

Bharat Heavy Electricals Limited

Electronics Division

Mysore Road, Bangalore – 560 026



IT & S Department

Tender Ref: BHEL/EDN/ITS/AC/2017/DC/BUILD

Tender document

For

DESIGN, SUPPLY, CONSTRUCTION AND MAINTENANCE OF DATA CENTERS

On

Five years financial lease



DEFINITION OF TERMS

Throughout the Tender Documents including the Enquiry Letter, the following words shall have the meanings assigned to them herein, unless the subject matter or the context requires otherwise.

1. **Purchaser** shall mean M/s Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act 1956 acting through its Electronics Division Mysore Road, Bangalore – 560 026 which expression shall include its successors and assigns. It may also be referred to as BHEL.
2. **Tenderer/Bidder** shall mean the Firm/ Company/ Organisation, which quotes against the Tender Enquiry issued by Purchaser.
3. **Contract** shall mean and include the Contract Agreement to be entered into in terms of clause 4.6 of Commercial Conditions, and other documents listed at Clause 1.2 herein below and any amendments in any of these documents. In the event of conflict between the documents mentioned above, the Contract Agreement shall prevail over other documents.
4. **Purchase Order (PO)** means the order placed by Purchaser pursuant to the Contract for supply/installation/commissioning/PG tests and warranty and support services in respect of Systems/Equipments.
5. **Vendor/ Contractor** shall mean the Firm/ Company/ Organisation with whom the Contract is made and shall be deemed to include its successors, representatives, heirs, executors, administrators and permitted assigns, as the case may be. It may also be referred as Supplier.
6. **Site** shall mean and include the land and place where the data center and its Equipments are deployed and where warranty and support service is to be provided in connection with the System & Equipment so deployed as described in the PO.
7. **Performance Guarantee Tests (PG Tests)** shall mean such tests as prescribed in specifications and/ or tests mutually agreed upon by Client and Vendor/ Contractor, to be performed by Vendor/ Contractor after construction of data centers and commissioning of its equipment to establish its satisfactory operation as per specifications.



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भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Limited
(A Government of India Undertaking)
ELECTRONICS DIVISION
P.B. No. 2606, Mysore Road, Bangalore - 560 026

Gram : BHARATELEC
Fax : 080-26740137
PHONE : 26998.....
(EPABX. NO.)

Tender Ref: BHEL/EDN/ITS/AC/2017/DC/BUILD

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8. **System/Equipment** shall means all the hardware and software needed for the complete functionality and successful implementation of the entire scope of work.
 9. **Month** shall mean calendar month and **week** shall mean 7 days.
 10. **Consignee** shall mean the official(s)/ person(s) to whom the stores are required to be delivered in the manner indicated in the Order/ Contract.
 11. **Resident Engineer (RE)** shall mean the suitably qualified employee/representative of Contractor posted at Site for providing the warranty and support for the System/Equipment as per the Purchase Order.



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Date: 12 August 2017

Dear Sir / Madam,

Sub: Enquiry for DESIGN, SUPPLY, CONSTRUCTION AND MAINTENANCE OF DATA CENTERS

Sealed bids are invited for DESIGN, SUPPLY, CONSTRUCTION AND MAINTENANCE OF DATA CENTERS as per the terms and conditions of RFQ enclosed.

Any corrigendum / notifications issued by BHEL, related to this tender, shall be available / hosted on www.bhel.com, www.bheledn.com and CPP Portal. Hence, all bidders are expected to keep visiting www.bhel.com, www.bheledn.com and CPP portal for any corrigendum / notification in their own interest.

The bidders are expected to examine all instructions, formats, terms, specifications, conditions and all other information in the bidding documents. Failure to furnish all information asked for or to submit a bid not substantially responsive to the bidding documents may result in rejection of the bid as decided by the BHEL. BHEL's decision shall be final and binding.

Please ensure that your response complete in all respect in requisite format with necessary enclosures is delivered on or before the due date & time i.e., **18/09/2017 at 1300 hrs.**

Bids shall be addressed to:

Manager (IT&S)

Bharat Heavy Electricals Limited,

Electronics Division,

Mysore Road, Bangalore – 560 026.

Thanking you, yours faithfully,

for and on behalf of
BHEL

Manager (IT&S)



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BID DATA SHEET

Part I		
1	Ref. No: Date:	BHEL/EDN/ITS/AC/2017/DC/BUILD 12 th August 2017
2	The name of the RFQ is:	DESIGN, SUPPLY, CONSTRUCTION AND MAINTENANCE OF DATA CENTERS on five years financial lease
3	The client is:	Electronics Division, BHEL
4	Contact Person for Queries and communication related to RFQ	Senior Engineer (IT&S) Bharat Heavy Electricals Limited, Electronics Division, Mysore Road, Bangalore – 560 026. Tel: 080-2699-8192
5	Postal Address for Submission of Bids	Tender Box-IT&S (Box No.2) Reception Area at BHEL, Electronics Division, Mysore Road, Bangalore – 560 026
6	Bidding Process	Two part Bid. Two sealed envelopes (Technical and Financial) sealed together in outer envelope
Part II: Schedule of Events		
	EVENT	DATE/TIME
8	Issuance of Request For Quotation (RFQ)	12-AUG-2017
9	Last date and time for submission of Bids	18-SEP-2017 13:00 hours
10	Technical& Commercial Bid opening	18-SEP-2017 13:30 hours
11	Price Bid opening of Technically Qualified Bidders	Will be intimated later
Part III. Others		
12	Website for information / RFQ Download	www.bhel.com , www.bheledn.com , https://eprocure.gov.in/cppp/
13	Validity of Bid	The Bid will remain valid for a period of 120 days from the date of price bid opening
14	Bid Security-EMD	(INR) : 7,30,000/- (seven lakhs thirty thousand only) EMD in the form of Fixed Deposit (validity 180 days)



1 REQUIREMENT AND PROCUREMENT PROCESS

1.1 INTRODUCTION

1.1.1. About Organization:

BHEL is the largest engineering and manufacturing enterprise in India in the energy related/infrastructure sector, today. BHEL was established more than 50 years ago, ushering in the indigenous Heavy Electrical Equipment industry in India - a dream that has been more than realized with a well-recognized track record of performance. The company has been earning profits continuously since 1971-72 and paying dividends since 1976-77.

BHEL Electronics Division (EDN), located at Mysore Road, Bangalore along with Electronics Systems Division (ESD-part of EDN), located at Electronics City, Bangalore is a leading supplier of new Generation Power Plant Automation and Control Systems.

The Electronics Division has also emerged as a leading player in the field of power transmission and distribution, industry, transportation and non-conventional energy sources. The state-of-the-art equipment and systems manufactured, meet the demanding requirements of both the national and international markets in terms of technical specification and quality.

The Division has established references both in India and overseas by successful Installation of Power Plant Automation and Photovoltaic Systems. Besides providing unified solutions for various control system applications, the Division proudly holds the largest market share for Power Plant Automation Systems in India

1.1.2. BHEL, Electronics Division, Mysore Road, Bangalore – 560 026 (A Government of India Undertaking) invites tenders for the design, supply, installation, testing, training, maintaining of Data center on Financial Lease (Rental and Maintenance Charges) basis for a period of 5 years at following locations from eligible bidders.

Phase	Location description	
1	HR & IT ground floor -Electronics Division Mysore Road, Bangalore	DC
2	HVDC building (building no -5) ground floor -EDN, Mysore Road, Bangalore	Near DR

Details on the scope of work and services expected from the Bidder are provided in Scope of Work



1.2 DOCUMENTS ISSUED TO THE BIDDERS

- 1.2.1. Requirement and the Procurement process
- 1.2.2. Pre-Qualification criteria for bidders
- 1.2.3. Technical Terms and conditions
- 1.2.4. Technical Specification
- 1.2.5. Commercial Terms and Conditions
- 1.2.6. Price Format
- 1.2.7. Authorization and Back to Back Support Format by OEMs.
- 1.2.8. Format for declaring deviations
- 1.2.9. Format for No Deviations Certificate
- 1.2.10. Format for Non-Disclosure Agreement
- 1.2.11. Format for List of Enclosures.
- 1.2.12. Format for Integrity Pact (If applicable)
- 1.2.13. Reverse Auction (RA) guidelines

1.3 KEY ACTIVITIES AND DATES

S.No.	Key Activity	Date
1	Issuance of Request For Proposal (RFP)	12-AUG-2017
2	Last date and time for submission of Bids	18-SEP-2017 13:00 hours
3	Technical & Commercial Bid opening	18-SEP-2017 13:30 hours
4	Price Bid opening	Will be intimated later

1.4 AMENDMENT OF BIDDING DOCUMENTS

- 1.4.1 Purchaser may, at its sole discretion, amend the Bidding Documents at any time prior to the deadline for submission of bids. However in case of such amendments, the bid submission date may be extended at the discretion of Purchaser.
- 1.4.2 Amendments made prior to submission of bid will be provided in the form of Addenda/ Corrigendum to the Bidding Documents and will be posted on the BHEL website only (<http://www.bheledn.com> and <http://www.bhel.com>). The Bidders in their own interest are advised to refer to the website frequently and no separate communication may be issued by the Purchaser to the Bidders.



1.5 BID SUBMISSION PROCESS

The Bidders shall submit the offer in **TWO INNER ENVELOPES** as indicated below which shall be sealed in one outer envelope.

Envelope I: This sealed envelope should contain all the copies of technical bid together with un-priced commercial bid (all documents indicated at clause 1.2). This should also contain EMD in the form of DD/ Pay order for an amount of INR 7, 30,000.00 (INR seven lakhs thirty thousand rupee only) and non-refundable Tender Fee if any. The envelope should be clearly marked "**Part I - Technical and Commercial Bid**", indicating Enquiry Number, Due Date and Address & Reference of the Bidder.

Envelope II: This sealed envelope should contain price details only. This envelope should be clearly marked "**Part II - Price Bid**", indicating Enquiry Number, Due Date and Address & Reference of the Bidder.

Both the envelopes (Part I & II) shall be put in one cover, duly sealed, super scribing as Part I & Part II of Enquiry Number, Due Date of opening and the Address and Reference of the Bidder.

There can be only 1(one) bid from each Bidder.

To be dropped in the IT&S (Box No. 2)

Tender Box kept in the Reception Area at BHEL, Electronics Division, Mysore Road, Bangalore – 560 026

In case of any difficulty in dropping the tender in the designated tender box, it may be handed over to the following personnel before the due date and time:

- 1) Mr. Ravindranatha S, IT&S, 26999546
- 2) Mr. Gurunath Yankanchi, IT&S, 26998266 | Email: gurunath@bheledn.co.in

The above offer should reach this office on or before the due date at the given address, tender should not be addressed to any Individual's name but only by designation to:

Manager (IT&S),
Electronics Division,
Bharat Heavy Electricals Limited,
Mysore Road, Bangalore – 560 026

Tenders should be free from CORRECTION AND ERASURES, corrections if any must be attested. All amount shall be indicated both in words as well as in figures.



1.6 EARNEST MONEY DEPOSIT (EMD)

This part shall consist of the following:

EMD of Rs.7,30,000/- (Rupees Seven lakhs thirty Thousand only) in the form of Banker's cheque/ Pay order/ Demand draft in favour of "BHEL" payable at Bangalore.

Tender not accompanied with EMD/ EMD submitted in any other forms other than mentioned above will not be accepted. Earnest Money is to be paid by each tenderer for securing fulfilment of any obligations in terms of the NIT.

a) Modes of Deposit

The EMD may be accepted only in the following forms:

- Cash deposit as permissible under the extant Income Tax Act (before tender opening)
- Electronic Fund Transfer credited in BHEL account (before tender opening)
- Banker's cheque/ Pay order/ Demand draft, in favour of BHEL (along with offer)

b) Forfeiture of EMD

EMD by the Tenderer will be forfeited as per NIT conditions, if:

- After opening the tender and within the offer validity period, the tenderer revokes his tender or makes any modification in his tender which is not acceptable to BHEL.
 - The Contractor fails to deposit the required Security deposit or commence the work within the period as per LOI/ Contract.
- c) EMD given by all unsuccessful tenderers shall be refunded normally within fifteen days of award of work.
- d) EMD shall not carry any interest.
- e) EMD of successful tenderer will be retained as part of Security Deposit.

1.7 OPENING OF TENDERS

1.7.1 The Part I – Technical & Commercial bid would be opened on the Tender opening date.

1.7.2 The Part II – Price bid of Technically & Commercially suitable Bidders alone would be opened. The Technically & Commercially suitable Bidders would be informed about the price bid opening date.

1.7.3 Clarifications, if any, required by BHEL for Technical evaluation would be sought from Bidders before opening of Part II –Price bid.

BHEL reserves the right to go for a Reverse Auction (RA) instead of Opening the submitted sealed price bid, which will be decided after techno-commercial evaluation.



1.8 DOCUMENTS TO BE SUBMITTED ALONG WITH THE BID

Following documents shall be submitted in the bid. The Bidder shall bear all costs associated with the preparation and submission of their bid and BHEL will not responsible in any case or liable for those costs.

Bidders are required to quote for all the items of the Tender Enquiry specified in the technical specification (Requirement) document.

The bid, all correspondence and documents related to the bid shall be in English.

1.8.1 Documents to be submitted for Technical and Commercial bid

- Check List of Enclosures format (Annexure-VIII) along with all enclosures indicated therein.
- Price format copy with prices masked or without prices (PI note that % figures shall be indicated. Only the values shall be masked). All applicable taxes on various items / heads should clearly be mentioned
- Technical offer including Brochures/literature for the equipment offered

1.8.2 Document to be submitted for the Price Bid

- Price in the Price bid Format.

1.9 LATE BIDS

Any bid received by BHEL after the deadline for submission of bids will be summarily rejected and returned unopened to the bidder.

1.10 EVALUATION OF BIDS

BHEL will evaluate the bids as follows;

Stage-I: Evaluation of Technical and Commercial Bid

Eligibility criteria are mandatory requirements to be met by the Bidder. Only those Bidders who meet all the requirements as per **Pre-Qualification Criteria (PQC) for Bidders** will be considered for further evaluation.

BHEL's Technical Committee will evaluate the Technical bid submitted by the Bidders. During the Technical Evaluation of the bid, BHEL may ask for information / resources to validate the bid. These may include technical documents / supporting papers from OEM or third party, references, demonstration of a proof of concept or solution, visit to OEM's lab or their clients reference site, etc.



Failure to furnish all information as required or to submit a bid not substantially responsive to the bidding documents may result in rejection of the bid. If there are any deviations in the technical and commercial solution offered, without affecting the functional requirement, they shall be filled-in the Deviation format issued with the tender document and submitted along with the bid substantially in the form placed at Annexure-IV. The deviations from the tender Specification shall be clearly indicated giving the reference of the specification, if any, as per format for declaring deviations. If deviation other than what is specified in the list is found, the bid will be liable for rejection. In case of no deviations, **"No Deviation Certificate"** shall be submitted substantially in the form placed at Annexure-V. Commercial conditions sought in the tender also will be evaluated by the BHEL's committee. BHEL reserves the right to accept or reject any deviation. Bids meeting BHEL's technical and commercial requirements only will be considered for Stage-II price evaluation.

Stage –II: Evaluation of the Price Bid

Gross Total of Prices should be indicated both in words as well as in figures. If there is a difference between price quoted in words and figures or if there is any other price discrepancy the interpretation will be done as detailed below:

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



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- e. Through offer of higher warranty/configuration/rating, that what is required as per tender specifications, may be accepted, no extra weightage or preference will be given for the same.
 - f. Bidder shall quote the prices as per the Price Format issued with the tender document. Prices of optional items, if any, shall not be considered for Price evaluation, unless specifically called for in the enquiry and built into the price bid.
 - g. The Lease Tax / RTU Tax/GST/any other tax shall be extra at actuals however, such taxes as per prevailing rates will be considered for price evaluation and comparison.
 - h. BHEL will claim depreciation as per the provisions of the Income Tax Act/Companies Act-2013.
 - i. **The evaluation will be on the basis of one times charges less Buyback value plus total Lease Charges for all the items including all applicable Taxes and Duties but after deducting all input credits available to BHEL.**
 - j. **The bid having the least “cost for BHEL” for 5 years (L1) will be considered for order placement.**
 - k. All applicable taxes are to be specified clearly in the Price Bid Format.
 - l. Prices of optional items, which is beyond scope of this tender if any, shall not be considered for Price evaluation and ordering.
 - m. BHEL reserves the right to retain the hardware, software and other items supplied in this procurement at the end of the lease period on payment of Re. 1/- (Rupee One only) per equipment. If BHEL does not retain the equipment, the vendor shall dismantle all the equipment and move it away from BHEL's premises at vendor's cost.
 - n. The percentage of AMC charge quoted will not be considered for tender evaluation i.e. evaluation of L1 offer either through RA or opening of conventional price bid. However, BHEL reserves the right to negotiate with L1 vendor.
 - o. BHEL reserves the right to go for Reverse Auction (RA) instead of opening the sealed envelope price bid, submitted by the bidder. This will be decided after



techno-commercial evaluation. All bidders to give their acceptance for participation in RA. Non acceptance to participate in RA may result in no consideration of their bids, in case BHEL decides to go for RA and in such circumstances, the EMD submitted by such vendor shall be forfeited. Successful bidder after RA has to furnish break up of RA closing price between all the line items tendered for and arrive at cash outflow and cost to company.

- p. In case BHEL decides to go for RA only those bidders who have given their acceptance to participate in RA will be allowed to participate in the RA. Those bidders who have given their acceptance to participate in RA will have to necessarily submit 'Online sealed bid' in the RA. Non submission of 'Online sealed bid' by the bidder will be considered as tampering of the tender process and will invite action by BHEL as per extant guide lines in vogue.
- q. Terms and conditions of RA are contained in Annexure–IX.

1.11 BHEL'S RIGHT TO ACCEPT OR REJECT ANY OR ALL BIDS

BHEL reserves the full right to accept or reject any bid or to annul the bidding process and reject all bids at any time prior to Contract award, without thereby incurring any liability to the Bidders. Offers with following conditions, but not limited to, are liable for rejection.

- Demanding advance payment
- Demanding exemption of EMD (exempted in case of MSME, bidder has to provide valid MSME certificate)
- With offer validity less than what is asked by BHEL
- Non-Acceptance for participating in Reverse Auction



2 PRE-QUALIFICATION CRITERIA FOR BIDDERS

- 2.1 The bidder must have successfully completed similar work, not necessarily on lease rental basis during last 7 years ending last day of month previous to the one in which offers are invited. The experience should be one of the following:

Three similar completed works costing not less than the amount Rs. 86,00,000/-

OR

Two similar completed works costing not less than the amount Rs. 1,07,00,000 /-

OR

One similar completed work costing not less than the amount equal Rs. 1,70,00,000/-

Similar works" means design, supply, installation, testing, training, maintaining of Datacenter tier II or higher.

Bidder shall submit documentary evidence to support this.

- 2.2 This bidder shall be manufacturers of the equipment (OEM Supplier)/System Integrator/Authorized partner. The bidder shall have authorization from respective OEMs to quote for all products offered in this tender.

Shall submit certificate from the OEMs/ Self-certified to this effect.

- 2.3 Bidder shall have Average Annual financial turnover during the last 3 years, ending 31st March of the previous financial year, should be at least Rs. 1,00,00,000/-(one Cr.).

Attested copies of the Profit & Loss account, balance sheet etc., income tax return, VAT/service tax return of the last three years to be submitted as proof. Certificate from bankers/chartered accountant/IT return in this regard should be submitted along with the offer.

- 2.4 The bidder should have not been debarred / blacklisted by BHEL as on date of issue of this RFQ

Declaration by authorized signatory of the bidder

Note: Relevant portions, in the documents submitted in pursuance of eligibility criterion shall be highlighted. If the bidder failed to submit the relevant documents sought by BHEL, will be liable for rejection.

BHEL reserves the right to verify/ confirm all original documentary evidence submitted by vendors in support of the eligibility criteria. Upon verification, evaluation/ assessment, if any information furnished by the bidder is found to be false/ incorrect/forged, bid is liable for rejection.



3 TECHNICAL TERMS AND CONDITIONS

3.1 SCOPE OF WORK

3.1.1 The scope involves

- A. Design, supply, installation, testing, training, maintaining of Data center on Financial Lease (Rental and Maintenance Charges) basis for a period of 5 years at following locations.

Phase	Location description		Start Time	Remark
1	HR & IT ground floor -Electronics Division Mysore Road, Bangalore	DC	Immediate after PO	
2	HVDC building (building no -5) ground floor -EDN, Mysore Road, Bangalore	Near DR	The work will be started after successful completion of Phase 1.	BHEL will intimate the date

- B. 48 core Fiber connectivity between two data center HR & IT ground floor and HVDC building (building no -5).
 C. 24 core Fiber connectivity between data center HR & IT ground floor and NEB ground floor.
 D. Comprehensive AMC

Providing Comprehensive AMC for the complete Datacenter for the period of 5 years including one time battery refreshment at the end of 3rd year.

3.1.2 The Successful Bidder shall at his own cost, Supply, Install, Integrate, Carryout Tests, and Commissioning of System/equipment at the Site of BHEL complex as per technical specifications & requirements of this tender. Movement of System/Equipment inside site, including lifting to requisite floor is responsibility of vendor. Vendor may visit the Site, if required before quoting.

3.1.3 Arranging requisite tools, measurement equipment and resources required for installation and commissioning of the product and other equipment is the responsibility of the vendor.

