FRONT DOOR.
 **MFM (MULTI-FUNCTIONAL METER) SHALL BE PROVIDED AT EACH ACDB.



PROJECT:- 2X660 MW UDANGUDI TPP-STAGE I

TITLE:- UPS SCHEME
FOR MAIN PLANT

DRG. No. PE-DG-435-145-I004

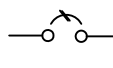
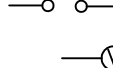
REV. No. 00 DATE 24.03.2018

SHEET 2 OF 5

GENERAL NOTES:

1. ACDB-1&2 NEUTRAL TO BE GROUNDED TO A DEDICATED GROUND.
2. ALL OUTPUT FEEDERS OF ACDB SHALL BE PROVIDED WITH AN LED AFTER THE FUSE FOR 'FEEDER ON' INDICATION WITH FEEDER DESCRIPTION.
3. ONLINE BATTERY HEALTH MONITORING SYSTEM SHALL BE PROVIDED FOR MAIN PLANT & OFFSITE UPS.
4. SINCE, THIS DIAGRAM IS AN SLD FOR UPS, DETAILS REGARDING SIZING HAVE NOT BEEN SHOWN. BHEL-EDN SHALL DO THE SIZING AND PREPARE TECHNICAL SPECIFICATION FOR PROCURING THE UPS.
5. FILTER CIRCUITS SHALL BE PROVIDED ON AC & DC SIDE AS REQUIRED.
6. UPS DB SHALL HAVE 1Ø240V MCB OUTGOING FEEDER.
7. RECTIFIER SHALL HAVE FACILITY FOR BOOST CHARGING THE BATTERY.
8. BOTH STATIC TRANSFER SWITCHES SHALL BE SELECTED ON AUTO MODE FOR AUTOMATIC TRANSFER TO BACKUP SUPPLY.
9. ACDB's PROVIDED ARE NON-COMPARTMENTALIZED TYPE.
10. ELECTRONIC TRANSFER SWITCHES SHALL BE PROVIDED AS PER CUSTOMER SPECIFICATION. 2
11. TRANSIENT/SURGE PROTECTION CIRCUIT SHALL BE PROVIDED IN THE INPUT CIRCUIT AS PER CUSTOMER SPECIFICATION. 2
12. RADIO FREQUENCY FILTERS SHALL BE PROVIDED AT THE INPUT AND OUTPUT OF UPS AS PER CUSTOMER SPECIFICATION. 2
13. TRANSDUCERS SHALL BE PROVIDED AT AC INPUT AND BATTERY SUPPLY DC MCCB FOR GIVING 4-20 mA ISOLATED SIGNALS FOR DDCMIS AND PLC 2
14. TRANSDUCERS SHALL BE PROVIDED AT SVS OUTPUT FOR GIVING 4-20 mA ISOLATED SIGNALS FOR DDCMIS AND PLC 2
15. NOMINAL VOLTAGE OUTPUT SHALL BE 230 V, 50 HZ, SINGLE PHASE WITH +/- 1% RESOLUTION. 2
16. MCCB AND MCB SHALL BE PROVIDED WITH ON, OFF, TRIP POSITION INDICATOR. 3
17. ACDBs SHALL HAVE FAULT LEVEL OF 10KA. 4
18. UPS SHALL BE CONNECTED TO EMS 7
19. MCB SHALL BE PROVIDED FOR OUTGOING FEEDERS RATINGS <= 16A AND MCCB FOR >16A. 8

LEGEND:

	ISO. TRF		INDUCTOR
	CAPACITOR		FUSE
	INVERTER		MCCB
	STATIC BYPASS SWITCH		SELECTOR SWITCH
	RECTIFIER		VOLTMETER
	INDICATING LAMP		FREQUENCY METER
	AMMETER		GROUNDING



PROJECT:- **2X660 MW UDANGUDI TPP-STAGE I**

DRG.
No.

PE-DG-435-145-I004

TITLE:-
UPS SCHEME
NOTES & LEGEND

REV.
No.

00

DATE

24.03.2018

SHEET

4

OF

5

UPS SIGNAL INTERFACING WITH DDCMIS/DCS & PLC

1. ALARMS AND STATUS INDICATIONS, CURRENT, VOLTAGE ,FREQUENCY, PF ETC SHALL BE PROVIDED THROUGH SERIAL LINK WITH MODBUS OR ANOTHER COMPATIBLE PROTOCOL .
2. LIST OF 4–20 mA SIGNALS TO DDCMIS/PLC :
 - I) INVERTER A & B OUTPUT VOLTAGES
 - II) INVERTER A & B OUTPUT CURRENTS
 - III) INVERTER A&B OUTPUT FREQUENCY
 - IV) RECTIFIER A & B INPUT VOLTAGES
 - V) RECTIFIER A & B INPUT CURRENTS
 - VI) BATTERY A & B DC VOLTAGES
 - VII) BATTERY A & B DC CURRENTS
3. LIST OF ALARMS (MIN.) TO DDCMIS THROUGH POTENTIAL FREE CONTACTS :-
 - I) RECTIFIER – 1 TRIP.
 - II) INVERTER – 1 TRIP.
 - III) UPS BATTERY–1 LOW.
 - IV) UPS BATTERY–2 LOW.
 - V) RECTIFIER – 2 TRIP.
 - VI) INVERTER – 2 TRIP.
 - VII) LOAD ON STATIC BYPASS.
 - VIII) STATIC BYPASS FAILURE
 - IX) ACDB – 1 INCOMER TRIPPED.
 - X) ACDB – 2 INCOMER TRIPPED.
 - XI) UPS – 1 FAN TRIPPED.
 - XII) UPS – 2 FAN TRIPPED.



PROJECT:- 2X660 MW UDANGUDI TPP-STAGE I

DRG.
No.

PE-DG-435-145-I004

TITLE:- UPS SCHEME

REV.
No.

00

DATE

24.03.2018

SHEET

5

OF

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