3.1.4 All documents, manuals, administration manuals and software CD/DVDs along with activation code, if any, shall be submitted to BHEL before commissioning the systems. All software shall come with at least two sets of CDs/DVDs, etc.

3.1.5 BHEL may shift the equipment in different site/location during the lease period. The vendor shall carryout the shifting activity at its own cost, at least once during the lease



period, if so directed by the Purchaser. Vendor will continue to provide warranty, support and services for the shifted equipment during the lease period.

- 3.1.6 The vendor shall ensure that none of BHEL's equipment/structure/setup is damaged during commissioning and operations of the supplied equipment. Any damages, if caused to BHEL's property due to Vendor's activity/negligence or the operations of the equipment, shall be rectified, repaired by the vendor at their own cost to the satisfaction of the Purchaser.
- 3.1.7 Maintenance of the hardware, software and other equipment ensuring that full functionality thereof is available to BHEL throughout the lease period shall be as per the service level agreement.
- 3.1.8 The products whose remaining end-of-support is less than **7 years** need not to be offered. In case the OEM discontinues the warranty and support to the model of the System/Equipment during the Contract period and any system/Equipment starts malfunctioning or stops functioning, then, the same shall be replaced by the Contractor with the best and the nearest available substitute(s) thereof which is not technically inferior to the undelivered System/Goods of the same OEM or, if no such System/Equipment is available from the same OEM, then from any other OEM at no extra cost to BHEL.
- 3.1.9 Insurance including transit insurance of the hardware, software or other equipment during the duration of the contract and lease period shall be in the scope of the vendor.
- 3.1.10 Any travel, boarding and lodging incurred for the Resident Engineer/representative for installation, commissioning, migration, upgrade will be borne by the vendor.
- 3.1.11 The bidder must undertake the complete responsibility of supply, installation and commissioning of all hardware, software & other equipment which may belong to different OEMs (i.e. the entire scope of work of this tender) and to provide complete warranty and support as per terms and conditions herein and if so desired by BHEL, at the end of the lease period, to provide the requisite AMC support for the further period of 2 years.

3.2 INSTALLATION AND COMMISSIONING:

i. Operation & Maintenance

Allocation of one resource per shift on 24/7 basis for the period of 5 years considering 365 operation.



- ii. The requirements have been detailed in the document. However all accessories and licenses required for implementation shall be in Vendor scope within the quoted price, whether these are specifically mentioned herein or not. Any other equipment, module required for the safe and satisfactory operation, control, protection, monitoring, testing and maintenance should also be in vendor's scope.
- iii. The supply shall be complete in all respects for reliable performance. The Vendor shall submit the detailed BoM, block schematic, power wiring diagram, data sheets of equipment supplied.
- iv. Buy Back: The scope also includes buyback of old equipment (4 nos of PAC, 4 nos of UPS with Batteries, 6 nos of server Rack, 3 nos of Network Racks, security systems), as is condition from BHEL. All handling charges, transportation, incidental charges etc. are in vendor's scope. If required, bidders may inspect the old machines at BHEL before submission of bid.
- v. The Systems/Equipment shall be installed on the site in EDN, Mysore Road, Bangalore premises.
- vi. The entire System/equipment is required on five years Financial Lease and if BHEL opts, the bidder shall undertake to provide maintenance support for two years after the expiry of the Financial Lease period.
- vii. Equipment /Service supplied should be IPv6 compliant, wherever applicable.

3.3 DOCUMENTS TO BE SUBMITTED DURING COMMISSIONING

On successful installation of the equipment and configuration of individual components and the solution as a whole, the Vendor shall submit the following documents as part of the commissioning:

- 3.3.1 Newness certificate for all items.
- 3.3.2 Network diagrams / cabling scheme
- 3.3.3 Security scheme for entire solution.
- 3.3.4 Evidence of Comprehensive Insurance documents for all the items.
- 3.3.5 Security Deposit for the Purchase Order.
- 3.3.6 Document for Basic Operating Manual for the equipment supplied and the configuration done on these for BHEL environment.
- 3.3.7 IPv6 Compliance Certificate, if needed.

On completion of the installation commissioning and submission of above documents, the Vendor shall carry out Performance Guarantee Tests of the supplied hardware & software as given below.



3.4 PERFORMANCE GUARANTEE TESTS (PG TESTS):

- 3.4.1 The Performance Guarantee Test shall start after installation and commissioning of all the Hardware & Software at site.
- 3.4.2 The Performance Guarantee Tests (and repeats of such tests limited to a maximum of two) shall be the primary responsibility of the Vendor, but shall be conducted with the full cooperation of BHEL to ascertain whether the supplied System meets the standard of performance and complete functionality as specified by BHEL.
- 3.4.3 The performance test will be done simultaneously for all the equipment installed. After successful completion of installation and commissioning, PG test shall be conducted for ascertaining the availability for a minimum period of 14 days continuously. The Performance Acceptance Tests shall be conducted by Powering Up and continuous operation of all the systems on a 24x7 basis to ascertain that all components of the solution are working in the desired fashion individually and together.
- 3.4.4 All the Systems together shall give an uptime of 99.7% during the test period. The test duration time shall be exclusive of external power failure time and any scheduled down time by BHEL. The system shall be considered as "available", if all supplied all the Systems together are working satisfactorily with full functionality as per contract.
- 3.4.5 If the system is found to be lacking in meeting Performance Guarantee Test, the test time will be extended **7days**. If the equipment/system does not provide the required uptime even after 2 extensions, the supplied equipment is liable to be rejected. Vendor shall take away the rejected equipment at his own cost and replace the same with a new equipment of the same make and model and cause it to be installed/commissioned as per the directions of the Purchaser. The new equipment so supplied shall undergo PG test again as per the provisions contained herein. Down time will not be counted, in case the failure is due to any other reasons not attributed to the Vendor.
- 3.4.6 If the System or any equipment comprising the same, fails to successfully clear the PG tests even after one replacement, then, the Purchaser, may purchase the required Systems of the Equipment as the case may be, at the risk and cost of the Contractor. The Contractor shall continue to be liable for the warranty and support in respect of the System or the equipment which have cleared the **PG Tests**.



3.5 BILL of QUANTITY

DC BHEL EDN Bangalore		Near DR, BHEL EDN Bangalore	
Design, Implementation & Project Management	Qty	Design, Implementation & Project Management	Qty
Civil works :		Civil works :	
False flooring, False ceiling, Partitions, Doors, flooring, Painting	as required	Partitions, Doors, flooring, Painting	as required
Electrical works:		Electrical works:	
Main panel with Auto change over		Main panel with Auto change over	
LT Cabling works	as required	LT Cabling works	as required
Industrial sockets with connectivity	76 nos single phase 32A, 4 nos Three phase 32A	Industrial sockets with connectivity	28 nos, single phase 32A, 2 nos 3 phase 32A
Earthing,	as required	Earthing,	as required
Cable trays	as required	Cable trays	as required
UPS Systems:		UPS Systems:	
80kVA , Online double conversion UPS with 12V, VRLA SMF batteries to provide battery backup for 15 minutes on full load of each UPS	2	40kVA , Online double conversion UPS with 12V, VRLA SMF batteries to provide battery backup for 15 minutes on full load of each UPS	2
PAC Systems:		PAC Systems:	
17TR , Precision Air Conditioner units, floor mounted type bottom throw and top return with the outdoor units at terrace location with all required accessories.	2	11TR , Precision Air Conditioner units, floor mounted type bottom throw and top return with the outdoor units at terrace location with all required accessories.	2
Safety, Security Systems:		Safety, Security Systems:	
Fire alarm system,	1	Fire alarm system,	1
VESDA system,	1	VESDA system,	1
NOVEC 1230 Fire suppression system,	1	NOVEC 1230 Fire suppression system,	1
Hand held fire suppression system,	1	Hand held fire suppression system,	1
Access control & CCTV system,	1	Access control & CCTV system,	1



Rodent repellent & Water leakage detection system,	1	Rodent repellent & Water leakage detection system,	1
Datacenter management system	1	Datacenter management system	included in DC
Racks & Containment:		Racks & Containment:	
42U, 800(w)x1000(d) Server / Network Racks with 4 PDUs of 12 socket per Rack and all required accessories.	12	42U, 800(w)x1000(d)(2 nos) & 600(w)x1000(d)(6 nos) Server / Network Racks with 4 PDUs OF 12 socket per Rack and all required accessories.	8
Cold aisle containment with top covers, sliding doors at both sides. This shall be of expandable type for future	1	Cold aisle containment with top covers, sliding doors at both sides.	1
Comprehensive AMC		Comprehensive AMC	
Providing Comprehensive AMC for the complete Datacenter for the period of 5 years including one time battery refreshment at the end of 3rd year.	1	Providing Comprehensive AMC for the complete Datacenter for the period of 5 years including one time battery refreshment at the end of 3rd year.	1
Connectivity			
Fiber connectivity between two data center HR & IT ground floor and HVDC building (building no -5).		48 core	
Fiber connectivity between data center HR & IT ground floor and NEB ground floor.		24 core	
Operation & Maintenance			
Allocation of one resource per shift on 24/7 basis for the period of 5 years considering 365 operation		1	

3.6 COMMISSIONING/ACCEPTANCE TEST/PG TEST CERTIFICATE

BHEL will issue a Commissioning/ATP/PG Test Certificate on successful completion of Performance Guarantee/Acceptance Tests of all the Hardware & Software.

3.7 TRAINING

3.7.1 The vendor shall provide following training at BHEL premises on the procured equipment. The training course shall be constructed and supported by programmed illustrations, video charts etc. Vendor shall provide extensive lecture notes and other training documentation.

3.7.1.1 User Level Training for a minimum period of **2 days for 5 persons** and ensure familiarity to enable them to provide and use the system efficiently.



3.7.2 Boarding and lodging of the training faculty will be the responsibility of vendor.

3.8 SERVICE LEVEL AGREEMENT

Vendor shall provide an uptime of 100% for system and 99.7 % per quarter on all hardware & software products on monthly basis.

3.9 DEDUCTIONS FOR SLA NON-CONFORMANCE

- 3.9.1 The vendor shall maintain the overall uptime of equipment to as per SLA during the lease period.
- 3.9.2 A deduction from the quarterly rental of affected equipment / software shall be made on downtime basis. The downtime calculation shall be based on 24X7 hours. The deduction for downtime shall be as follows:

Working calculation for deduction

System (as total/full):

If the system is down for x hours in a quarter

Quarterly Financial Lease (Rental and Maintenance Charges) amount of entire system is Rs. A Then the deduction will be: Rs. $(A / 90) * (x/24)$

Component:

If any of the component is down for y hours beyond 0.3% of grace downtime in a quarter.

Quarterly Financial Lease (Rental and Maintenance Charges) amount of the component is Rs. B Then the deduction will be: Rs. $(B / 90) * (y/24)$

Note:

- Vendor has to provide component wise break-up of lease rental charges.
- Vendor has to provide quarterly uptime report of the system and components.
- If any equipment is down continuously for a month in spite of being serviced, the equipment shall have to be replaced by the Vendor, without any extra charge.

Cumulative deduction for downtime shall be restricted to 10% of the order value. If



Cumulative deduction for downtime exceeds the above mentioned limit then the Purchaser, without prejudice to any other right that it may have in this behalf, reserves the right to terminate the Contract.

- 3.9.3 There shall be no downtime due to mutually agreed scheduled maintenance of equipment, network equipment fault, fault due to mishandling of equipment by users or due to prolonged power outage.
- 3.9.4 If the uptime of a particular equipment/system falls below 90% continuously for 3 months, the equipment/system shall have to be replaced with the new equipment by the vendor without any extra cost to BHEL.

3.10 AVAILABILITY OF SPARES:

3.10.1 Sufficient stock of critical spares shall be maintained at sites or vendor's warehouse at all times to ensure the uptime as per SLA

3.10.2 Must have office or setup office in Bangalore. Documentary proof shall be submitted.

3.11 WARRANTY & SUPPORT:

3.11.1 All the supplied equipment/systems (hardware/software) shall be covered under a Comprehensive On-Site Warranty & service support for entire contract period. The lease period shall start from the date of successful installation and commissioning of the Equipment /System followed by completion of the PG test successfully. Warranty shall be delivered directly by the OEM for the equipment. In case of authorized partner being the Vendor, back to back agreement from OEM should be attached stating that the OEM will provide onsite support directly during the warranty period, replacement of spares etc. for all the hardware and software supplied. The OEM's obligation to provide onsite support is without prejudice to the overall responsibility of the Contractor and the Contractor shall be responsible to ensure the uptime requirement as per SLA. If the Contractor commits a default in providing warranty and support in respect of the Systems/Equipments, the Client may obtain the warranty and support from the OEM directly and shall be entitled to deduct/recover the charges payable/paid to the OEM from the lease rental payable to the Contractor.

3.11.2 If any document/manual/CD supplied by the Vendor is found to be inadequate / incomplete / corrupted within the period of the contract, the supplier shall replace / complete such document/manual/CD at their cost within 15 days' time. The



document / manual / CD released with upgrades and updates shall be supplied free of cost as and when they are released.

3.12 WARRANTY SHALL COVER THE FOLLOWING

- 3.12.1 Repair / Replacement of faulty / defective Hardware and other supplied items inclusive of supply of all types of spare parts etc. (Including batteries)
- 3.12.2 All Software Patches, Upgrades, updates, Service Packs, etc. of Software supplied by the OEM must be made available free of cost during the entire warranty period. Software subscription and any other subscription required during entire lease period.
- 3.12.3 Installation / Re-Installation / Maintenance and update patches, upgrades, updates and fixes of software supplied in the contract.
- 3.12.4 Licenses shall be perpetual and made current whenever the license policy of the Software changes during tenure of lease.

3.13 SUPPORT SHALL INCLUDE THE FOLLOWING

Comprehensive maintenance shall include the following:

- 3.13.1. Operations, maintenance and upkeep of System.
- 3.13.2. Repair / Replacement of faulty equipment including but not limited to all plastic and/or rubber parts, cables, fibers etc.
- 3.13.3. Installation charges
- 3.13.4. Site inspection charges - Expert Visit
- 3.13.5. Periodic maintenance, wherever required
- 3.13.6. Cost of Maintenance Engineers
- 3.13.7. Keeping sufficient spares to maintain the specified uptime.
- 3.13.8. Vendor shall warrant that spare parts of the equipment shall be available for minimum period of 7 years after completion of the acceptance test.
- 3.13.9. Physical Monitoring of the Critical Equipment on a daily basis
- 3.13.10. Daily Monitoring of the datacenter equipment
- 3.13.11. Weekly Reporting, MIS & Trending
- 3.13.12. Power & Thermal Audit once a year
- 3.13.13. Annual Energy Audit

3.14 THE OFFLINE SUPPORT SHALL HAVE

- 3.14.1 24x7 National telephonic supports.
- 3.14.2 There must be a single point of contact for any eventuality and an escalation matrix must be provided with the bid.



- 3.14.3 The bidder should clearly provide Escalation mechanism and the contacts/mobile phone number of OEM's technical resource.
- 3.14.4 Access to raise technical assistance request at hardware vendors / supplier website.

3.15 ROLE RESIDENT/ON-SITE ENGINEERS

- 3.15.1.1 Allocation of one resource per shift and three shifts per day for the period of 5 years considering 365 operation
- 3.15.1.2 Shall be responsible for following but not limited to:
- a) Physical Monitoring of the Critical Equipment on the floor on a daily basis
 - b) Daily Monitoring of the Critical Equipment.
 - c) Repair / Replacement of faulty equipment
 - d) Weekly Reporting, MIS & Trending
- 3.15.2 The Bio-data of the engineer(s) will be submitted to BHEL for approval before posting. Vendor will be responsible for background verification of experience and references mentioned in the Bio-data.
- 3.15.3 The working hours of the on-site engineers will be round the clock.
- 3.15.4 On-site resident engineer will be replaced within 48 hours if BHEL is not satisfied with the engineer.
- 3.15.5 Attendance of the on-site resident engineer will be maintained by BHEL.
- 3.15.6 Shall have their own accommodation, mobile phones, vehicle etc.
- 3.15.7 Shall leave the station only after seeking permission from BHEL and arranging for proper substitute.

3.16 ANNUAL MAINTENANCE CONTRACT

- 3.16.1 After the expiry of 5 years Warranty and the lease period, all the supplied equipment/systems (hardware/software) shall be covered under a Comprehensive On-Site AMC & service support for minimum of 2 years along with back to back support agreement with OEM for all the supplied hardware. The AMC can be terminated with three months' notice without assigning any reason and the payment of AMC will be done at the end of each quarter or on pro-rata basis if terminated.
- 3.16.2 During the AMC period the on-site engineers posting and its terms and condition will be same as that of the warranty period.
- 3.16.3 The AMC for 2 years will be binding on the successful bidder, at the charges agreed in the contract. However, BHEL reserves the right not to continue with AMC after the expiry of lease period.



ಭಾರತ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Limited
(A Government of India Undertaking)
ELECTRONICS DIVISION
P.B. No. 2606, Mysore Road, Bangalore - 560 026

Gram : BHARATELEC
Fax : 080-26740137
PHONE : 26998.....
(EPABX. NO.)

Tender Ref: BHEL/EDN/ITS/AC/2017/DC/BUILD



4 TECHNICAL SPECIFICATION

4.1 CIVIL & INTERIOR WORKS

4.1.1 Raised floor

The server & other required area (as shown in the drawing Annexure I) should be equipped with raised floor with 600 mm height at Primary DC and 300mm at Secondary DC(existing will be used with minimal modification). Cavity floor shall have false flooring panels of 18 gauge steel 600 x 600 coated with 50 micron epoxy conductive paint. Floor shall be finished with 2mm thick antistatic high pressure laminate with 2mm thick PVC trim edge all-round. The interior of the panels shall be filled with non-combustible cementitious compound.

4.1.2 False flooring panels:

The floor should be designed for standard load conforming to BIS 875-1987.

- Panels should be made up of 18-gauge steel of 600mmx 600mm size treated for corrosion and coated with epoxy conductive paint (minimum thickness 50 Micron). False flooring covering shall be antistatic high pressure laminate 2 mm. thick in approved shade and colour with PVC TRIM edge.
- Perforated floor panels are to be provided on the designated floor for air delivery. The placement of perforated panels shall be decided as per the PAC layout. The perforated panels shall have dampers. The interior of the panels shall be filled with non-combustible cementitious compound.
- The false floor should withstand the load of the racks with 50% safety margin.
- No obstructions of pipes, conduits, detectors shall be permitted in space immediately under equipment line-ups. The under floor space under line-ups is required for equipment frame securing, cable management and power access.
- Steps are to be provided for transitioning to elevated floor area.
- Special tools and tackles required for operation of false flooring shall be supplied in two sets.
- The bidders may note the following details pertaining to panels for false flooring:
 - Panel Loading: Concentrated point load: 450 Kg as per European Standard EN 12825
 - Uniformly Distributed Load: 1350 Kg/ M2
 - Fire Rating: Panels will conform to Class 0 and Class 1 fire rating tested as CIRC 91/ 61 or BS 476 Part 6 & 7 (60 minutes).

Under Structure:



Pedestal Assembly: Pedestal assembly shall be of snap lock type consisting of base assembly 100 x 100 x 2 mm. with full bead weld to steel base plate with embossing and four numbers holes which shall be fixed to the floor with screws. Anti-vibration rubber pad shall be provided below base plate. Steel pipe riveted to base plate shall engage the pedestal head assembly. Head shall be formed steel and full bead weld to stud, with four flange having shape and size as per standard approved manufacturers' specifications. Pedestal head flanges shall be provided with holes for screws for fastening the G.I. Stringers. No sharp edges or corners shall be exposed from pedestal head when floor panel is removed. G.I. rod, fully threaded shall be locked to pedestal head. The entire head assembly is engaged in the base assembly by means of nut and check nut.

Stringer:

Stringer system is hot dipped galvanized sheet, construction having channel, with pre punched counter and holes at both ends of the top face for securing the stringers on to the pedestal head to be fixed with screw ensuring maximum lateral stability in all directions. The grid formed by the pedestal and stringer assembly shall receive the floor panel. The stringer system would be earthed properly by using copper wire. This is required for some of the servers for transient grounding.

4.1.3 Partitions / Walls

Partitions/ wall for walls other than brick walls shall be of Gyp board.

The internal partitions for server room, UPS and electrical room shall be full height 125 mm thick fire line Gyp Board using 12.5 mm thick double fire line gyp-board on both sides with GI sheet metal vertical stud frame of size 75 mm thick fixed in the floor and ceiling channels of 75 mm wide to provide a strong partition. Glass wool insulation inside shall be provided as required. Fixing shall be made by self-tapping screw width vertical studs being at 610 mm intervals. The same should be inclusive of making cut-out for switchboards, sockets, grills etc. It shall also include preparing the surface smoothly and finally finishing with one coat of approved brand of resistant coating.

4.1.4 Vitrified Flooring

Vitrified flooring shall be used for NOC room and common passage areas. 20mm thick vitrified tiles 600 mm x 600 mm size conforming to IS: 15622: 2006 to be fixed with special adhesive of Dr. Fixit Fevimate X-L or equivalent in NOC room area. All areas should have 6" skirting.

4.1.5 Vinyl Flooring

2 mm thick anti-static vinyl flooring over the prepared surface. It shall be fixed by applying the appropriate cement paste to fix the vinyl flooring over the base floor slab. Vinyl flooring shall be done for the Electrical / UPS room.



4.1.6 Doors

Server room, Staging room & Electrical / UPS Room:

Fire rated double leaf metal doors of size as per the drawing and requirement with 2 hour Metal fire rating, along with the required framework, Vision Panel, handle, locking system, top patch and bottom patch, hardware, etc as per the manufacturer's specifications etc. complete.

Glass door of required size shall be used for NOC room.

4.1.7 Painting

Gypsum / Plaster of Paris paste of thickness 5 - 8 mm punning over cement plaster shall be provided so as to ensure a level and smooth texture to the exposed walls and columns. The existing surfaces are to be cleaned and scratched and markers are kept before the application of punning material. After the material has dried upon application it is to be smoothened by means of rubbing it with sandpaper. Upon this smoothened surface one coat of primer and two coats of plastic emulsion paint of approved make & shade is to be applied. This will be applicable for all vertical plane surface and for fire line gyp-board ceiling (if applicable). Server room shall additionally be applied with painting putty to level & plumb and painting with 2 coats of fire retardant painting.

4.2 ELECTRICAL WORKS

4.2.1 Electrical distribution – Minimum requirements:

- Single EB source and DG Source shall be provided at Electrical room by BHEL. Further cabling to be carried out by the Bidders to Datacenter distribution
- UPS shall be proposed in N+N redundancy with 30minutes back up on full load condition on each UPS
- Each rack shall be proposed with 2 number of power feeds from two difference sources
- Power distribution to Comfort AC units, lighting and utility raw power shall be taken from the main panel
- The above shown typical architecture shall be followed for Primary and Secondary DC. Feeder requirements shall be as per actual requirement will be considered.

4.2.2 Specification for UPS & Batteries

The following are the required specification for UPS:

The UPS system shall ensure continuity of electric power to the load within the specified tolerances, without interruption upon failure or deterioration of the normal AC source (utility power) for a maximum protection time determined by the capacity of the backup batteries installed.

- The UPS system shall be in double - conversion mode Stand-alone UPS.



- Two numbers of 80kVA UPS for Primary DC and two numbers of 40kVA for Near DR shall be used. This will be in N+N redundancy configuration.
- The required battery backup shall be 15 minutes on full load of the each UPS.

#	Specification	Primary DC & Secondary DC
1	Rating	80 kVA / 40 kVA
2	Type	Stand alone
3	Power factor	≥ 0.9
Environmental characteristics:		
1	Working temperature	10°C to 40°C
2	Storage temperature	10° to 45° C
3	Humidity	95% non-condensing
4	Interference	EN50091-2/IEC 62040-2
General characteristics:		
1	Efficiency	
	AC/AC total efficiency at 25% load	$\geq 94\%$
	AC/AC total efficiency at 50% load	$\geq 94\%$
	AC/AC total efficiency at 75% load	$\geq 94\%$
	AC/AC total efficiency at 100% load	$\geq 94\%$
2	Noise level @ 1meter distance	<65dB
3	Conversion technology	True online technology
4	Dimensions in mm (L X B X H)	To be specified by bidder
5	Weight(kgs)	To be specified by bidder
6	Cable entry & exit	bottom
7	Degree of protection	IP 21
8	Battery self-discharge test	required
Input electrical characteristics		
1	Type of rectifier	IGBT
2	Input Voltage(3 phase)	415V $\pm$ 15%
3	Input Frequency	50Hz $\pm$ 5%
4	Input Power factor @ 25 to 100% load	0.99
5	TVSS /Surge protection	required
6	Input current harmonics (THDi) at 25 to 100% of loads	$\leq 5\%$



7	Maximum current drawn during battery charging & inverter with nominal power (In Amps)	To be specified by bidder
8	Charging time	8 - 10 hrs.
Output characteristics:		
1	Output Voltage (3 phase)	415V
2	Static output voltage variation	±1%
3	Output waveform	Sinusoidal
4	Dynamic output Voltage variation when load varies from 0 - 100% & vice versa.	To be specified by bidder
5	Output Voltage variation at balance load	415V
6	Output Voltage variation at unbalance load	±1%
7	Output Voltage adjustment - 100% unbalance load	To be specified by bidder
8	Voltage adjustment - Manual	To be specified by bidder
9	Output frequency	50Hz
10	frequency regulation	To be specified by bidder
11	phase displacement-in balance load	120° , ±1%
12	Output power factor	0.8 lag – unity - 0.9 lead
13	Overload capacity	
	For 60 minutes	110%
	For 10 minutes	125%
	For 1 minutes	150%
14	Short circuit capability	To be specified by bidder
15	Crest factor	> 3:1
16	Recovery time	20ms to ±1%
17	Galvanic isolation transformer	Not Required
Static bypass		
1	Static bypass arrangement	Required (Should be disabled)
2	Rated Voltage (3 Phase with neutral)	By bidder
3	Voltage variation	±10% (Adjustable)
4	Nominal Frequency	50Hz
Battery details:		
1	Type of batteries	12V, VRLA, SMF



2	Back-up	15 minutes on each UPS at full load condition. Load power factor shall be 0.9
3	AH of the battery	To be specified by bidder
4	Life of battery	≥ 10 Years
5	Battery temperature sensor	Required
6	No. of Batteries provided	To be specified by bidder
7	Battery Monitoring in UPS	Required
8	Battery Mounting	Cabinets
9	Dimensions of battery cabinet(LXBXH)	To be specified by bidder
10	Weight of battery cabinet	To be specified by bidder
11	Base Frames for UPS & Battery Racks	Required
Communication:		
1	BMS & DCIM compatibility	Required
2	SNMP	Required
3	Past Events & Trend Analysis	Required

4.2.3 Technical Specification for LT Panels

The power control panels

The power control panels shall be metal clad, totally enclosed, rigid, floor mounting, air insulated, cubical type for use on 415 volts, 3 phase, 4 Wire 50 cycles system. The equipment shall be designed for operation in high ambient temperature and high humidity tropical atmospheric conditions. Means shall be provided to facilitate ease of inspection, cleaning and repairs, for use in installations where continuity of operation is of prime importance.

The equipment shall be designed to confirm to the requirements of:

- IS 4237 - General requirements for switchgear and control gears for voltages not exceeding 1100 volts.
- IS 2147 – Degree of protection provided by enclosures for low voltages switchgear
- ARE 375 – Marking and arrangements of bus bars
- Individual equipment housed in the power control to the following IEC specifications:
- Moulded case circuit breakers - IS 13947
- Miniature circuit Breakers – IS 8828 -1996
- Fuse switch units – IS 4064
- Current Transformer – IS 2705



- Voltage Transformer - IS 3156
- Relays – IS 3231
- Indicating Instruments - . IS 1248
- Control Switches and push buttons – IS 711
- Auxiliary contractors – IS 6875

4.2.4 Technical Specification- Supply and Installation of Low Voltage Cables

Type:

Low voltage cables shall be Aluminium or copper conductor (Copper shall be used for UPS input and Output distribution other cables shall be of Aluminium), PVC /XLPE insulated and will be of FR / FRLS type. PVC sheathed and steel wire armored or steel tape armored construction. The conductors of cable from 16sqmm size shall be stranded. Sector shaped stranded conductors shall be used for cables of 50sqmm size and above. The cable shall conform to IS – 1554 part -I in all respects.

The XLPE cables shall be ST HR inner sheathed ST2 - FRLS outer sheathed as per IS – 7098 (Part-1) wire stripped.

Rating:

The cable shall be rated for a voltage of 1100 volts.

Core Identification:

Cores shall be provided with the following color scheme of PVC insulation.

- 1 Core: Red/Black/Yellow/Blue OR proper identification with heat shrinkable sleeve at the termination ends and at every 1 meter interval in case of black cables.
- Cores: Red and Black
- Cores: Red, Yellow and Blue
- 1 / 2 / 4 Core: Red, Yellow, Blue & Black.

Cables and other items:

- Specifications for XLPE Cables: IS 7098 part-1-1988
- Specification for PVC insulated: IS 1554 -1964 (Heavy duty) electric cables Part - I for voltage up to 1100 Volts.
- Specifications for PVC insulated: IS 694 – 1988 for voltage up to 1100V Part - II With aluminum conductors.
- Glossary of terms for electrical cables: IS 1885 - 1971 and conductors.
- Code of practice for safety of buildings: IS 1646 -1961 □ (General) Electrical installation.
- Single phase neutral conductors shall be sized throughout to carry the full design load current and shall not be less than the full size of the phase conductors. Neutral



conductors shall not be shared between circuits. All 3 phase neutral conductors shall be rated at 150 % of the phase current. No cable joins are to be used

Cable Terminations:

Each termination shall be carried out using brass compressions glands and cable sockets. Hydraulic crimping tool shall be used for making the end terminations. Cable gland shall be bonded to the earth by using suitable size G.I wire / tape.

4.2.5 Cable Trays:

Cables shall be laid on cable trays. The cables laid shall be securely fixed to the Cable trays by means of lockable nylon ties. After laying the cables the cable shall be securely fixed by using 25x3mm GI strips and bolted to the cable tray. The cost of the nylon ties and the overlapping GI strip shall be included in to the laying cost of the cable as no separate payment will be made for the overlapping strip and nylon ties. Cables installed on trays or ladder shall be laid in a single layer, leaving 25% of the tray or ladder width as spare capacity for further use. Single core cables forming part of a three phase circuit shall be run in trefoil formation.

Inside the server room, perforated type cable tray should be used. Other areas Ladder type needs to be installed.

4.2.6 Low Voltage Distribution System

Distribution boards for power and lighting distribution:

Distribution boards shall be suitable for 415 volts, 3 phase A.C. supply of 230 volts single phase A.C. supply as required. Distribution board shall generally conform to IS: 2675.

PVC Conduits & Accessories:

Conduits

General conduits shall be of PVC extruded – FR / FRLS with original mix. The wall thickness of conduits shall be as follows: -

- a. 20, 25 & 32mm – 1.5mm or 2mm thick.
- b. 38, 50mm and above - 2.5mm thick.

The PVC conduits shall conform to the requirements of IS: (latest edition) in all respects. The conduits shall have uniform wall thickness and uniform cross section throughout. The conduit shall be free from burrs. Conduits shall bear the name or trade mark of the manufacturer on each length. Conduits of less than 19mm dia. shall not be used. Conduits accessories such as bends, inspection bends, inspection tees, elbows, reducers, draw boxes, junction boxes, etc. shall be of approved makes. The conduit accessories shall conform in all respects to IS: 3837. Boxes shall have internally tapped spouts.



Junction boxes / inspection boxes shall be provided with suitable covers.

Installation of Conduits:

Open / Surface Conduit System:

Wherever, specifically called for, surface conduit system shall be adopted conduits shall be run in square and symmetrical lines. Before the conduits are installed, the exact route shall be at site and approval of the user shall be obtained. Conduits shall be fixed by heavy gauge

GI saddles, secured to suitable raw plugs, at an interval of not more than 1 meter. Wherever couplers, bends couplers, bends or similar fittings are used, the saddles shall be provided on either side at a distance of 30 cm from the centre of such fittings. Conduits shall be joined by means of screwed couplers and screwed accessories only. In long distance straight runs of conduits, inspection type couplers or running type couplers with jam nut shall be provided. Threading shall be long enough to accommodate pipes to the full threaded portion of the couplers, and accessories. Cut end of conduits shall have neither sharp edges nor any burrs left to avoid damage to the insulation of the conductors. Bends in conduit runs shall be done by bending conduits by pipe bending machine or any other suitable device as far as possible. Bends which cannot be negotiated by pipe bends shall be accompanied by introducing solid bends, inspection bends or cast iron inspection box. The radius of solid bends shall not be less than 7.5cm. Not more than three equivalent 90 deg bends shall be used in a conduit running from outlet to outlet. Bends shall be properly drained and ventilated to prevent sweating or condensation inside the pipes. The entire conduit opening shall be properly plugged with PVC stoppers/ bushes. The conduits shall be adequately protected against rust by applying two coats of approved synthetic enamel paint after the installation is completed. Wherever conduits terminate into point control box, outlet box, distribution board etc., conduits shall be rigidly connected to the box / board with check nuts on either side of the entry to ensure proper electrical and mechanical continuity. The entire conduit system after installation shall be bounded to the earth

4.2.7 Testing of electrical installations:

- a) The insulation resistance shall be measured by applying suitable pressure between earth and whole system of conductors or any section thereof with all fuses in places and all switches closed and except in earthed concentric wiring all lamps in position or both poles of the installation otherwise electrically connected together, where a direct current pressure of not less than twice the working pressure provided that it does not exceed 500 volts for Medium Voltage circuits. Where the supply is derived from added resistance, the working pressure shall be deemed to be that which is maintained between the outer or phase conductor and the neutral the three wire (A.C. or D.C.) or a poly phase system, the neutral pole of switch is connected to earth direct.
- b) The insulation resistance measured as above shall not be less than 50 mega ohms divided



by the number of points on the circuits, provided that the whole installation shall be required to have an insulation resistance greater than one mega ohm.

- c) Control rheostats, heating and power appliances and electric signs, if required, be disconnected from the circuit during the test but in the event of the insulation resistance between the case or frame work and all live parts of each rheostat appliances and sign shall not be less than that specified in relevant British Standard Specifications or where there is no such specification shall not be less than a half mega ohm.
- d) The insulation resistance shall also be measured between all conductors connected to one pole or phase conductor of the supply and all the conductors connected to the middle wire or the neutral or to the other pole or phase conductors of the supply and its value shall not be less than specified in sub clause (b).

4.2.8 Testing of Earth continuity path:

The earth continuity conductor including metal conduits and metallic envelopes in all cases shall be tested for electric continuity and the electrical resistance of the same along with the earthing lead but excluding any added resistance or leakage circuit - breaker measured from the connection with the earth electrodes to any point in the earth continuity conductor in the completed installation shall not exceed one mega ohm.

4.2.9 Specification of Light Fixtures

- Server room shall be designed for 500lux
- Staging, NOC room, Electrical / UPS room shall be designed with 350 lux
- Passage / common area shall have 150-200 lux
- 15 – 20% of fixture shall be of Emergency type with MCB controls. Power for the emergency lighting shall be taken from existing building inverter / UPS circuits.
- The proposed light fixtures shall be of Energy efficient LEDlight fixtures
- The fixture shall be high P.F correction Type
- All the fixture shall be with loop in or loop out wiring facility

4.2.10 Specification of Earthing System

4.2.11 General

All non-current carrying metal parts of the electrical installation shall be earthed as per IS: 3043 and with subsequent amendments. All metal conduits, trunking, cable sheathes, switchgear, distribution boards, meters, light fixtures , fans and all other metal parts forming part of the work shall be bonded together and connected by two separate and distinct conductors to earth electrodes.

Special instruction:



The soil at the area of location require any special earthing to achieve suitable value, namely chemical type earthing bidders are requested to consider the same.

4.2.12 Earthing Conductors

All earthing conductors shall be of high conductivity copper or GI as required /specified and shall be protected against mechanical damage and corrosion. The connection of earth continuity conductors to earth bus and earth electrode shall be strong and sound and shall be easily accessible. The earth conductors shall be rigidly fixed to the walls, cable trenches, cable trays or conduits and cables by using suitable clamps.

- Main earth bus shall be taken from the main medium voltage panel to the earth electrodes. The number of electrodes required shall be arrived at taking in to consideration the anticipated fault on the medium voltage network.
- The sub-mains and sub-circuits shall be provided with earth continuity conductors as specified and connected to the main earth bus. Earthing conductors for equipment shall be run from the exposed metal surface of the equipment and connected to a suitable point on the sub -main or main earthing bus. All switch boards, distribution boards and isolators, disconnect switches shall be connected to the earth bus. Earthing conductors shall be terminated at the equipment using suitable lugs, bolts, washers and nuts. All conduits, cable armor, raceways, rising mains, metal boxes, panel boards etc., shall be connected to the earth all along their run by earthing conductors of suitable cross sectional area. Sprinkler pipes, water pipes, steel structural elements, lighting conductors shall not be used as a means of earthing an installation.

The electrical resistance of earthing conductors shall be low enough to permit the passage of fault current necessary to operate a fuse / protective device / a circuit breaker and shall not exceed 1Ohm.

4.2.13 Earthing Electrodes

Plate electrodes

Plate electrodes shall be made of copper plate of 3.15 mm thick and 60 x 60 cm size. The plate shall be buried vertically in ground at a depth of not less than 2 meters to the top of the plate, the plate being encased in salt and charcoal to a thickness of 15 cm all round. It is preferable to burry the electrode to a depth where subsoil water is present. Earth leads to the electrode shall be laid in a GI pipe and connected to the plate electrode with brass, bolts, nuts and washers. A GI pipe of not less than 25mm dia. shall be placed vertically over the plate and terminated in a funnel at 5 cms above the ground. The funnel shall be provided with a wire mesh. The funnel shall be enclosed in a masonry chamber of 45 cm x 45 cm x 30 mm dimensions. The chamber shall be provided with heavy duty C.I. cover and C.I. Frame / MS Cover / frame if vehicle movement area. The earth station shall also be provided with a suitable permanent identification using painting / or engraving. Bidders are requested to use standard and similar specification and design already used in the site.



4.2.14 Pipe Electrode

Pipe electrode shall comprise of a 2.5 mtr long 38mm dia class 'B' GI pipe buried vertically in a pit of 35cm x 35 cm size and filled with alternate layers of charcoal, salt and connected at the top to a Class 'B' GI pipe of 25mm, 1 meter long with a funnel at the other end, 5 cms above the ground. The earth lead shall be properly bolted to the pipe electrode with brass bolts, nuts and washers. The funnel and earth lead connections shall be enclosed in a masonry chamber of 45m cms x 45 cms. The chamber shall be provided with heavy duty C.I. cover and C.I. frame / MS Cover / frame if vehicle movement area. Proper permanent identification tag / label shall be provided for each electrode using painting.

4.2.15 Testing

On the completion of the entire installation, test on earth resistance of electrode shall be conducted. All meters, instruments and labor required for the tests shall be provided by the contractor. The test results shall be submitted to the Client for approval. Tests shall be conducted in the presence of Engineer -in-charge.

4.3 Comfort Air-conditioning

Cooling system split AC of suitable nominal cooling capacity fitted with hermetically sealed compressors operating on Non CFC suitable for wall mounting operating on single phase / three phase AC supply complete with remote control capable of performing

- Cooling
- Dehumidifying
- Air circulating
- Filtering

The following areas shall be covered with Comfort Cooling:

DC:

- Electrical / UPS room with N+1 redundancy
- NOC room with N+1 redundancy

Near DR:

- Electrical / UPS/battery room with N+1 redundancy
- Staging room with N+1 redundancy
- NOC room with N+1 redundancy



Installation of split AC includes:

- Mounting / Fitting indoor & outdoor unit at their respective location.
- Laying Refrigerant pipelines as required at site and connecting both the unit after drilling hole in the wall. The thickness of Cu. Tubing shall not be less than 0.80mm.
- Insulating the suction pipe with expanded polythene foam tubing.
- Supply & Installation of drain pipe, to drain out the condensate water being formed in the indoor unit.

4.4 Precision Cooling – Server rooms

The proposed ratings of PAC units are as below,

- DC : 2 x 17TR Dx based in N+1 redundancy
- Near DR: 2 x 11TR Dx based in N+1 redundancy

PAC unit – Specifications:

Precision Air Conditioning units should be Variable Cooling Capacity Type, designed and built using long unrivalled experience in close control air conditioning, with extensive testing of components and complete systems. Every aspect is to be engineered to ensure maximum reliability, economy of operation and long working life, together with ease of installation and maintenance.

The Cooling Capacity should be designed at Cold Aisle Temperature of 23+-1 Deg C and Hot aisle temperature with a Delta of 8-10 Deg C. The units should have DX Type Cooling Coil in slant configuration. Precision AC Unit should be designed at max ambient temperature of Bangalore conditions. All units shall be designed with high Sensible Heat Factor. Indoor Unit have Internal refrigeration pipework compete with liquid line shut off ball valve with Schrader, filter drier, electronic expansion valve with sight glass and filter, Schrader charging valve.

4.4.1 Cabinet

Unit shall be made of anodized Aluminum profile frame, Curved front service access doors with key entry compression locks and quick release hinges. Panels shall be Pre coated scratch and dirt resistant steel ,Lined with 25 mm thick, non-eroding, non-combustible insulation with thermal and acoustic properties.

4.4.2 Cooling Coil

Cooling Coil shall be 4 Row inclined and High performance type. The coils shall be constructed from Inner grooved and 3/8" O/D copper tubes with mechanically bonded aluminium fins having not less than 14 FPI for optimal Heat Transfer. The coil face area shall be maximized to ensure high sensible heat ration and low airside pressure drop, thereby minimizing fan power and noise level. A stainless steel condensate drain tray with U trap shall be included to ensure efficient removal of the condensate.



4.4.3 Compressor

Each unit shall have One refrigerant circuit with one Invertor compressor to match step less variable load .

Unit shall be operating on R410A refrigerant only. Scroll Compressor should have High efficiency, permanent magnet, brushless DC motors, and Periodical oil reclaim cycle. Compressor should also have Speed controlled on cooling demand, with operational thresholds to avoid coil freeze up and high pressure trip, Motor protected against overcurrent and thermal overload, Suction and hot gas line shut off ball valves with Schrader for compressor isolation and Neoprene anti-vibration mounts.

Units shall be able to run in part load conditions in automatic mode and incase of failure, load should be further distributed among the running units.

4.4.4 Indoor Unit Fan

Unit shall have One No Direct driven variable speed high efficiency EC Plug fan with backward curved three dimensional profiled blades, made from reinforced high performance composite material suitably designed for different capacities models. Impeller optimally balanced according to ISO1940. In the event of fan failure all other unit functions are disabled. Motor efficiency class shall be IE4. Fan speed shall be automatically modulating on actual return air temperature.

4.4.5 Electric Heating

Electric heaters shall have rigid Incoloy sheathed elements with steel finning balanced over three phases and rated to operate at black heat and protected by a high temperature safety cut-out. Three phase staged heater bank with Stainless steel hairpin elements and fins operating at low surface temperature. Overheat protection thermostat (Klixon).

4.4.6 Steam Humidifier

The humidifier shall be of the electrode-boiler type, located in the bottom of the units. Features shall include proportional steam output and microprocessor control with alarms and diagnostic facilities. The control system shall allow the use of a wide range of mains water conditions and optimize drain down frequency for maximum operational economy. The humidifier should be designed for connection to untreated mains cold water at a pressure of between 1 and 10 bar. Electrode boiler cylinder should be generating sterile, odourless and mineral deposit free, steam. It should give Proportional output with adaptive drain cycle for increased cylinder life. It shall require a water inlet hose with 15mm compression fitting, filter, solenoid valve and fill cup with air break. Steam should be distributed into the airflow via a nozzle or sparge pipe.

4.4.7 Electronic Expansion Valve (EEV)

Precision AC unit should have Electronic Expansion Valve/s with Sight glass as an integral part of it.



4.4.8 Air Filter of Indoor Units

The filters shall have an efficiency of (G4). They shall be fitted in the return air stream held by quick release retaining clips, and be accessible from the front of the units. A differential pressure switch shall be fitted which, through the alarm facility in the microprocessor controller, shall indicate when the filters need changing. Pleated form and Cassette type air filter should be placed in the indoor unit.

Air sensor

Indoor Unit should have Return air temperature and humidity sensor in totality.

4.4.9 Water Leak Detection

Precision AC indoor unit should have 5m long Tape type Water Sensor and additional sensor will be placed in condensate tray.

4.4.10 Control Panel

Integral control panel wired in accordance with EN60204 complete with the following components:

- Circuit breakers to protect individual components
- Electrical Contactors
- Colour Coded and Numbered Cabling
- Transformer and Control Circuit fuse
- Volt free critical and maintenance alarm terminals

4.4.11 Microprocessor Controller

Units shall be fitted with advanced microprocessor controls systems. This shall provide maximum economy of operation, a comprehensive intelligent alarm system and a wide range of information for operators and service engineers. All information shall be presented in a user-friendly format with tamper-proof setting up arrangements. In addition to precise control of temperature and humidity, the system shall include the following features.

Main Control Functions:

- Temperature Return or Supply air OC
- Return air Humidity %RH or Moisture content g/kg
- Optimization of fan speed



- Optimization of compressor operating conditions
- Optimization of Humidifier output □ Auto restart after power failure.
- Team Mode
- Cascad Mode

Monitoring of all digital and analogue inputs and outputs including:

- Fan Speed
- Low and High side Compressor operating pressures □ Suction and Discharge compressor Temperatures.

Alarms:

- High and Low temperature
- High and Low humidity or moisture content
- Airflow Failure, Filter Blocked, Refrigeration system fault
- Humidifier Fault, Electric Heating Fault, Sequential communication and sensor failure.

Touch Screen Display

- 4.3" colour touch screen display facial mounted on unit front door.
- 3 levels of password protection.

Graph Plots: -

Temperature
OC - Humidity
%RH.

Features:

- Alarms are displayed in plain text
- Saving and loading of commissioning settings
- Refrigerant Pressure Gauges
- Refrigeration Circuit Monitoring

4.4.12 Service Entry/Access

These Precision AC units shall be designed to be completely front access (Not more than



880 mm for the highest capacity) for service/maintenance via the front hinged / removable doors. Therefore, no allowance for access to the ends or back is necessary, although the end panels can be removed in-site if required.

4.4.13 Air Cooled Condensers

The condenser components shall be housed in a casing using powder coated rolled steel sheet. The coil and fan shall be supported by a single piece casing and two sides concealing pipe work. The coils shall be constructed from three rows of 3/8 inches O/D , internally grooved copper tubes with corrugated aluminums fins not less than-14FPI. The fans shall be EC (Electronically Commuted) axial flow type with profiled aluminium sheet metal blades fitted to an external rotor motor. The fans shall be statically and dynamically balanced and shall be designed for intake temperatures of -25 Deg C to +55 Deg C. The Motors shall be 6 Pole /50 hZ, Weatherproof and have IP54 class of enclosure protection, and class "F" for insulation material.

4.4.14 Refrigerants

Units shall be designed with Eco-friendly Green Refrigerant i.e R410a only.

4.4.15 Communication Protocol

Units controller will be communicate with RS485 communication protocol as it is inbuilt in the microprocessor.

4.5 Safety & Security systems

4.5.1 Fire detection system

4.5.1.1 MAIN FIRE ALARM CONTROL PANEL (FACP)

A. The main FACP Central Console shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with and control the following types of equipment used to make up the system: intelligent addressable smoke and thermal (heat) detectors, addressable modules, control circuits, and notification appliance circuits, local and remote operator terminals, printers, annunciators, and other system controlled devices.



B.formation is critical to fire evacuation personnel, and it contains large 640-character Liquid Crystal Display (LCD) presents vital information to operators concerning a fire situation, fire progression, and evacuation details. A host of other options are available, including single- or Multichannel voice; firefighter's telephone; LED, LCD, or PC based Graphic annunciators; fire or integration networking; advanced detection products for challenging environments, and many additional options.

4.5.1.2 PANEL COMPONENTS & FUNCTIONS

The control panel(s) shall be a multi-processor based networked system designed specifically for fire, one-way and two-way emergency audio communications, and smoke control, extinguishing agent releasing system if necessitated, with integration modules for BMS or any third party control/annunciation. The control panel shall be UL/FM listed The control panel shall include all required hardware, software and site specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any applications can be configured, and modified. The control panel(s) operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel.

The control panel shall include the following capacities:

- Support up to minimum 125 devices
- Support up to minimum 2500 analog/addressable points.
- Support network connections up to minimum 64 or other control panels and annunciator.
- Support multiple digital dialers and modems □ Support multiple communication ports and protocols
- Support up to a minimum of 1740 chronological events.

The network of control panels shall include the following features:

- Ability to download all network applications and firmware from the configuration computer from the configuration computer from a single location on the system.



- Provide electronic addressing of analog/addressable devices.
- Provide an operator interface control/display that shall annunciate command and control system functions.
- Provide an internal audible signal with different programmable patterns to distinguish between alarm, supervisory, trouble and monitor conditions.
- Provide a discreet system control switch provided for reset, alarm silence, panel silence, drill switch, previous message switch, next message switch and details switch.
- Provide system reports that provide detailed description of the status of system parameters for corrective action or for preventative maintenance programs.
- Reports shall be displayed by the operator interface or capable of being printed on a printer. Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords, holiday dates; restart the system and clear control panel event history file.
- Provide an authorized operator to perform test functions within the installed system.
- The control panel shall contain a standby power supply that automatically supplies electrical energy to the system upon primary power supply failure. The system shall include a charging circuit to automatically maintain the electrical charge of the battery.

Operator's Interface

The system shall be designed and equipped to receive, monitor, and annunciate signals from devices and circuits installed throughout the building. Standard LED annunciator may be combined in common enclosures provided that the groups of LED's comprising each of the required annunciator are separated from one another (Detection, Supervisory, Status, and Security) and clearly labeled. A minimum 640-character LCD display shall be part of the main control panel for easy alarm reading and understanding. Receipt of alarm, trouble, and supervisory signals shall activate integral audible devices at the control panel(s) and at each remote annunciation device. The integral audible devices shall produce a sound output upon activation of not less than 85 dBA at 10 feet.

The annunciator shall contain the following system status indicators:

LCD character Backlit Liquid Crystal Display

- System Normal Indicator



- System Common Alarm Indicator
- System Common Trouble Indicator
- System Common Supervisory Indicator
- System Ground Fault Indicator
- System Common Security Indicator
- System Disabled Point(s) Indicator
- System Reset Switch with Indicator
- System Alarm Silence Switch with Indicator ☐ System Trouble Silence Switch with Indicator ☐ System Message Queue Scroll Switches.

Digit Keypad to Enable/Disable System and Functions

Power Supply

System power supply(s) shall provide multiple powers limited 24 VDC output circuits as required by the panel. Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any system functions. Each system power supply shall be individually supervised. Power supply trouble signals shall identify the specific supply and the nature of the trouble condition.

All standby batteries shall be continuously monitored by the power supply. Low battery and disconnection of battery power supply conditions shall immediately annunciated as battery trouble and identify the specific power supply affected. All system power supplies shall be capable of recharging their associated batteries, from a fully discharged condition to a capacity sufficient to allow the system to perform consistent with the requirements of this section, in 48 hours maximum.

All AC power connections shall be to the building's designated emergency electrical power circuit and shall meet the requirements of NFPA 72 - The AC power circuit shall be installed in raceway. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside the each control panel the disconnect serves.

Power supply for all input & output devices to be driven from main Fire Alarm Panel. And as alternative, Hooters, Strobes or any other modules can drive power from additional source.

Reports

The system shall provide the operator with system reports that give detailed description of the status of system parameters for corrective action, or for



preventative maintenance programs. The system shall provide these reports via the main LCD, and shall be capable of being printed on any system printer.

The system shall provide a report that gives a sensitivity listing of all detectors that have less than 75% environmental compensation remaining. The system shall provide a report that provides a sensitivity (% Obscuration per foot) listing of any particular detector.

The system shall provide a report that gives a listing of the sensitivity of all of the detectors on any given panel in the system, or any given analog/addressable device loop within any given panel.

The system shall provide a report that gives a chronological listing of up to the last 1740 system events.

The system shall provide a listing of all of the firmware revision listings for all of the installed network components in the system.

Field Mounted System Components

Intelligent Smoke Detectors:

General

The smoke detector shall have inbuilt microprocessor and shall be capable of taking an independent alarm decision. Minimum to 125 intelligent smoke detectors should connect to one loop. Each intelligent addressable smoke detector's sensitivity shall be capable of being programmed electronically from Control Panel without any extra tools as most sensitive, more sensitive, normal, and less sensitive or least sensitive. In addition to the five sensitivity levels the detector shall provide a prealarm sensitivity setting, which shall be settable in 5% increments of the detector's alarm sensitivity value. The detector should continue to give TRUE alarms even if the loop controller on the main panel fails.

An alternate alarm sensitivity level shall be provided for each detector, which can be set to any of the five (5) sensitivity settings manually or automatically using a time of day event. In addition to the five alternate sensitivity levels the detector shall provide an alternate prealarm sensitivity setting, which shall be settable in 5% increments of the detector's alternate alarm sensitivity value. The detector shall be able to differentiate between a long drift above the prealarm threshold and fast rise above the threshold.

The detector's sensing element reference point shall automatically adjust, compensating for background environmental conditions such as dust, temperature, and pressure. Periodically, the sensing element real-time analog value shall be compared against its



reference value. The detector shall provide a maintenance alert signal that 75% to 99% compensation has been used. The detector shall provide a dirty fault signal that 100% or greater compensation has been used.

The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced. System shall display an off-normal condition until the proper detector type has been installed or change in the application program profile has been made.

Multi-sensor Photo Thermal Detector

The Multisensor or multitech smoke detector which will have both photoelectric as well as thermal detection elements shall have inbuilt microprocessor, and shall be capable of taking an independent alarm decision. The scattering of smoke particles shall activate the photo sensor. Each intelligent addressable smoke detector's sensitivity shall be capable of being programmed electronically from Control Panel without any extra tools as: most sensitive, more sensitive, normal, less sensitive or least sensitive. In addition to the five sensitivity levels the detector shall provide a prealarm sensitivity setting, which shall be settable in 5% increments of the detector's alarm sensitivity value. The detector should continue to give TRUE alarms even if the loop controller on the main panel fails. Alarm condition shall be based upon the combined input from the photoelectric and thermal detection elements. Each detector shall be capable of transmitting prealarm and alarm signals in addition to the normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient "environmental thresholds approximately six times an hour. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 75% and 100% of the allowable environmental compensation value.

Intelligent Thermal Detector:

The heat detector shall have a thermal sensing element /circuit. The detector shall have inbuilt microprocessor, not microcontroller and shall be capable of taking an independent alarm decision. Detectors shall be rated at 15°F (9°C) per minute rate-of-rise and 135°F (57°C) fixed temperature. The detector shall be capable of being addressed electronically from control panel without any extra tool.

Detector Bases

The bases shall be easy to install and mount and shall be of standard type or isolator base type or sounder base type. The sounder base shall be used where local or group alarm



signaling is required. The sounder base emits a audible alarm when there is fire. The base shall, contain no electronics and support all series detector types.

Manual Stations

The fire alarm station shall be of polycarbonate construction and incorporate an internal toggle switch. A locked test feature shall be provided. The station shall be finished in red with silver "PULL IN CASE OF FIRE" lettering.

Intelligent Modules

The personality of multifunction modules shall be programmable at site to suit conditions and may be changed at any time using a personality code downloaded from the Analog Loop Controller. The modules shall have a minimum of 2 diagnostic LEDs mounted behind a finished cover plate. A green LED shall flash to confirm communication with the loop controller. A red LED shall flash to display alarm status. The module shall be capable of storing up to 24 diagnostic codes, which can be retrieved for troubleshooting assistance.

Input and output circuit wiring shall be supervised for open and ground faults.

Control Relay Module:

The Control Relay Module shall provide one form "C" dry relay contact rated at 2 amps @ 24 Vdc to control external appliances or equipment shutdown. The control relay shall be rated for pilot duty and releasing systems. The position of the relay contact shall be confirmed by the system firmware.

Isolator Module:

Provide intelligent fault isolators modules. The Isolator Module shall be capable of isolating and removing a fault from a class A data circuit while allowing the remaining data loop to continue operating.

Monitor Module:

The Monitor Module shall be factory set to support one (1) supervised Class B NormallyOpen Active Non-Latching Monitor circuit.

The input module shall support the following circuit types:

- Normally-Open Alarm Latching (Manual Stations, Heat Detectors, etc.)
- Normally-Open Alarm Delayed Latching (Waterflow Switches)
- Normally-Open Active Non-Latching (Monitor, Fans, Dampers, Doors, etc.) ☐

Normally-Open Active Latching (Supervisory, Tamper Switches)



Sequence of Operations General - Audio

Upon alarm activation of any area smoke detector, heat detector, manual pull station, sprinkler water flow, the following functions shall automatically occur:

The internal audible device shall sound at the control panel or command center.

Display the alarm event on the graphical workstation. The LCD Display shall indicate all applicable information associated with the alarm condition including: zone, device type, device location and time/date. All system activity/events shall be documented on the system printer. Any remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.

The following audio messages and actions shall occur simultaneously:

An evacuation message shall be sounded on fire floors (zones) immediately above and below (adjacent to) the fire floor (zone), on the floor in fire condition. It is the intent of this message to advise occupants hearing this message that they are near danger and should leave the building via the stairs (nearest exit) immediately.

Activate visual strobes on the fire floors (zones) immediately above and below (adjacent to) the fire floor (zone). The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed. An alert message shall be sounded on the remainder of building. It is the intent of this message to advise occupants to prepare for evacuation if necessary. An instructional message shall be sounded in the stairwells instructing occupants to move carefully and quickly down the stairs to exit the building and to exit to a safe floor if you encounter smoke in the stairwell.

An instructional message shall be sounded in the elevator cabs. It is the intent of this message to advise elevator occupants that an emergency exists, the elevator has been directed to the ground floor, and that occupants should quickly exit the building. An instructional message shall be sounded in the lobby. It is the intent of this message to advise lobby occupants to leave the lobby and clear the area for arriving firefighters. An instructional message shall be sounded in the concourses connected to the building's lobby. It is the intent of this message to prevent new entries into the lobby by advising occupants not to attempt to enter the lobby of the affected building.

Provide selective paging to each individual floor (zone). In addition to the message/channels detailed above, a dedicated page channel shall be capable of simultaneously providing live voice instructions without interrupting any of the messages listed above shall be provided.



Transmit signal to the building automation system.

Transmit signal to the central station with point identification.

Activate automatic smoke control sequences.

All automatic events programmed to the alarm point shall be executed and the associated outputs activated.

All stairwell/exit doors shall unlock throughout the building.

All self-closing fire/smoke doors held open shall be released.

4.5.2 Fire suppression system

General

The bidder shall supply, install, test and put in operation NOVEC 1230 (Fluro Ketone – FK- 5-1-12) based fire suppression system. The fire suppression system shall include and not be limited to gas release control panel, PESO approved seamless cylinders, discharge valve (with solenoid or pneumatic actuator) as the case may be, discharge pipe, check valve and all other accessories required to make a complete operation system meeting applicable requirements of NFPA 2001 standards and installed in compliance with all applicable requirements of the local codes and standards.

The system design should be based on the specifications contained herein, NFPA 2001 and in accordance with the requirements specified in the design manual of the agent. The bidder shall confirm compliance to the above along with their bid.

The system shall be properly filled and supplied by an approved OEM (Original Equipment Manufacturer)

Generally the key components are valves and its accessories, actuators, flexible discharge and connection hoses, check valves, pressure switch, and nozzles of the system shall be FM/UL listed.

The NOVEC 1230 gas shall comply with NFPA 2001 standard

- i. Have the approval from US EPA (Environmental Protection Agency) for use as a total flooding fire extinguishing for the protection of occupied space:
- ii. Be given Underwriters' Laboratories Inc. (UL, USA) component listing for the NOVEC 1230 gaseous agent.
- iii. Must have zero ozone depletion potential (ODP)
- iv. Have a minimal life span in atmosphere, with atmospheric life time of less than 5 days
- v. be efficient, effective and does not require excessive space and high pressure for storage;



vi. commercially available

The gas release panel to be available for cross-zoning for detectors and be capable for integration to FAS via relay.

Design Condition

The NOVEC 1230 agent is stored in seamless steel cylinders and dry nitrogen is added to provide additional energy to give the required rapid discharge. At the normal operating pressure of 25 bar at 21°C, the agent is a liquid in the container.

- The designer shall consider simultaneous total flooding of all voids within the protected volume. The system shall be designed in accordance with the OEM's Design Manual.
- In order to extinguish a fire using clean agent, the concentration of agent delivered to each void shall be above the minimum design concentration. The following shall be considered while designing the system.
 - The minimum design concentration shall be 4.7% (NFPA Class C).
 - If the protected volume has a floor and / or ceiling void the spaces shall be included in the protected volume, employing a minimum design concentration not below that of the main room compartment.
- The discharge nozzles shall be located within the protected volume in compliance to limitations and with regard to spacing, floor and ceiling coverage, etc. The nozzles shall be positioned such that they would cover the entire area up to the extreme corners of the area under protection and the design concentration will be established in all parts of the protected volumes.
- The final numbers of discharge nozzles shall be according to the OEM's product manual.
- The average pressure at each nozzle shall not be less than 6.034 Bar.
- The gas flow calculations shall be carried out on special software given by the OEM. The software should support usage of seamless cylinders which have a different design compared to the standard containers used worldwide. The system acceptance report shall show the resulting concentration in each independent void to be above 4.7% and the average pressure at each nozzle to be not less than 6.034



Bar

- The agent discharge time shall not exceed 10 seconds and not less than 5 seconds.
- - The design concentration shall follow at minimum NFPA 2001 for under floor, room and ceiling space. Unless otherwise approved, room temperature for air-conditioned space shall be taken around 20°C. For non-air conditioned space, the temperature shall be taken around ambient temperature. The system shall be designed with minimum design concentration of 4.7 % as applicable to Class C fire.

The system engineering company should carry out the piping Isometric design and validate the same with a hydraulic flow calculation generated by using the agent's design software.

Appropriate fill density to be arrived at based on the same.

The system shall be so designed that a fire condition in any one protected area shall actuate automatically the total flooding of clean agent in that area independently. The entire system shall incorporate inter-alia detection, audible and visual alarms, actuation and extinguishing.

SYSTEM DESIGN

Cylinders

Each cylinder shall be seamless steel type manufactured from billets and tested in accordance with IS 7285 / BS 5045 standard and approved by PESO.

The cylinder/valve assembly shall have suitable metallic protection for the valve enabling transportation of the filled cylinders safely.

The cylinders shall be super-pressurized with dry Nitrogen to 25 bar. The cylinder shall be capable of withstanding any temperature between -30° C and 70° C.

All cylinders shall be distinctly and permanently marked with the quantity of agent contained, the empty cylinder weight, the pressurization pressure and the zones they are protecting.

Cylinder Valve

The Valve assembly shall be mounted directly on the cylinder and should NOT have any adaptor provision between the cylinder and Valve as per requirements of PESO. Cylinders with Adaptor between Valve assemblies shall be rejected as it is a violation of the PESO norms.

Each cylinder valve shall have a provision for fixing a supervisory pressure switch and a safety burst disc to protect the cylinder from over pressure. The cylinder valve shall have



a disabling plug to prevent accidental discharge of the valve during transportation and installation.

Each valve is to be fitted with a pressure gauge for monitoring loss of pressure.

The master cylinder valve is to be released electrically which is performed by means of a solenoid valve arrangement. Pilot cylinder actuation and pyrotechnic devices shall not be used.

Cylinder valve Actuators

In a single cylinder system the cylinder shall have a solenoid operated actuator and a manual actuator incorporating a strike knob mounted on top of the solenoid operated actuator. Multi cylinder systems shall have the same fitted on to the master cylinder and pressure operated actuators fitted on each slave cylinder. All actuators shall be original OEM make and locally manufactured actuators shall not be used.

Hoses

Each cylinder valve shall be provided with a plug in type flexible rubber discharge hose of minimum 40mm size with a test pressure of 52 Bar. Each hose shall be permanently marked with the test pressure and OEM's part number. Multi cylinder systems shall have an interconnect hose for each cylinder. All hoses shall be original OEM make and locally manufactured hoses shall not be used.

Manifold with Check valve

The manifold shall be fabricated from ASTM A106 Schedule 80 seamless pipe and shall have integral check valves provided for each cylinder. The Manifold shall preferably be supplied by the original equipment manufacturer instead of fabricating the same at site.

RE-FILLING AND MAINTENANCE

In case of any leakage or accidental discharge of the agent, it should be possible to re-fill the cylinders from a valid PESO approved OEM filling station in India itself. The contractor should indicate the source of re-filling and the time that will be taken for re-filling and replacement.

PIPING AND FITTINGS

All piping shall be ASTM A-106, Grade-B, Schedule 40 seamless pipes and all fitting shall be of ASTM A-105.

4.5.3 Aspiration system

System Description



Design Requirements

1. Shall consist of a highly sensitive LASER-based smoke detector, aspirator, and filter.
2. It shall have a display featuring LEDs and a Reset/Isolate button. The system shall be configured by a Programmer that is either portable or PC based.

The system shall allow programming of:

- up to three smoke threshold alarm levels
 - time delays;
 - faults in airflow, detector, power and filter as well as an indication of the urgency of the fault;
 - Three relay outputs for remote indication of alarm and fault.
3. It shall consist of an air sampling pipe network to transport air to the detection system, supported by calculations from a computer-based design modeling tool.
 4. Optional equipment may include intelligent remote displays and/or a high level interface with the building fire alarm system, or a dedicated VESDA System Management.
 5. Performance Requirements
 - Shall be tested and approved to cover up to 250 sq. m. or 500 sq. m. as per site requirement
 - Shall be approved to provide very early smoke detection and provide up to three output levels corresponding to Alert (optional), Pre-Alarm and Fire. These levels shall be programmable and able to be set at sensitivities ranging from 0.005 – 20% obs/m.
 - Shall report any fault on the unit using the fault relay or via VSM.
 - Shall be self-monitoring for filter contamination.
 - Shall incorporate a flow sensor in the pipe inlet port and provide staged airflow faults.

Detector Assembly

1. The Detector, Filter, Aspirator and Relay Outputs shall be housed in an enclosure and shall be arranged in such a way that air is drawn from the fire risk and a sample passed



through the Dual Stage Filter and Detector by the Aspirator.

2. The Detector shall be LASER-based type and shall have an obscuration sensitivity range of 0.005 – 20% obs/m.
3. The Detector shall have up to three independent field programmable smoke alarm thresholds across its sensitivity range with adjustable time delays for each threshold between 0-60 seconds.
4. The Detector shall also incorporate the facility to transmit a fault either via VESDAnet or relay.
5. The detector shall have a single pipe inlet which must contain a flow sensor. Both Minor and Urgent flow faults for both high and low shall be reported.
6. The filter must be a two-stage disposable filter cartridge. The first stage shall be capable of filtering particles in excess of 20 microns from the air sample. The second stage shall be ultra- fine, removing more than 99% of contaminant particles of 0.3microns or larger, to provide a clean air barrier around the detector's optics to prevent contamination and increase service life.
7. The aspirator shall be a purpose-designed rotary vane air pump. It shall be capable of supporting a single pipe run of 50m, or two or three pipe runs, with a transport time of less than 60 seconds or as appropriate codes dictate.
8. The Assembly must contain relays for alarm and fault conditions. The relays shall be software programmable (latching or non-latching). The relays must be rated at 2 AMP at 30 VDC. Remote relays shall be offered as an option and either configured to replicate those on the detector or programmed differently.
9. The assembly shall have built-in event and smoke logging. It shall store smoke levels, alarm conditions, operator actions and faults. The date and time of each even shall be recorded.
10. Each detector (zone) shall be capable of storing up to 12,000 events.

Displays

1. The detector will be provided with LED indicators only.
2. Each Detector shall provide the following features at a minimum:



- Independent high intensity alarm indicators for Pre-Alarm and Fire (Alert indicated by the Pre-Alarm LED flashing) corresponding to the alarm thresholds of the detector.
- Fault indicator.
- OK indicator.
- Isolate indicator.

A single button supporting the following features:

- a) Reset – (a single push of the button) unlatches all latched alarm conditions on the assigned VLC zone.
 - b) Isolate – (push and hold) Isolates the individual VLC zone (inhibits Alarm and Fault relays and initiates the Fault relay).
- A remotely mounted Display may be optionally equipped with 7 configurable relays for signaling alarm and fault conditions.
 - The remote Display shall be able to identify Faults originating in the particular VLC zone (Zone Fault), those produced by the overall smoke detection system or from those resulting from network wiring errors (Network Fault). LED indicators shall be provided for each fault category.

Programmers

When required, a Programmer module may be in a remote mounting box, a 19 inch remote Rack, or in a portable hand-held unit (VN version).

- Alternatively, programming may be performed using a Windows® application running on a PC; connected through a PC-Link HLI for VN.
- Connected across RS232 with VESDA link for RO.

Each Programmer shall support the following features at a minimum:

- Programming of any device on the VESDAnet system.
- Viewing of the status of any device in the system.
- Adjustment of the alarm thresholds of a nominated detector.
- Initiation of Auto Learn™, to automatically configure the detector's alarm



threshold settings to suit the current environment.

- Multi-level password control.
- Programmable latching or non-latching relay operation.
- Programmable high and low flow settings for airflow supervision.
- Programmable maintenance intervals.
- Facilities for referencing with time dilution compensation. (VN only) □ Testing of relays assigned to a specific zone to aid commissioning.

Device Networking Requirements

1. The devices in the smoke detection system shall be capable of communicating with each other via twisted pair RS485 cable. The network shall be able to support up to 250 devices (detectors, displays and programmers), of which at least 100 detectors can be supported.
2. The unit shall be capable of being configured in a fault tolerant loop for both short circuit and open circuit.
3. PC based configuration tools shall be available to configure and manage the network of detectors.

Digital Communication Port: Shall comply with EIA RS485 Protocol.

Application

1. Detection Alarm Levels
The laser based aspirating detection system shall have up to three (3) independently programmable alarm thresholds. The three alarm levels may be used as follows:
 - Alarm Level 1 (Alert): Activate a visual and audible alarm in the fire risk area.
 - Alarm Level 2 (Pre-Alarm): Activate the electrical/electronic equipment shutdown relay and activate visual and audible alarms in the Security Office or other appropriate location.
 - Alarm Level 3 (Fire): Activate an alarm condition in the Fire Alarm Control Panel to call the Fire Brigade and activate all warning systems.

NOTE: The alarm level functions as listed are possible scenarios. Consideration



- should be given to the best utilization of these facilities for each application and the requirements of local authorities.
2. Initial Detection Alarm Settings
- Initial settings for the alarm levels shall be determined by the requirements of the fire zone.
- Default settings of the unit shall be:
- Alarm Level 1 (Alert) not configured (0.08% Obs/m if configured)
 - Alarm Level 2 (Pre-Alarm) 0.14% Obs/m
 - Alarm Level 3 (Fire) 0.2% Obs/m
3. Alarm Delay Thresholds
- Alarm delay threshold shall be programmable for the following:
- Alarm Level 1 (Alert)
 - Alarm Level 2 (Pre-Alarm)
 - Alarm Level 3 (Fire)
4. Fault Alarms
- The Detector Fault relay shall be connected to the appropriate alarm zone on the Fire Alarm Control Panel in such a way that a Detector Fault would register a fault condition on the FACP. The fault relay shall also be connected to the appropriate control system. (Check local Codes, Standards or Regulations to determine whether compliance with this set-up is required).
5. Power Supply and Batteries
- The system shall be powered from a regulated supply of nominally 24V DC. The battery charger and battery shall comply with the relevant Codes, Standards or Regulations. Typically 24 hours standby battery backup is required followed by 30 minutes in an alarm condition.

Local Power Supply Standards that may apply:
ASNZ 1603 Part 4 –1987

UL 1481 listed (provided the power supply and standby batteries have been appropriately sized/rated to accommodate the system's power requirements). US Telecommunication Central Office Power Supply: The system shall operate on negative 48 VDC (provided continuously from the telephone central office power source) converted to 24VDC.

Sampling Pipe Design Sampling Pipe

- The sampling pipe shall be smooth bore with an internal diameter between 15-25mm.



normally, pipe with an outside diameter of 25mm and internal diameter of 21mm should be used.

- The pipe material should be suitable for the environment in which it is installed, or should be the material as required by the specifying body.
- All joints in the sampling pipe must be air tight and made by using solvent cement, except at entry to the detector.
- The pipe shall be identified as Aspirating Smoke Detector Pipe (or similar wording) along its entire length at regular intervals not exceeding the manufacturer's recommendation or that of local codes and standards.
- All pipes should be supported at not less than 1.5m centers, or that of the local codes or standards.
- The far end of each trunk or branch pipe shall be fitted with an end cap and drilled with a hole appropriately sized to achieve the performance as specified and as calculated by the system design.

Sampling Holes

Sampling holes of 2mm, or otherwise appropriately sized holes (see Section 3.05), shall not be separated by more than the maximum distance allowable for conventional point detectors as specified in the local code or standard. Intervals may vary according to calculations. For AS1670 the maximum allowable distance is 10m. For BFPSA the maximum allowable distance is 10m For NFPA the maximum allowable distance is 30 ft.

Each sampling point shall be identified in accordance with Codes or Standards.

Consideration shall be given to the manufacturer's recommendations and standards in relation to the number of Sampling Points and the distance of the Sampling Points from the ceiling or roof structure and forced ventilation systems.

5.4. Access control system

Biometric Finger Scan Reader

FEATURES	MINIMUM REQUIRED PARAMETERS
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भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Limited
 (A Government of India Undertaking)
 ELECTRONICS DIVISION
 P.B. No. 2606, Mysore Road, Bangalore - 560 026

Gram : BHARATELEC
 Fax : 080-26740137
 PHONE : 26998.....
 (EPABX. NO.)

Tender Ref: BHEL/EDN/ITS/AC/2017/DC/BUILD

Transmission Frequency	13.56 MHz
Technology	iClass
Security	64 bit authentication keys. The data flow between card & Reader should be encrypted
Graphical Display	LCD display
Function	Should be configured as a Reader – Enroller, Enroller Only & Reader Only (All three are mandatory)
Enrollment of fingerprint templates iClass Smart Cards	Yes
Read Range	Minimum 3.5”
Operating Voltage	10 – 12V DC
Operation	Indoor use
Housing	Polycarbonate
Fingerprint Sensor	Optical
Sensor Resolution	500 dpi
Timing	Fingerprint Capture: Less than 2 Sec
	Verification of captured finger: Less than 1 Sec
False Acceptance Rate	Less than 0.01%
False Rejection Rate	Less than 0.01%
Fingerprint Enrollment Software	Yes
Technology Compliance	iClass 15693 & 14443B
Certifications	UL / CE
Operating Temperature	0 deg C to 50deg C
Operating Humidity	10% to 90% relative humidity (Non-Condensing)

Smart Card Reader

FEATURES	MINIMUM REQUIRED PARAMETERS
Transmission Frequency	13.56 MHz
Technology	iClass
Security	64 bit authentication keys. The data flow between card & Reader should be encrypted
Audio Visual Indication	Yes
Card Compatibility	iClass 15693 & 14443B



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 (EPABX. NO.)

Tender Ref: BHEL/EDN/ITS/AC/2017/DC/BUILD

Operating Voltage	10 – 12V DC
Operation	Indoor use
Cable Distance	150 meters (Wiegand)
Read Range	Minimum 3”
Certifications	UL
Operating Temperature	0 deg C to 45 deg C
Operating Humidity	10% to 90% relative humidity (Non-Condensing)

Access Controller

FEATURES	MINIMUM REQUIRED PARAMETERS
Reader Inputs	Two
Universal Inputs	Two
Tamper Input	One
Digital Lock Inputs	Two
Processor	50 MHz with 128 MB RAM and 32 MB Flash
Processor For Reader Inputs	Yes (Dedicated Processor for each Reader)
Communication	10/100 Ethernet Port
Memory	Minimum 96000 personnel Records
Area Lockdown Support	Yes
Real Time Clock	Yes
Encryption	64 bit
Visual Indicator	Yes
Mounting	Wall / Ceiling Mount
Battery Backup	5 hours
Technology Compatibility	Wiegand
Card Reader Power	5V DC & 12V DC (Jumper Selectable)
Wiring Distance	150 meters (Wiegand)
Indicator LED	Yes
Push Button Switches	Yes (For clearing the memory & Resetting the IP Address)
Offline Mode Operation	Yes (In the event of Network failure)
Enclosure	Yes
Certifications	UL / CE
Operating Temperature	0 deg C to 45 deg C



Operating Humidity	10% to 80% relative humidity (Non-Condensing)
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Access Control Software: The Access Control Software should have the following Specifications:

1. Compatibility with any Windows Operating System
2. Compatibility with MYSQL / SQL / ORACLE
3. Support for TCP/IP Communication
4. Provision for Alarm Monitoring for Battery, Mains Supply, Door Opened too Long, Door Forced Opened, Unauthorized Swipe & Controller Tampering
5. Support for unlimited number of Card Database & Transactions
6. Specify Card Activation & Expiry Date
7. Support for Biometric, Pin & Smart Card Applications
8. Management of Dual Access Levels to a single Card
9. Remote Locking & Unlocking of Doors
10. Remote management of Controllers
11. Customization of Door User time for every card holder
12. One Client License
13. Two Stages of Alarm Management (Acknowledgement on Receipt & Closure on Investigation)
14. Management of Minimum 100 Readers
15. Access Privileges on the basis of Time & Date
16. Creation of holiday schedules to cover maintenance & Vacations / Holidays
17. Setting of Time / Date from Client workstation
18. Permission to activate any control output for a specific event such as alarm
19. Programmable Shunt time to control the door opening time
20. Area Control by using Hard Anti Pass back, Soft Anti Pass back, Timed Anti Pass back, Occupancy Limit, Multi man principle, Area Lock down, Threat level conditioning=
21. Alarm Management
22. Automatic User Log off
23. Cardholder Management & Enrollment
24. Creation & Maintenance of User Database
25. Assignment of Access Privileges



Time Attendance Software: The Time – Attendance Software should have the following Specifications

1. Compatibility with Windows Operating System
2. Function in a multi user working environment
3. Provide intranet viewing facility for time-attendance
4. Support web-based reporting
5. Support IE-6 or Netscape Navigator
6. Configure readers for IN swipe & OUT swipe
7. Capable of managing sites, branches, departments, Grades, Employee types & Batch numbers
8. Record the working hours on the basis of calculating the difference between first & last swipe
9. Capable of calculating overtime working hours
10. Software shall have provision to generate various types of Reports: User Activity Log, Alarm History Log, Muster Reports, Door Status Report, Alarm Point Status Report, Controller Status Report, Workstation Status Report, Event History Log, Invalid Attempt Log, Valid Access Log etc.
11. Operate for financial year as well as calendar year, as per the requirement of the user
12. Facilitate leave types like Casual, Sick, Earned, maternity, Compensatory, Special leave & without pay leave
13. Provide facility for online leave authorization.
14. Configure shifts for each employee with overnight shift Management
15. Privileges to the top management like attendance marked for single swipe etc

5.5. CCTV system

The IP based Closed Camera surveillance system shall use state of the art technology and shall comply with the UL standards. The IP based systems shall either use integrated or encoders for their camera systems and shall be from the same manufacturer as that of the IP Digital Video management system provider.

All the cameras proposed shall be power over Ethernet with option for 24 Vac input.

The system shall support open architecture and shall not have any proprietary equipments to ensure future compatibility with third party systems. The scope shall include supply, installation, testing, commissioning and maintenance of the IP based CCTV system proposed.



Scope shall include supply , installation , testing and commissioning of cameras, network video recorders / servers, Video Management Software, workstations, monitors, racks, cables etc. The specifications for these components shall be as mentioned below.

The location of the Cameras shall be such that no blind spot is observed in the Server Room Area and covering entrance of all other rooms.

Indoor High Definition Day/Night Camera

1. 1/3" Progressive High Definition CMOS Sensor
2. Wide dynamic range
3. Minimum Illumination: Color 0.1 lux and B/W 0.03 lux
4. 3mm-9mm Varifocal, Auto Iris lens
5. Adjustable Horizontal coverage between 40° to 110°
6. Automatic Gain Control, White balance: On/Off
7. 3D Noise reduction: ON/Off
8. Tamper Detection: On/Off
9. Compression: Dual stream, H.264
10. Resolution: 800 x 600 @ 25FPS on stream 1 and stream 2 respectively at the same time
11. Bandwidth: 64Kbps to 8Mbps
12. Built-in Multi-zone motion detection
13. Unicast, Multicast, RTP, TCP, UDP, HTTP, IGMP, ICMP, DHCP, DNS, POE
14. 10/100 Base-T Auto sensing, Half/Full Duplex (RJ45)
15. S/N Ratio: >50db
16. Power: 802.3af class 3 PoE and 12VDC/24VAC auto sensing
17. Vandal resistant clear bubble surface mount enclosure
18. Operating Temp: 0° C to 50° C
19. Humidity: 90% (Non-condensing)
20. UL, CE and FCC certified
21. ONVIF S Compliance

Network Video Recorder / Server

1. The Network video recorder / Server shall support a minimum of 16 cameras and shall be possible to expand for 64 video inputs in NVR system / Server.
2. The total NVR/Server shall have an internal hard disc capacity of upto 30 days of video storage (whichever is maximum) at 4CIF resolution, 25 frames per second for the installed cameras with provision for 25% additional cameras in RAID configuration. When the number of cameras increases further, the storage should be upgradeable in modular fashion.
3. The NVR / Server shall support central archive storage of a SAN or NAS storage solution in case of extended for backup facility.



4. The NVR / Server shall be able to record individual camera with selectable frame rate
5. The NVR / Server shall support remote administration, monitoring and management of video, audio and data.
6. The NVR/ Server shall support health and event monitoring of the system.
7. The NVR / Server shall support logical camera grouping.
8. The NVR / Server shall have the bare minimum specs as mentioned below – vendors to select the server as per their system requirement but shall have these bare minimum specs standard.
9. The NVR / Server should at least support H.264, MPEG 4 & MJPEG formats
10. The network video recorder / Server shall be able to record videos in CIF(352 x 288) ,VGA (640 x 480) 4CIF/D1 CIF resolutions (720 x 576), HD 720 (1280 X 720) & HD 1080 (1920 X 1080).
11. Necessary operating system and the system software licenses required shall be included.

Digital Video Management System (DVMS) software features

- The software shall manage and support video from IP cameras and encoders through the Ethernet.
- Remote administration, monitoring and management of video and audio, the software shall be in a position.
- The DVMS software shall be able to display a minimum of 16 videos on the screen.
It shall be possible to get the following information.
 - Host name
 - IP address
 - Software version
 - Model number
 - Number of system cameras
 - Camera names
 - Camera status (recording, no signal, scene loss)
 - Number of days of video storage on disk
 - Licensed product name
 - Camera list change
 - Service changes
 - System restart Hard drive event
 - System shutdown
 - Alarm events



- Video deleted sooner than expected
- The DVMS software shall allow users to monitor and manage any IP devices through a single digital video surveillance application.
- The DMS shall support open architecture platform expands the capabilities of legacy devices and maximizes investments in current and future security technology.
- The DVMS shall support third-party applications, video analytics and data transaction information.

5.6. Rodent repellent system

GENERAL OBJECTIVE:

The objective is to protect the entire premises viz., all the voids against rodents. The purpose is to keep the rodents away from the floor by generating very high frequency sound waves (above 20 KHz) which are not audible to human ear but irritates rodents. The objective is to protect all the cables below floor, above ceiling & room void from damage caused by rodents.

SCOPE:

The system proposed is to protect all the equipment's, areas with relevant type of high frequency sound producing device called satellites or transducers. Once powered up these transducers produce very high frequency variable sound waves (above 20 KHz) continuously which irritate the rodents and are forced to evacuate the place. The system shall cover minimum of 2500 sq.ft. area per controller & shall be able to connect minimum 12 transducers per controller. The transducers shall cover minimum 250 sq.ft. of area. The devices can be tested periodically by means of a test switch provided on the Main console.

APPLICABLE STANDARD:

The OEM shall have an IDEMI certification for its products.

SYSTEM COMPONENTS:

SATELLITES:

The satellites or Transducers shall be circular ceiling mounted low profile units that produce high decibel sound waves at very high frequency not less than 20 KHz. These satellites shall cover an area not less than 300 Sq.ft. for Room void application, and 150 Sq.ft. for ceiling Voids & floor void applications. No looping is permitted while connecting the satellites to the main controller. Every satellite connected to the controller shall have a dedicated connection with the controller.



CONTROLLER:

The controller shall support 12 Transducers and shall come with a pair of stands and brackets. The controller is installed in the control / BMS room and the transducers in the problematic areas i.e. above and below false ceiling and below false flooring. Controller Features:

- 2500 Sq. Feet of Area Coverage per system / Controller.
- Shall drive up to 12 Transducers. With minimum @ 250sft coverage each.
- LCD display with on-board controls for changing parameters.

5.7. Water leakage detection system

General

- The Tenderer shall be responsible to supply, deliver, install, test, commission and maintain of a proven technology and industry standard solution for a water detection system in the Data Center.
- The complete system shall include electronic alarm panel, sensing cable, 4x20 alphanumeric display, and auxiliary equipment, as indicated on the design drawings. The system shall simultaneously detect the presence of water at any point along the cable's length and switch the module's leak alarm relays.
- The sensing cable shall be of such construction by using Non-conductive polymers in the leak detection cable's construction. The Sensing Cable shall be an abrasion resistant polymer cores to increases the strength of the cable. Pressure on the sensing cable shall not create a false alarm.
- The Digital Sensor Cable shall be provided with pre-connectorised sensing cable components.

Alarm Panel

The alarm panel shall be capable of monitoring up to (30 meters) of sensing cable.

- The alarm Panel shall have LEDs indicating "power" (green), "alarm" (red), and "continuity" (yellow). The system shall sound an audible alarm upon sensing a leak.



The unit can then continue to monitor and will re-alarm if there are any major changes. Once the alarm condition has been cleared, the panel is reset with a single keystroke. The Panel shall have 4x20 alpha numeric display with adjustable contrast.

- Basic Features of the alarm panel o In addition to detecting leaks, the system shall warn of fault conditions and indicates when service is required.
 - o An event history log allows leaks (and other events) to be tracked.
 - o Both the events history log and any user settings are held in non -volatile memory. Event log shall stores 50 date and time stamped alarm.
- The alarm module will be powered by 230 VAC. The panel shall have a pair of contacts open on an alarm, and a pair of contacts close on an alarm. These contacts shall be used to actuate other alarms and shall be capable of switching 10 amps at 250 VAC.
- In additions, the panel shall be provided with RS-485 series port for connection to BMS & shall have slave Modbus RTU protocol.
- The module enclosure shall be NEMA 1, constructed of 18- gauge steel with gray colour Powder Coated. The enclosure shall be capable of either semi flush of surface mounting.

Sensing Cable

The water sensing cable shall detect the presence of water and other conductive fluids. The sensing technology shall be very low current AC signal and not DC signal to avoid corrosion when subject to wetness for long period.

Accessories

A Complete system accessories (leader cable, end terminations, etc.) shall be provided by the system manufacturer.

5.8. Building management system

SYSTEM DESCRIPTION & INPUT OUTPUT SUMMARY:

- o The system will consist of a flat, open architecture that utilizes high-speed



communication protocol between all controlled and controlling devices.

- Microprocessor based Direct Digital Distributed Controllers (DDC) shall interface with sensors, actuators and environmental control systems (i.e. HVAC units, chillers, pumps, electrical & plumbing system etc.) and carry out followings functions:
 - i. Individual input/output point scanning, processing and control.
 - ii. Centralized operation of the plant (remote control). iii. Dynamic graphic details of plant and building.
 - iii. Energy Management through optimization of all connected electrical and mechanical devices.
 - iv. Alarm Detection and early recognition of faults.
 - v. Time, event and holiday scheduling as well as temporary scheduling.
 - vi. Prevention of unauthorized or unwanted access.
 - vii. Communication interfaces and control.
- The control system shall be designed such that mechanical equipment will be able to operate under stand-alone control. In general, the operation of any controllers on the network shall not rely on any other controller for its functional operation. System controllers that require a master computer will not be considered. Function specific modules may be used to supplement the functionality resident in each controller. As such, in the event of a network communication failure or the loss of any other controller on the communication network, the control system shall continue to independently operate under local control of the resident program stored in nonvolatile memory as detailed herein. In such a case, each individual controller shall continue to perform basic functions until a network connection can be restored.
- The number of controllers for central plant room equipment's shall be decided by the contractor with a maximum capacity limited to 24 points per controller. Overall, the system shall be provided with 15% spare capacity, with spare of at least 15% points on each controller.
- There shall be one control station located in NOC Room managing both datacenter at one location. The computer shall be sized to cover the graphic display memory and planning information. The display shall be in the form of dynamic color graphics and



text format with menu driven pop-up windows and help facility.

Reference Standards

Control system components shall be new and in conformance with the following applicable standards for products specified:

- ANSI/EIA 709.1 (LonTalk Protocol) ○ Lon Mark Certified (Version 3.1 Guidelines) ○ BacNet/IP ○ Modbus
- UL 916 (Energy Management Equipment)
- OPC

Products

Utilize standard components for all assemblies. Custom hardware, operating system, and utility software are not acceptable.

- All products (PCU's, TDCU's and ID's) shall contain LonWorks/BacNet/Modbus networking elements to allow ease of integration of devices from multiple vendors.
- All materials, equipment and software shall be standard components, regularly manufactured for this and other systems and custom designed for this project. All systems and components shall be thoroughly tested.

CENTRAL STATIONS HARDWARE

The Control stations shall comprise of Personal computers (PC) providing high-level operator interface with the system. The terminals shall be capable of providing the operator with the facility for remote system interrogation, control, and retrieval / storage of logged data, annunciation of alarms and reports, analysis of recorded data and the formatting of management reports.

- The control station shall consist of the following hardware with all of them suitable for the power supply voltage of 230 V AC $\pm$ 10%, 50 HZ + 3%. ○ PC with Core I7 Processor/2GB RAM/1TB Hard Disk ○ 21" LCD Display ○ Suitable printer for printing of Alarms
- Windows 7/8 operating system and other required software shall be included.

CENTRAL STATION SOFTWARE

A. Command & Operating Software

1. As a minimum, the menu driven command and operating software shall permit the



operator to perform the following tasks with a minimum knowledge of the HVAC Control System provided and basic computing skills.

- i. Configure the network.
 - ii. Create control sequences.
 - iii. Graphical interface to systems.
2. Provide additional third party software to permit the operator to manage hard drive files such as access, delete, copy, modify, etc. The package shall be object oriented and permit the user to manage directories upon boot-up. The file management software shall organize directories and sub-directories using files, file folder objects.
 3. On-Line Help. Provide a context sensitive, on-line help system to assist the operator in operation and editing of the system. On-line help shall be available for all applications and shall provide the relevant data for that particular screen. Additional help information shall be available through the use of hypertext.
 4. Security. Each operator shall be required to log on to that system with a user name and password in order to view, edit, add, or delete data. System security shall be selectable for each operator. The system supervisor shall have the ability to set passwords and security levels for all other operators. Each operator password shall be able to restrict the operator's access for viewing and/or changing each system application, full screen editor, and object.
Each operator shall automatically be logged off of the system if no keyboard or mouse activity is detected. This auto log-off time shall be set per operator password. All system security data shall be stored in an encrypted format.
 5. System Diagnostics. The system shall automatically monitor the operation of all HVAC control workstations, printers, modems, network connections, and nodes. The failure of these devices shall be annunciated to the operator.
 6. Reports and Logs. Provide a reporting package that allows the operator to select, modify, or create reports. Each report shall be definable as to data content, format,



interval, and date. Report data shall be archived on the hard disk for historical reporting. Provide the ability for the operator to obtain real time logs of designated lists of objects. Reports and logs shall be stored on the PC hard disk in a format that is readily accessible by other standard software applications including spreadsheets and word processing. Reports and logs shall be readily printed to the system printer. Data shall be able to transferable to other software packages so as to create custom reports.

7. Web Browser Access: The DDC system shall provide total integration of the facility infrastructure systems with user access to all system data, either locally over a secure Intranet within the building or by remote access by a standard Web Browser over the Internet.

B. Graphical Object-Oriented Programming Software

1. The system shall include a graphical object-oriented programming function which shall be used to create all control sequences utilized in programmable nodes (PN). The graphical object-oriented programming function shall provide programming elements to be connected together to create a logic diagram. The graphical objectoriented programming function shall include elements for mathematical, logical, timing, set point, display and input/output functions to create logic diagrams that represent sequences of operation for PNs.
2. Program elements shall be able to be combined into a custom template that can then be used as a standard function.
3. Program checkout and debug tools shall include display of real-time and/or simulated system variables and inter-object data on the programming screens. The user shall be able to assign fixed or variable values to inputs during the dynamic debugging of the control sequence.
4. The graphical programming tools shall provide the ability to print I/O lists, lists of standard network variables and lists of all parameters to be viewed by the HMI.



5. The programming software shall reside on each POT and OW server for programming and/or configuring each model of PN on the project. The applications shall be downloaded and executed at the appropriate nodes. The software shall allow for updated applications via the network from the OW.
6. DDC programs are to be provided to meet the control strategies as called for in the sequence of operation sections of these specifications. Each PN shall have available a full library of DDC algorithms, intrinsic control operators, arithmetic, trigonometric, logic, Proportional Control, Proportional plus Integral (PI), Proportional plus Integral plus Derivative (PID), and relational operators for implementation of control sequences. 2-POSITION, FLOATING, STANDARD I/O AND COUNTER INPUTS, TIME BASED DATA, CURVE FIT FUNCTION, PSYCHOMETRIC FUNCTIONS, INTEGRATION.
7. All DDC set points, gains, and time constants associated with DDC programs shall be available to the operator for display and modification via the POT, DDU or OW interface.

C. Library of Applications:

A library of control, application, and graphic objects shall be provided to enable the creation of applications and user interface screens. Provide the capability to cut & paste objects and libraries into applications for a node/system. Applications are to be created by selecting the desired control objects from the library, dragging or pasting them on the screen, and linking them together, using a built-in graphical connection tool. Completed applications may be stored in the library for future use. Graphical User Interface screens shall be created in the same fashion. Data for the user displays is obtained by graphically linking the user display objects to the application objects to provide “real-time” data updates. Any real-time data value or object property may be connected to display its current value on a user display. Systems requiring separate software tools or processes to create applications and user interface display shall not be acceptable.

- D. Provide integral trend-logging presentation in the programming screen.
- E. Print capability, with page break reference tags to allow down to 8 ½”x 11” size paper
- F. Off-line simulations (step function, continuous run function, simulation of



external inputs)

- G.** Dynamic presentation of logic in on-line state (all intermediate values)
 - H.** Text to logic screens
 - I.** Memory monitoring
 - J.** Run-time capability
 - K.** Calculator objects, (basic stuff), including if-then-else, log, ln, exp, and trig functions.
 - L.** Recognize standard network variable type data (nvi) and create network variables to put on the network (nvo).
 - M.** Programming Objects
1. Provide the capability to copy objects from the supplied libraries, or from a userdefined library to the user's application. Objects shall be linked by a graphical linking scheme by dragging a link from one object to another. Object links will support oneto-one, many-to-one, or one-to-many relationships. Linked objects shall maintain their connections to other objects, regardless of where they are positioned on the page and shall show link identification for links to objects on other pages for easy identification.
 2. Configuration of each object will be done through the object's property sheet using fill-in the blank fields, list boxes, and selection buttons. Use of custom programming, scripting language, or a manufacturer-specific procedural language for configuration will not be accepted.
 3. The software shall provide the ability to view the logic in a monitor mode. When online, the monitor mode shall provide the ability to view the logic in real time for easy diagnosis of the logic execution. When off-line (debug), the monitor mode shall allow the user to set values to inputs and monitor the logic for diagnosing execution before it is applied to the system (step function and run mode, integral trend logging).



4. The system shall support object duplication within the Owner's database. An application, once configured, can be copied and pasted for easy re-use and duplication. All links, other than to the hardware, shall be maintained during duplication.

N. Object Libraries

1. A standard library of object function blocks shall be included for development and setup of application logic, user interface displays, system services, and communication networks.
2. The function blocks in this library shall be capable of being copied and pasted into the user's database and shall be organized according to their function. In addition, the user shall have the capability to group objects created in their application and store the new instances of these objects in a user-defined library.
3. Start-Stop Time Optimization Object. Provide a start-stop time optimization object to provide the capability of starting equipment just early enough to bring space conditions to desired conditions by the scheduled occupancy time. Also, allow equipment to be stopped before the scheduled un-occupancy time just far enough ahead to take advantage of the building's "flywheel" effect for energy savings. Provide automatic tuning of all start / stop time object properties based on the previous day's performance.

O. Application Specific Node Configuration software Tools: Provide application specific node configuration software tools that will permit the individual network nodes to be configured and commissioned with appropriate parameters. This software will reside on the POT.

P. Network Management

Network Management Software for Windows network management software tool shall be used to assign domain, subnet, and node addresses to nodes; configure all routers and repeaters; define network data connections between LonWorks®/BACNet Device/Modbus Device network variables, known as "binding;" and record binding data into node addressing tables, and create a database of all addressing and binding information for all nodes on the network.



DIRECT DIGITAL CONTROLLER
DIRECT DIGITAL CONTROLLER (DDC) HARDWARE REQUIREMENT:

- 1) DDC controllers shall be capable of fully “stand- alone” operation i.e. in the event of loss of communication with other DDC’s or Control Station, they shall be able to function on their own. The controllers shall be LonWorks/BacNet/Modbus based products.
- 2) The controllers shall consist of minimum single 32-bit microprocessors for reliable throughput, based with EEPROM based operating system (O.S.).
- 3) The memory available to the controller board as working space for storage of the Operating system software and data files shall be decided on the basis of number of points being controlled by them.
- 4) The controllers shall be UL listed and conforming to CE (Euro norms).
- 5) Controllers requiring nickel-cadmium/lithium battery to support the full operation of the RAM, in addition to the above battery reserve a further battery shall be provided to retain the RAM for a minimum of 2 days, after the expiration of the standard battery

A low battery alarm shall be provided with each Controller and with an indication at the Control Station.
In case the memory is stored on EEPROM, the battery backup will not be required.
- 6) The Controllers shall have proportional control, Proportional plus Integral (PI) Control, Proportional plus Integral plus Derivative (PID) Control, Two Position Control and Time Proportioning Control and algorithms etc, all in its memory and all available for use by the user, i.e. all the control modes shall be software selectable at any time and in any combination. The analog output of Proportional Control, PI Control, and PID Control shall continuously be updated and output by the program shall be provided. Between cycles the analog output shall retain its last value. Enhanced integral action in lieu of Derivative function shall not be acceptable.
- 7) The controllers shall have a resident real time for providing time of day, day of



week, date, month and year. These shall be capable of being synchronized with other clocks in the network.

Back-up power shall support the clock. Upon power restoration all clocks shall be automatically synchronized.

- 8) The microprocessor based DDC's shall be provided with power supply, A/D and D/A converters, memory, and capacity to accommodate a maximum of 18 input/output (I/O) hardware points (with or without an expansion board). DDC's with a lower capacity of points shall preferably be provided at the locations with relatively less input/output points.
- 9) If the controllers provided by the contractor have the configurable plug in function cards, then the following minimum specifications shall have to be met:
 - i) In addition to the basic outstation, a minimum of two slots shall be provided for the insertion of plug-in function cards.
 - ii) The cards shall provide for analog or digital, input or output, hardwired connections to the installed plant.
 - iii) The quantity and combination of these cards shall be determined by the requirements of the plant in that location with the concurrence of the Owner/Consultant.
- 10) The DDC's shall have 15% spare capacity (digital/analog input/output) to give flexibility for future expansion.
- 11) All DDC controllers shall be capable of handling voltage, milli-ampere, resistance or open and closed contacts inputs in any mix, if required.
- 12) Analog inputs/outputs of the following minimum types shall be supported:
 - a) 4-20 mA.
 - b) 0-1 volts.
 - c) 0-10 volts.
 - d) 0-5 volts, and
 - e) 2-10 volts.
 - f) Resistance Signals (either PTC or NTC) (PT 100, PT 1000, PT 3000, Balco 500, NI 1000)

Digital input/output types to be supported shall be, but not limited to the following:

- i) Normally-open contacts.
- ii) Normally-closed contacts. Modulating outputs shall be true proportional



outputs and not floating control type.

- 13) Controller's packaging shall be such that complete installation and check out of field wiring can be done prior to the installation of electronic boards.

DATA COMMUNICATION:

The communication between controllers shall be via a dedicated communication network as per LonWorks/ BACNet/ Modbus recommended standards. Controllers microprocessor failures shall not cause loss of communication of the remainder of any network. All networks shall support global application programs, without the presence of a host PC. Each controller shall have equal rights for data transfer and shall report in its predetermined time slot. There shall be no separate device designated as the communication's master. Those systems using dependent controllers shall be pointed out by the contractor and a dual redundant transmission media with automatic switching and reporting in the event of line faults will have to be provided.

The communication network shall be such that

- 1) Every DDC must be capable of communicating with all DDC's.
- 2) Network connected devices with no messages to transmit shall indicate "No failure" message each cycle. Lack of this message after successive retries shall constitute a communication or device failure

FIELD DEVICES

TEMPERATURE SENSOR:

Temperature sensors for space, pipes and ducts, shall be of the Resistance Temperature detector (RTD) type or thermistor. These shall be two wire type and shall conform to the following specifications:

- 1) The sensor housing shall plug into the base so that the same can be easily removed without disturbing the wiring connections.
- 2) The sensors shall not be mounted near any heat source such as windows, electrical appliances, etc.
- 3) The temperature sensors may be of any of the following types:
 - a. PT 100, PT 1000, PT 3000



- b. NI 100, NI 1000
- c. Balco 500
- d. Thermistor
- e. NTC1800

HUMIDITY SENSOR

- Space and duct humidity sensors shall be of capacitance type with an effective sensing range of 10% to 90% RH. Accuracy shall be + 3% or better. Duct mounted humidity sensors shall be provided with a sampling chamber.
- Wall mounted sensors shall be provided with a housing. The sensor housing shall plug into the base so that the same can be easily removed without disturbing the wiring connections. The sensors shall not be mounted near any heat source such as windows, electrical appliances, etc.

CONDUITS AND WIRING

Prior to laying and fixing of conduits, the contractor shall carefully examine the drawings indicating the layout, satisfy himself about the sufficiency of number and sizes of conduits, sizes and location of conduits and other relevant details. Any discrepancy found in the drawings shall be brought to the notice of Architect/Engineers Any modifications suggested by the Contractor shall be got approved by the Architect /Engineers before the actual laying of conduits is commenced.

CONNECTIONS WIRING

All jointing methods shall be subject to the approval of the Architect/Engineer.

Separate conduits shall run for all power wiring.

The threads and sockets shall be free from grease and oil. Connections between conduit and controller metal boxes shall be by means of brass hexagon smooth bore bush, fixed inside the box and connected through a coupler to the conduit. The joints in conduits shall be smooth to avoid damage to insulation of conductors while pulling them through the conduits.

5. COMMERCIAL TERMS AND CONDITIONS

5.1. RATES

Rates to be quoted are net F.O.R. destination inclusive of freight, handling and packing charges, transit insurance, installation, regular insurance and on-site comprehensive maintenance including spares at stipulated locations during the entire lease period and shall remain FIRM without any variation till completion of the lease contract. However, the Lease Tax/ RTU Tax will be payable as per actuals.

Rates are to be quoted as per Price Bid Format providing details of rates of taxes and duties prevailing as on the last date of bid submission. Bidders, in their own interest, are requested to check up the different tax tariff like “Right to use” etc. at stipulated locations. After opening of Price Bid, no request for any change in rates/tariff with respect to the taxes/rates/tariffs of taxes prevailing as on the last date of bid submission will be entertained and such taxes will be to the account of the Contractor.

5.2. BANK CHARGES

Unless otherwise specified, the Bank charges, if any, shall be to the account of Bidder.

5.3. PAYMENT TERMS

Lease period will start only after successful installation and commissioning of all the equipment as per the requirement, at the Site followed by completion of the PG test successfully and the issue of the commissioning certificate.

No interest, whatsoever, shall be payable by the Client on any amount due to the Contractor.

Registration under GST - BHEL GST number (hosted in EDN webpage) to be mentioned in NIT Supplier GSTIN number should be mentioned in all quotations & invoices submitted

HSN (Harmonized System of Nomenclature) / SAC (Services Accounting Code) to be mandatorily mentioned in all quotations & invoices submitted

Invoice submitted should be in the format as specified under GST Laws viz. all details as mentioned in Invoice Rules like GSTN registration number, invoice number, quantity, rate, value, taxes with nomenclature – CGST, SGST, IGST mentioned separately, HSN Code / SAC Code etc

Payment to vendors as applicable will be made only if it is matching with data uploaded by Vendors in GST portal

Vendors to give undertaking that GST as mentioned in the Invoice is paid / will be paid either through cash or admissible input credit and also filed / will file the returns

For invoices paid on Reverse charge basis – remarks that it is “payable on reverse charge basis” to be mentioned on the invoice.

W.r.t. PR supplies, vendor should intimate BHEL immediately on dispatch for parallel billing on customer



The payment will be made by the Client on quarterly deferred basis within 30 days from the date of submission verified documents as below:

In the First Quarter:

After installation & acceptance, following document to be submitted.

- Copy of Bipartite/Tripartite Lease Agreement
- Copy of Insurance valid for 1 year.
- Copy of Installation Certificates signed by IT Coordinator of Client.
- Original copy of Certificate signed by IT Coordinator of Client certifying only non-availability figures for the quarter.
- Newness certificate of the equipment supplied.
- Invoices in triplicate.

Subsequent Quarters:

- Original copy of Certificate signed by IT Coordinator of the Client certifying only no availability/downtime figures for the quarter.
- Invoice in triplicate.

Annually:

a) Documents at clause “Subsequent Quarters” along with Copy of Renewal of Insurance valid for the next one year.

5.4. VALIDITY OF THE OFFER

The offer shall be valid for 3 months from the date of Technical and Commercial bid (Part I) opening.

5.5. NOTIFICATION OF AWARD

BHEL will notify the successful Bidder in writing by way of Letter of Intent/work order transmitted through e-mail/ Letter/ Fax.

5.6. SIGNING OF CONTRACT/ LEASE AGREEMENT

The successful Bidder and the Financier, if any, shall enter into bipartite or tripartite Agreement, as the case may be, with the Purchaser.

Upon notification of award as per clause 4.6 herein, the Bidder shall sign and return back to the Owner duplicate copy of the LOI/WO as an acknowledgement of receipt of the LOI/WO within 7 working days along with Performance Bank Guarantee (PBG) for a sum equivalent to <value of the PBG say 10% of the tentative order value as indicated in the LOI/WO>.

Within 15 (fifteen) Days from the date of issuance of PO, the Contractor shall submit:

Signed copy of BHEL Purchase Order as an acceptance of the PO.



Security Deposit (SD) as per clause 5.7 herein.

Bidder shall furnish the details regarding Address, Tax details, Bank details etc. for placement of Order

5.7. SECURITY DEPOSIT (SD)

Security Deposit means the security provided by the Contractor towards fulfilment of any obligations in terms of the provisions of the contract.

The total amount of Security Deposit will be 5% of the contract value. EMD of the successful tenderer shall be converted and adjusted towards the required amount of Security Deposit.

Modes of deposit:

The balance amount to make up the required Security Deposit of 5% of the contract value may be accepted in the following forms:

- I. Cash (as permissible under the extant Income Tax Act)
- II. Local cheques of Scheduled Banks (subject to realization)/ Pay Order/ Demand Draft/ Electronic Fund Transfer in favour of BHEL through SB collect.
- III. Bank Guarantee from Scheduled Banks/ Public Financial Institutions as defined in the Companies Act. The Bank Guarantee format should have the approval of BHEL.
- IV. Fixed Deposit Receipt issued by Scheduled Banks/ Public Financial Institutions as defined in the Companies Act (FDR should be in the name of the Contractor, a/c BHEL.
- V. Securities available from Indian Post offices such as National Savings Certificates, Kisan Vikas Patras etc. (held in the name of Contractor furnishing the security and duly endorsed/ hypothecated/ pledged, as applicable, in favour of BHEL) (Note: BHEL will not be liable or responsible in any manner for the collection of interest or renewal of the documents or in any other matter connected therewith).

Collection of Security:

At least 50% of the required Security Deposit, including the EMD, should be collected before start of the work. Balance of the Security Deposit can be collected by deducting 10% of the gross amount progressively from each of the running bills of the Contractor till the total amount of the required Security Deposit is collected. If the value of work done at any time exceeds the contract value, the amount of Security Deposit shall be correspondingly enhanced and the additional Security Deposit shall be immediately deposited by the Contractor or recovered from payment/s due to the Contractor.



The recoveries made from running bills (cash deduction towards balance SD amount) can be released against submission of equivalent Bank Guarantee in acceptable form, but only once, before completion of work, with the approval of the authority competent to award the work.

(Note: In case of (a) small value contracts not exceeding ` 20 lakhs or (b) SAS jobs, work can be started before the required Security Deposit is collected. However, payment can be released only after collection/ recovery of initial 50% Security Deposit).

Security Deposit shall be released to the Contractor upon fulfilment of contractual obligations as per terms of the contract.

The Security Deposit shall not carry any interest.

5.8. RETURN OF SECURITY DEPOSIT:

Security Deposit shall be refunded/Bank Guarantee(s) released to the Contractor after deducting all expenses/ other amounts due to BHEL under this contract. or any other contracts entered into with the Contractor by BHEL.

5.9. DELIVERY SCHEDULE

The Contractor shall be responsible for timely delivery, installation & commissioning of all the equipment given in the scope of supply/work at the BHEL's premises. All the equipment shall be delivered and successfully installed and commissioned as detailed below and delivery period will be counted from the date of Purchase order:

Phase	Item	Delivery Period	Installation period (from delivery Date)
Phase-I DC	All items as per bill of material.	10 weeks	12 weeks
Phase-II Near DR	All items as per bill of material.	10 weeks after The work will be started after successful completion of Phase 1.	12 weeks

5.10. LIQUIDATED DAMAGES FOR LATE DELIVERY (INCLUDING INSTALLATION, COMMISSIONING, MIGRATION & UPGRADE)

For the delay in delivery, liquidated damages (LD) shall be levied at the rate of 0.5% per week (or part thereof) subject to maximum of 5% of the total lease rent for the Purchase Order for entire lease period for all the System/Equipment of the Purchase Order (as per the scope, i.e. including installation, commissioning etc.) as per delivery schedule. This LD will be deducted from the first quarter rental charges. In case the LD amount to be deducted is



more than the first quarter rental charges, the same will be adjusted from the immediate next quarter consecutively until the entire LD is adjusted.

5.11. FORCE MAJEURE

Contractor shall not be responsible for delay in delivery/installation/commissioning/PG Tests or in providing warranty and support as per SLA in respect of a Purchase Order, resulting from acts/events such as acts of God, war, floods, earthquakes, epidemics, riots, fire or Governmental regulations imposed after the date of contract beyond the Contractor's control, provided notice of the happening of such act/event is given by the Contractor to the Purchaser within 15 days from the date of its occurrence. .

In the event that the Force Majeure event lasts for more than 6 months, then, the Client reserves the right to cancel/terminate/foreclose the Purchase Order without any compensation being payable to the Contractor in respect of such cancellation/termination.

If there are multiple Purchase Orders, the obligations of the Contractor in respect of any other Purchase Order(s) not affected by the Force Majeure event, shall continue to subsist.

5.12. RISK PURCHASE

Client reserves the right to purchase from elsewhere at the risk and cost of the Contractor, either the whole or part of

- a) The Systems/Equipment, which the Contractor has failed to deliver within the stipulated delivery period in the concerned Purchase Order or if the same were not available, the best and the nearest available substitute(s) thereof which is not technically inferior to the undelivered System/Goods.
- b) The warranty and support which the Contractor has failed to provide in respect of the supplied system/equipment suffering from not less than 1 month of downtime.

The Contractor shall compensate the Client for any loss or additional expense, which the Client may sustain by reason of such purchase. The Client may recover the amount from any money due to the Contractor in respect of this contract or any other contract which the Contractor has with Purchaser.

This clause will be operated only after completion of delivery period including extended period with LD, if any.

5.13. LIMITATION OF LIABILITY

The Contractor's liability under any one Purchase Order will be limited to the value of that Purchase Order only.

Such limitation of liability shall not apply in cases of



- a) Gross negligence. Or,
- b) Fraud. Or,
- c) In the case of a third party claim in respect of infringement of intellectual property rights of the such third party by the Supplied System/Equipment or warranty/support.

Contractor shall not claim and the Purchaser shall not be liable towards a claim made by the Contractor towards any special, indirect, incidental, exemplary, punitive, speculative or consequential loss of any type, no matter how characterized, including but not limited to; loss of use, loss of revenue, loss of production or product, loss of profits or anticipated profits (if any), loss of or interruption to business, facilities, loss of use of property or wasted overheads or increased cost of working, in each case whether direct or Indirect, relating to, in connection with or arising out of the performance or non-performance of the Purchase Order, howsoever the same may arise, whether under contract, tort (including negligence), strict liability or otherwise at law, and whether or not foreseeable at the execution date of the Purchase Order.

5.14. ARBITRATION

Except as provided elsewhere in this Contract, in case amicable settlement is not reached between the Parties, in respect of any dispute or difference; arising out of or in connection with the formation, breach, termination, validity or execution of the Contract or the Purchase Order; or, the respective rights and liabilities of the Parties; or, in relation to interpretation of any provision of the Contract or the Purchase Order; or, in any manner touching upon the Contract, 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 to be appointed by the Head of the <insert the name of Purchaser Unit/Division>.

The seat of such arbitration will be the Bangalore.

It shall not be open to the Contractor to object to such arbitrator only on the ground that such arbitrator is an employee/ex-employee of BHEL or has dealt with or has expressed any opinion on any issue touching upon the Contract/Purchase Order.

The Arbitrator shall pass a reasoned award and the award of the Arbitrator 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.

In case of Contract with Central Public Sector Enterprise (CPSE) or a Government Department, the following shall be applicable:

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 cost of arbitration shall be borne equally by the Parties.

Notwithstanding the existence or any dispute or differences and/or reference for the arbitration, the Contractor shall proceed with and continue without hindrance the performance of its obligations under this Contract/Purchase Order with due diligence and expedition in a professional manner.

5.15. ETHICAL STANDARD & OTHER CONDITIONS

Bidders/Contractor are expected to observe the highest standard of ethics during the procurement and execution of this Contract. In pursuit of this policy, BHEL will reject a proposal for award if it determines that the Bidder being considered for award has engaged in corrupt or fraudulent practices in competing for the Contract. For the purposes of this provision, the terms set forth below are defined as follows:

- "Corrupt Practice" means the offering, giving, receiving, or soliciting of anything of value to influence the action in the procurement process or in Contract execution; and
- "Fraudulent Practice" means a misrepresentation of facts in order to influence a procurement process including collusive practices designed to establish bid prices at artificial, non-competitive levels to deprive the benefits of competition to BHEL.

By signing the Bid Forwarding Letter, the Bidder represents that for the product it supplies, it either is the owner of the Intellectual Property Rights or has procured/will procure all the necessary licenses for due and faithful performance of its obligations under the Contract/Purchase Order, should it be awarded the Contract. Wilful misrepresentation of these facts shall be considered a fraudulent practice.

If the information provided by the bidder is found to be false at a later date, BHEL reserves the right to reject such a bid at any stage or to cancel order/ contract/ lease agreement if awarded. In such a case, bidder shall also forfeit EMD/ Security Deposit/PBG.

In addition, any other rights that are also available to BHEL in connection with such contravention of the ethical standard or other conditions, BHEL may also take steps for suspension of business dealings with the Bidder or the Contractor, as the case may be, as per extant guidelines of the company.



5.16. NON-DISCLOSURE AGREEMENT

The bidder shall sign a Non-Disclosure Agreement (NDA) with BHEL. The format for the Non-Disclosure Agreement is attached as Annexure-4.

5.17. INFORMATION SECURITY REQUIREMENTS

BHEL has implemented Information Security Management System (ISMS) and has taken certificate for the same based on ISO 27001 standard. BHEL Information Security Policy is as follows:

“BHEL is committed to ensure Integrity, Confidentiality, Availability and Security of it information at all times for serving the needs of the organization in line with its Vision,

Mission & Values while meeting all regulatory requirements.”

In line with the ISMS requirements, vendor and its staff shall ensure the protection of BHEL information assets / information processing facilities at all times with respect to confidentiality, integrity and availability.

The vendor / personnel deputed by vendor shall comply with following requirements:

Personnel deputed by vendor shall follow the ISMS system requirements.

Personnel deputed by vendor shall present his / her identity proof to BHEL for getting proper authorization from BHEL. He/she shall not enter into BHEL premises without proper authorization.

Vendor and personnel deputed by vendor shall sign Non- Disclosure Agreement (NDA) in the specified format of BHEL.

When allowed by proper authority, he / she shall work in secure area only in the presence of BHEL staff.

If he /she has to work on any server / network device in secure area, the work shall only be allowed in presence of system administrator or any other person authorized by BHEL.

He / she shall maintain and service only those equipment which comes under his /her scope of contract.

Vendor / personnel deputed by vendor shall ensure the return or destruction of information/ data at the end of lease agreement and as and when required.

Access to information assets, which is not explicitly authorized, shall be treated as forbidden.

Any information security incident and / or security breaches shall be immediately reported to BHEL.



In case of any violation of the above, it will amount to non- fulfillment of terms & conditions of the contract.

5.18. INCOME TAX DEPRECIATION

Income tax depreciation, if any, will be claimed by BHEL.

5.19. DIRECT TAX

Client shall not be liable towards income tax of whatever nature including variations thereof, arising out of this Order/ Contract, as well as income tax liability of the Seller/ Contractor and his personnel/representatives.

Deductions of Tax at source at the prevailing rates shall be effected by the Purchaser before release of payment, as a statutory obligation, if applicable. TDS certificate will be issued by the Purchaser as per statutory provisions.

5.20. INDEMNITY:

The Bidder/Contractor represents and warrants that the System/Equipment supplied by it, or the warranty/support provided by it does not infringe upon the intellectual property rights of any third party.

Notwithstanding anything contained herein, bidder shall fully indemnify and keep indemnified the Purchaser/Client against all claims which may be made in respect of the use of System / Software / Item(s) / services supplied / rendered by the Bidder for infringement of any rights protected by patent, registration of designs or trademarks and copyright of the Software.

In the event of any such claims being made against the Purchaser/Client by a third party, Purchaser/Client will inform in writing to the Contractor, who shall thereupon, at his own risk and cost either settle any such dispute or conduct any litigation that may arise.

The Contractor, shall, upon the first demand by BHEL in respect of any loss/damage suffered or cost/expense (including reasonable attorney's fees) incurred by it owing to breach of this obligation, pay to BHEL the sum so demanded without any demur or recourse or protest. The decision of BHEL regarding the quantum of loss/damage suffered or cost/expenses incurred in or in connection with such infringement claim shall be final and binding upon the Contractor.

In the event, owing to such infringement, the use of the System/Equipment is disrupted/prevented for more than 24 hours at the user's end, the Contractor shall at his cost, within not more than 7 days from the date on which the same is reported, either ensure availability of the System/Equipment or provide a standby/replacement System/Equipment.

5.21. LAWS GOVERNING THE CONTRACT AND JURISDICTION:

The Contract/the Purchase Order shall be construed and be governed by the laws of India.



The concerned Court in the city from where the Contract is issued shall have sole and exclusive jurisdiction in connection with any matter arising between the Parties

5.22. MERGER & ACQUISITION:

In case of merger/amalgamation and acquisition of the Contractor the Contractor shall be obliged to ensure that the merged entity takes over the obligations under this Contract and acquiring company must assume all the obligations of the contract till the end of the contract period.

In the event the OEM in respect of the System/Equipment undergoes a merger/amalgamation or is restructured, then the Contractor shall procure and provide, at no extra cost to BHEL, the warranty/support from the merged/amalgamated/restructured entity.

5.23. BANKRUPTCY:

If the Contractor becomes bankrupt or have a receiving order made against him or enters into an arrangement of compounding with his creditors or being a Corporation commences to be wound up, not being a voluntary winding up for the purpose only or amalgamation or reconstruction, or carry on their business under a receiver for the benefit of their creditors or any of them, BHEL shall be at liberty:

To terminate the engagement forthwith without any notice in writing to the Contractor or to the liquidator or receiver or to any person in whom the Contractor may become vested.

To give such liquidator or receiver or other person the option of carrying out the engagement subject to their providing a guarantee for the due and faithful performance of the engagement up to an amount to be determined by BHEL.

5.24. SUB-CONTRACTING:

Order/contract or any part thereof shall not be sub-contracted, assigned or otherwise transferred to any third party without prior written consent of the Purchaser.

5.25. EXEMPTION:

MSMEs, registered with District Industries Centers or Khadi and Village Industries Commission or Khadi and Village Industries Board or Coir Board or National Small Industries Corporation or Directorate of Handicrafts and Handloom or any other body specified by Ministry of Micro, are entitled to avail the benefit of Public Procurement Policy for Micro and Small Enterprises (MSEs), dated 23.03.2012, subject to furnishing the documentary proof in support of claim along with their request letters and feasibility in terms of ordering and supply.

5.26. INSURANCE



Insurance for the complete Systems/ Equipments shall be arranged by the Contractor at his own risk and cost during transit, movement, storage and throughout the period of lease against loss or damage due to any reason including but not limited to loss or damage arising due to fire, theft, natural calamities, etc.

The Contractor shall submit the evidence of insurance document(s) to the Client.

Under any circumstances, Client will not be responsible for any loss/ damage/ theft of any Systems/ goods, due to any reasons, whatsoever.

Claim(s) etc., if any, will be dealt with the underwriters directly by the Contractor. BHEL shall cooperate with the Contractor for this purpose as far as practicable.

The Insurance policy shall be duly and promptly renewed by the Contractor and evidence thereof shall be submitted to the Client within not more than <no. of days> from the date of expiry of the existing Policy cover. If the Contractor fails to renew the policy Client may affect the insurance and shall recover the amount in this respect from the lease rental payable to the Contractor.

Notwithstanding that for any loss or damage to any of the supplied Systems/Equipments a claim has been or is being filed by the Contractor with the insurance agency; the Contractor shall be obliged to replace the damaged System/Equipment with a System/Equipment of equivalent make or model which is not technically inferior to the Systems/Equipments so damaged/lost, at its own cost, within the time as directed by the Client as the case may be, without linking it with receipt/settlement of claim from the insurance company failing which, the Purchaser, at its option, may resort to action in terms of SLA deduction and/or Risk Purchase clause.

5.27. E-WASTE DISPOSAL

Vendor shall ensure full compliance to E-waste (Management and Handling) Rules, 2011 for products being supplied to BHEL.

Vendor should ensure that either they or the producer of products supplied by them has required authorization from respective State Pollution Control Boards / Pollution Control Committees for implementing EPR (Extended Producer Responsibility) across the concerned state.

Vendor shall manage a system directly or with a help of any professional agency for collection and channelization system of E-waste generated by the end of lifecycle of products supplied by it or whenever BHEL discards these products as E-waste.

Vendor shall arrange for collection of e-waste generated at the end-of-life from BHEL or whenever BHEL discards these products as E-waste and channelize the waste to authorized collection centers or recyclers/dismantlers under E-waste (Management and Handling) Rules, 2011. Also, Vendor shall bear all costs including transportation costs etc. involved in the aforesaid arrangement.



Vendor shall provide the full contact details including helpline number of the authorized collection centers and collection points or their collection mechanism being used by them to BHEL and such information should be periodically updated.

5.28. TERMINATION OF CONTRACT & ITS CONSEQUENCES: <OPTIONAL>

Purchaser/Client reserves the right to terminate/cancel the Contract/Purchase Order, as the case may be, either wholly or in part, due to non-compliance of stipulations of the Contract/Purchase Order, by the Contractor, at the risk and cost of the Contractor by giving one-month notice in writing.

Contractor shall continue the performance of the Purchase Order/Contract under all circumstances, to the extent not cancelled/terminated.

The Purchaser/Client reserves the right to terminate/cancel the Contract/Purchase Order, either wholly or in part, on account of any decline, diminution, curtailment, stoppage of his business or if the warranty and support services are not found to be satisfactory and in that event, the Contractor shall have no claim for compensation against the Purchaser/Client on account of such termination/cancellation.

With effect from the date of expiry of one month notice, no lease charges towards warranty and support will be payable to the Contractor for the cancelled/terminated part of the agreement.

Consequences: In case of the contract foreclosure/termination/cancellation, BHEL at its option, may either:

Call upon Contractor to remove the Systems/Equipments either in whole or in part from Purchaser premises at his own risk and cost after due permission from BHEL whereupon the Contractor shall forthwith remove the System/Equipment the Systems/Equipments from the BHEL site.

And/Or,

Retain the Systems/Equipments either in whole or in part, on payment of price of such Systems/Equipments equivalent to the percentage/depreciated value thereof on outright purchase cost of the System/Equipment and proportionately linked to balance lease period. In such event, ownership of the Systems/Equipments shall be transferred to BHEL.

Confirm compliance for all clauses of - "Commercial Terms and Conditions"

Date: _

Bidder's Signature with Seal



ಭಾರತ ಹೆವಿ ಎಲೆಕ್ಟ್ರಿಕಲ್ಸ್ ಲಿಮಿಟೆಡ್
भारत हेवी इलेक्ट्रिकल्स लिमिटेड
Bharat Heavy Electricals Limited
(A Government of India Undertaking)
ELECTRONICS DIVISION
P.B. No. 2606, Mysore Road, Bangalore - 560 026

Gram : BHARATELEC
Fax : 080-26740137
PHONE : 26998.....
(EPABX. NO.)

Tender Ref: BHEL/EDN/ITS/AC/2017/DC/BUILD

6. Annexures

- Annexure-I: DRAWING
- Annexure-II: PRICE BID FORMAT.
- Annexure-III: AUTHORIZATION & BACK TO BACK SUPPORT UNDERTAKING BY OEM
- Annexure-VI: DEVIATION IN TECHNICAL SPECIFICATION
- Annexure-V: No Deviation Certificate
- Annexure-VI: Non-Disclosure Agreement
- Annexure-VII: EFT format
- Annexure-VIII: Checklist of Enclosure
- Annexure-IX: BUSINESS RULES FOR ONLINE REVERSE AUCTION

PRICE FORMAT – EQUIPMENT & SERVICES**Format for Submitting the Price details
Of****Supply, Construction and Maintenance of Data centers on financial Lease for a period of 5 years at BHEL Electronics Division Bangalore**

A Item 1-Data Center at HR&IT Building Ground Floor: DC								
S. No.	Particulars-components for One Time Charges	Qty p	Unit	unit price q	Total r=p*q	Tax %age s	Tax value t=r*s	Total includes Tax u=r+t
A.a.1	Civil works : Interior Package, False flooring, False ceiling, Partitions, Doors, flooring, Painting	1	set		0		0	0
A.a.2	Electrical works: Electrical Distribution, Main panel with Auto change over, LT Cabling works, Industrial sockets, Earthing, Cable trays	1	set		0		0	0
A.a.3	Project Management	1	Set		0		0	0
A.a.4	48 core Fiber connectivity between two data center HR & IT ground floor and HVDC building (building no -5).	1	Set					
A.a.5	24 core Fiber connectivity between data center HR & IT ground floor and NEB ground floor.	1	Set					
SubTotal					0		0	0
Outright Price								
Particulars-Components for financial lease								
A.b.1	UPS 80 KVA with 15 min Back-up on each	2	Nos		0			
A.b.2	PAC 17 TR	2	Nos		0			
A.b.3	Cold Aisle Containment	1	Set		0			
A.b.4	Data Center Safety and Security Management Center							
A.b.4.1	Fire alarm system,	1	Nos		0			
A.b.4.2	VESDA system,	1	Nos		0			
A.b.4.3	NOVEC 1230 Fire suppression system,	1	Nos		0			
A.b.4.4	Hand held fire suppression system,	1	Nos		0			

A.b.4.5	Access control & CCTV system,	1	Nos		0			
A.b.4.6	Rodent repellent & Water leakage detection system,	1	Nos		0			
A.b.4.7	Datacenter management system	1	Nos		0			
A.b.5	Server/Network Rack, TVS, Ladder, Tray with accessories	12	Nos		0			
SubTotal					0		0	0
A.c	Maintenance Charges including Resident Engineer (Payable Quarterly over lease period)							
A.c.1	Maintenance Charges - Value			Year_1	Year_2	Year_3	Year_4	Year_5
				0				
A.c.2	Trained Manpower for managing the Datacenter Infrastructure							
	Allocation of one resource per shift and three shifts per day for the period of 5 years considering 365 operation.							
	Sub Total			0	0	0	0	0
A.d	PTPQ Factor							
	Quarter Nos			One Time charges (Payable on Installation)	Lease Rental (PTPQ Factor applied on Leased Components)	Maintenance Charges (AMC from 2nd Year+ Manpower Support)	Total	
	Q0			0				
	Q1				0	0	0	
	Q2				0	0	0	
	Q3				0	0	0	
	Q4				0	0	0	
	Q5				0	0	0	
	Q6				0	0	0	
	Q7				0	0	0	
	Q8				0	0	0	
	Q9				0	0	0	
	Q10				0	0	0	
	Q11				0	0	0	
	Q12				0	0	0	

Q13	0	0	0
Q14	0	0	0
Q15	0	0	0
Q16	0	0	0
Q17	0	0	0
Q18	0	0	0
Q19	0	0	0
Q20	0	0	0
Total	0	0	0

B Item 2-Data Center at HVDC building (building no -5) ground floor

Near DR

S. No.	Particulars-components for One Time Charges	Qty p	Unit	unit price q	Total r=p*q	Tax %age s	Tax value t=r*s	Total includes Tax u=r+t
B.a.1	Civil works : Interior Package, False flooring, False ceiling, Partitions, Doors, flooring, Painting	1	set		0		0	0
B.a.2	Electrical works: Electrical Distribution, Main panel with Auto change over, LT Cabling works, Industrial sockets, Earthing, Cable trays	1	set		0		0	0
B.a.3	Project Management	1	Set		0		0	0
SubTotal					0		0	0

Outright Price**Particulars-Components for financial lease**

B.b.1	UPS 40 KVA with 15 min Back-up on each	2	Nos		0			
B.b.2	PAC 11 TR	2	Nos		0			
B.b.3	Cold Aisle Containment	1	Set		0			
B.b.4	Data Center Safety and Security Management Center							
B.b.4.1	Fire alarm system,	1	Nos		0			
B.b.4.2	VESDA system,	1	Nos		0			

B.b.4.3	NOVEC 1230 Fire suppression system,	1	Nos		0			
B.b.4.4	Hand held fire suppression system,	1	Nos		0			
B.b.4.5	Access control & CCTV system,	1	Nos		0			
B.b.4.6	Rodent repellent & Water leakage detection system,	1	Nos		0			
B.b.4.7	Datacenter management system	1	Nos		0			
B.b.5	Server/Network Rack, TVS, Ladder, Tray with accessories	8	Nos		0			
B.c	SubTotal				0		0	0

B.c.1	Maintenance Charges including Resident Engineer (Payable Quarterly over lease period)				Year_1	Year_2	Year_3	Year_4	Year_5
B.c.1.1	Maintenance Charges - Value				0				
	Sub Total				0	0	0	0	0

B.d	PTPQ Factor								
	Quarter Nos				One Time charges (Payable on Installation)	Lease Rental (PTPQ Factor applied on Leased Components)	Maintenance Charges (AMC from 2nd Year+ Manpower Support)	Total	
	Q0				0				
	Q1					0	0	0	
	Q2					0	0	0	
	Q3					0	0	0	
	Q4					0	0	0	
	Q5					0	0	0	
	Q6					0	0	0	
	Q7					0	0	0	
	Q8					0	0	0	
	Q9					0	0	0	

Q10	0	0	0
Q11	0	0	0
Q12	0	0	0
Q13	0	0	0
Q14	0	0	0
Q15	0	0	0
Q16	0	0	0
Q17	0	0	0
Q18	0	0	0
Q19	0	0	0
Q20	0	0	0
Total	0	0	0

C Buy Back								
S. No.	Particulars-components	Qty p	Unit	unit price q	Total r=p*q	Tax %age s	Tax value t=r*s	Total includes Tax u=r+t
C.1	Precision Air Conditioner (PAC)	4	Nos.					
C.2	UPS with Batteries.	4	Set					
C.3	Server and Network Rack	9	Nos.					
C.4	Safety and Security systems with accessories							
	a. Fire Alarm system							
	b. Water leakage system							
	c. Rodent repellent	2	Set					
	d. Access control							
	e. CCTV system,							

D	AMC charges beyond lease period (not for evaluation)	6 th year	7 th year	Total	Taxes	Total with taxes

Date:

Bidder's Signature & Seal

AUTHORIZATION & BACK TO BACK SUPPORT UNDERTAKING BY OEM

Date: _____

To,

Bangalore,
Electronics Division
Bangalore

Subject: Manufacturer's Authorization Form with Back to Back Support – Reg.

Tender Ref. No.: _____

Dear Sir,

We hereby authorize M/s _____ to quote / secure the order in their name / supply the equipment against the Tender Enquiry Ref. No.: _____.

It is confirmed that

1. The Authorized Partner will have back to back support for the following equipment for supply of spares, support and its services against this tender conditions for a minimum period of 7 years (5 Years Lease Period and 2 years AMC if ordered) from the date of commissioning.
2. The equipment will have 5 (Five)Years Warranty directly from the OEM during the Lease/ Contract Period.

This authorization is valid only for the following equipment for which we are the OEM:

- | | |
|----------|----------|
| 1. _____ | 2. _____ |
| 3. _____ | 4. _____ |

In case of any default by the Authorized Partner, or in the event the Authorised partner named herein ceases to be our Authorised Partner, it will be our responsibility to provide spares, support and services on-site on the same terms and conditions as negotiated and finalized in this tender enquiry.

(Authorized Signatory)

For _____

Note: This 'Authorization & Back to Back Support Form' should be issued on the letterhead of OEM.

DEVIATION IN TECHNICAL SPECIFICATION

Table No.	Sl. No	Item or Specification Parameter	Deviation	Alternate solution

Date: _____

Bidder's Signature with Seal

NO DEVIATION CERTIFICATE

(To be given in bidder's letter head)

Ref: BHEL's Enquiry No. _____ Dated

It is Certified that the offered solution vide Enquiry
No. _____ Dated _____ in response to BHEL's enquiry
mentioned under reference has no Technical and commercial deviation from the requirement
of BHEL<unit name>given vide the NIT.

Date: _

Bidder's Signature with Seal

THIRD PARTY NON-DISCLOSURE AGREEMENT

....., on behalf of(name of the Vendor),
.....(Address), (hereinafter vendor) acknowledge that the information received or generated, directly or indirectly, while working with Bharat Heavy Electricals Ltd (BHEL) on contract for Rapid Application Development Platform (RADP) is confidential and that the nature of the business of BHEL is such that the following conditions are reasonable, and therefore execute this agreement in favour of BHEL:

We warrant and agree as follows:

1. The vendor hereby declare and acknowledge the fact that in the performance of contract with BHEL, the Vendor or any other personnel employed or engaged directly or indirectly by vendor will be exposed to various Confidential Information of BHEL i.e. information or material that is valuable to Company and not generally known or readily ascertainable or not intended to be known in the industry and other Institutions and further that vendor or any other personnel employed or engaged directly or indirectly by vendor shall disclose directly or indirectly any information or part of such information of BHEL. Without restricting the generality of the foregoing the Confidential Information aforesaid includes, but not limited to:
 - (a) Technical information concerning BHEL's, services and offerings, domestic and international operating model/s, contacts in various countries, correspondence and other such information including but not limited to BHEL's methods, drawings, processes, formulae, compositions, systems, techniques, inventions, computer programs / data / configuration and research projects etc. not available in the public domain;
 - (b) Information concerning BHEL's business, including but not limited to its contracts with various concerns, project schedules, pricing data, estimates, financial or marketing data, consortium partners, collaborators, JVs, cost information, profits, sales information, accounting and unpublished financial information, business plans, markets and marketing methods, customer lists and customer information, purchasing techniques, supplier lists and supplier information and advertising strategies;
 - (c) Information concerning BHEL's employees, including their personal data, salaries, strengths, weaknesses and skills;
 - (d) information submitted by BHEL's customers, suppliers, employees, consultants or co - venture partners with BHEL for study, evaluation or use;
 - (e) Information of Quality systems, procedures and manuals and any other particulars developed exclusively at and for the BHEL or by its Consultants and
 - (f) Any other information not generally known to the public which, if misused or disclosed, could reasonably be expected to adversely affect BHEL's interests.
2. The Vendor further covenants with the BHEL that the unauthorized disclosure or use of such Confidential Information by Vendor contrary to the agreement herein would cause
3. Irreparable harm and significant injury to the BHEL, the degree of which may be difficult to ascertain. Accordingly, the Vendor agrees that BHEL will have the right to withheld any benefits which may accrue for the Vendor from the contract(s) offered or assigned or awarded to him by the BHEL and take any necessary action for protection of such confidential information or for

compensating losses that may be suffered due to such contravention of this agreement by the Vendor.

4. Further the Vendor agrees to the BHEL that in case he has committed or found to have been party to a breach of any provision of this Agreement, BHEL shall have the right to forthwith terminate the Vendor from the contract(s) with BHEL without any compensation and also to claim or recover any damages from him towards making good of the losses that the BHEL may suffer due to such violation by the Vendor without prejudice to any other right or claim for remedy, it may have at law or in contract.
5. In any such event of such termination, the Vendor shall, immediately return all copies of Confidential Information of the BHEL referred to in this Agreement.
6. The Vendor further agrees to the BHEL that
 - i. No failure nor any delay in exercising on the part of BHEL, any right or remedy under this Agreement, shall operate as a waiver thereof (in whole or in part), nor shall any single or partial exercise of any right or remedy prevent any further, future or other exercise thereof or any other right or remedy. The rights and remedies existing by virtue of this Agreement shall be cumulative and not exclusive of any rights or remedies provided by law.
 - ii. No term or provision hereof will be considered waived by BHEL, and no breach excused by it, unless such waiver or consent is in writing signed by an authorized representative of BHEL.
 - iii. No consent to, or waiver of, a breach by BHEL, whether express or implied, will constitute a consent to, waiver of, or excuse of any other, different, or subsequent breach by Vendor
7. The Vendor hereby irrevocably and unconditionally consent to submit to the exclusive jurisdiction of the courts of the Bangalore for any actions, suits or proceedings arising out of or relating to this Agreement and further agree that service of any communication, process, summons, notice or document by registered mail or courier service to the address set forth above shall be effective service of process for any communication, action, suit or proceeding brought against the Vendor.
8. This Agreement may be amended or supplemented only by a writing that is signed by duly authorized representatives of both parties.
9. Notwithstanding any provision herein contained, nothing contained in this Agreement requires BHEL to proceed with the Contract, or to refrain from pursuing the contract with a third party and any provision herein contained shall not be construed as imposing on BHEL an obligation to provide or disclose any information
10. If any part of this Agreement is found invalid or unenforceable, that part will be amended to achieve as nearly as possible to achieve the same economic and legal effect as the original provision and notwithstanding that the remainder of this Agreement will remain in full force all times.
11. It further agreed that Vendor on conclusion of contract, shall return to BHEL all documents and property of BHEL, including but not necessarily limited to: drawings, blueprints, reports, manuals, computer programs/data/configuration, and all other materials and all copies thereof relating in any way to BHEL, or in any way obtained by Vendor during the course of contract. Vendor further agree that vendor, or any others employed or engaged by vendor shall not retain copies, notes or abstracts of the foregoing.

12. This obligation of confidence shall continue after the conclusion of the contract also.

13. Vendor acknowledge that the aforesaid restrictions are necessary and fundamental to the business of the Parties, and are reasonable given the nature of the business carried on by the Parties. Vendor agree that this agreement shall be governed by and construed in accordance with the laws of India.

Executed byon behalf of aforesaid vendor with full knowledge and understanding of the above terms and its respective meanings; and voluntarily without any duress whatsoever.

Datedof20...

.....

Signature

Seal

EFT FORMAT

**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 swift Code(applicable for EFT only)

8 Bank IFSC code(applicable for RTGS)

9 NEFT IFSC 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 : 080-26998xxx / 2674xxxx or fax no. 080-2674xxxx

CHECKLIST OF ENCLOSURES**(TO BE ATTACHED WITH TECHNO-COMMERCIAL BID (PART-I) DULY FILLED BY THE BIDDER)**

Sl No	Documents with Tender	Format / Annexure	Whether Attached (Yes / No)
1	documentary evidence of successfully completed similar work as per clause 2.1		
2	Authorization letter from OEM of equipment as per clause 2.2	Annexure- III	
3	Attested balance sheets as per clause 2.3		
4	Declaration by authorized signatory of bidder as per clause 2.4		
4	Bidder's undertaking for complete responsibility as per clause 3.1.11		
5	Bidder's proof of registration as per clause 3.10.2		
6	Acceptance of Technical terms and conditions (Chapter 3) duly signed with stamp		
7	Acceptance of Technical specification (Chapter 4) duly signed with stamp		
8.	Acceptance of Commercial terms and conditions (Chapter 5) duly signed with stamp		
9	Deviations if any, as per BHEL format	Annexure - IV	
10	No Deviation certificate	Annexure - V	

11	Non-Disclosure Agreement	Annexure - VI	
12	Duly signed EFT form with cancelled cheque	Annexure - VII	
13	EMD of INR 7,30,000/-(Rupees Two Lakhs only)		
14	Unpriced commercial offer as per Price format (Equipment& Services)	Annexure - II	
15	Reverse auction signed documents	Annexure - IX	

Note: Tender documents shall not be modified and bidder shall fill in the information as required in the tender documents

BUSINESS RULES FOR ONLINE REVERSE AUCTION

Business Rules, Terms & Conditions of Online Reverse Auction for the “COMPREHENSIVE MAINTENANCE CONTRACT OF SERVERS, STORAGE AND DATA CENTER EQUIPMENT at BHEL-Electronics Division” vide tender enquiry ref. no. **BHEL/EDN/ITS/AC/2017/DC/METSO** dated 17 June 2017.

BUYER'S NAME	Bharat Heavy Electricals Limited Electronics Division
AUCTION TO BE CONDUCTED BY	To be intimated later
DATE & TIME OF AUCTION	Auction Date: To be intimated later Online Sealed Bid Time : To be intimated later Online Reverse Auction Time : To be intimated later Auction website : To be intimated later

This has reference to tender no **BHEL/EDN/ITS/AC/2017/DC/METSO** dated 17 June 2017. BHEL shall finalise the Rates for the COMPREHENSIVE MAINTENANCE CONTRACT OF SERVERS, STORAGE AND DATA CENTER EQUIPMENT through Reverse Auction mode. BHEL has made arrangement with M/s. _____, who shall be BHEL's authorized service provider for the same. Bidders should go through the instructions given below and submit acceptance of the same.

The technical & commercial terms are as per (a) BHEL Tender Enq. no **BHEL/EDN/ITS/AC/2017/DC/METSO** dated 17th June 2017, (b) Bidders' technical & commercial bid (in case of two-part bid) and (c) subsequent correspondences between BHEL and the bidders, if any.

1. Procedure of Reverse Auctioning

i. **Online Sealed Bid:** This duration of online sealed bid will be ----- minutes. All bidders to submit their online sealed bids during this period. ii. Online Reverse Auction: The 'opening price' i.e. start price for RA and 'bid decrement' will be decided by BHEL.

iii. If BHEL decides the lowest online sealed bid as the starting price, then the lowest bidder in online sealed bid shall be shown as current L1 automatically by the system and no acceptance of that price is required. System shall have the provision to indicate this bid as current L1.

iv. Bidders by offering a minimum bid decrement or the multiples thereof can displace a standing lowest bid and become "L1" and this continues as an iterative process.

v. After the completion of the online reverse auction, the Closing Price (CP) shall be available for further processing.

2. Schedule for Reverse Auction: The Reverse Auction is tentatively scheduled on {date}: and the duration of online sealed bid will be ----- minutes. All bidders to submit their online sealed bids during this period.

- **Online Sealed Bid:-**

- *Start Time:* To be intimated later
- *Close Time:* To be intimated later

- **Online Reverse Auction:-**

- *Start Time:* To be intimated later
- *Close Time:* To be intimated later

3. Auction extension time: If a bidder places a bid in the last ----- minutes of closing of the Reverse Auction and if that bid gets accepted, then the auction's duration shall get extended automatically for another ----- minutes, for the entire auction (i.e. for all the items in the auction), from the time that bid comes in. Please note

that the auto-extension will take place only if a bid comes in those last ----- minutes and if that bid gets accepted as the lowest bid. If the bid does not get accepted as the lowest bid, the auto-extension will not take place even if that bid might have come in the last ----- minutes. In case, there is no bid in the last ----- minutes of closing of Reverse Auction, the auction shall get closed automatically without any extension. However, bidders are advised not to wait till the last minute or last few seconds to enter their bid during the auto-extension period to avoid complications related with internet connectivity, network problems, system crash down, power failure, etc.

The above process will continue till completion of Reverse Auction. Complaints/ Grievances, if any, regarding denial of service or any related issue should be given in writing thru e-mail/ fax to M/s. _____ with a copy to BHEL within 15 minutes prior to initial closing time of Online Reverse Auction.

4. Bid price: The Bidder has to quote the {.....} Price inclusive of Packing & Forwarding charges, all the routine & type tests as per tender scope, ED + cess, CST against C-form, Freight (bidder to provide original Freight paid receipt), insurance charges, etc. including loading (if indicated by BHEL due to deviations in technical/ commercial terms) for the Items specified. Details are as shown in Excel Sheet for calculation of total cost to BHEL (To be specified by Unit as per NIT conditions).

5. Bidding currency and unit of measurement: Bidding will be conducted in *Indian Rupees per Unit* of the material as per the specifications {...} In case of foreign currency bids, exchange rate (TT selling rate of State Bank of India) as on scheduled date of tender opening (Part-I bid) shall be considered for conversion in Indian Rupees. If the relevant day happens to be a Bank holiday, then the forex rate as on the previous bank (SBI) working day shall be taken.

6. Validity of bids: Price shall be valid for 120 days from the date of reverse auction. These shall not be subjected to any change whatsoever.

7. Lowest bid of a bidder: In case the bidder submits more than one bid, the lowest bid at the end of Online Reverse Auction will be considered as the bidder's final offer to execute the work.

8. Bidders shall be assigned a **Unique User Name & Password** by M/s. _____. Bidders are advised to change the Password and edit the information in the Registration Page after the receipt of initial Password from M/s. _____ to ensure confidentiality. All bids made from the Login ID given to the bidders will be deemed to have been made by the bidders/ bidders' company.

9. Post auction procedure: BHEL will proceed with the Lowest Bid in the Reverse Auction for further processing.

10. Any commercial/ technical loading shall be intimated to bidders prior to RA. The excel sheet provided in this regard shall cover all these aspects. Commercial/ technical loading if any, shall be added by the respective bidder in its price during online sealed bid & Online Reverse Auction. Modalities of loading & de-loading shall be separately

intimated to the bidders. The responsibility for correctness of total cost to BHEL shall lie with the bidders.

11. Computerized reverse auction shall be conducted by BHEL (through **M/s.** _____), on pre-specified date, while the bidders shall be quoting from their own offices/ place of their choice. Internet connectivity shall have to be ensured by bidders themselves.

During the RA process if a bidder is not able to bid and requests for extension of time by FAX/ email/ phone then time extension of additional 15 minutes will be given by the service provider provided such requests come before 5 minutes of auction closing time. However, only one such request per bidder can be entertained.

Despite this extension if bidder fails to upload his prices due to extreme case of failure of Internet connectivity, (due to any reason whatsoever may be) it is the bidders' responsibility/ decision to send fax communication immediately to **M/s.** _____, furnishing the price the bidder wants to bid online with a request to the service provider to upload the faxed price online so that the service provider will upload that price online on behalf of the Bidder. It shall be noted clearly that the concerned bidder communicating this price to service provider has to solely ensure that the fax message is received by the service provider in a readable/ legible form and also the Bidder should simultaneously check up with service provider about the clear receipt of the price faxed. It shall also be clearly understood that the bidder shall be at liberty to send such fax communications of prices to be uploaded by the service provider only within the closure of Bid time and under no circumstance it shall be allowed beyond the closure of Bid time /reverse auction. It shall also be noted that the service provider should be given a reasonable required time by the bidders, to upload such prices online and if such required time is not available at the disposal of the Service provider at the time of receipt of the fax message from the bidders, the service provider will not be uploading the prices and either BHEL or the service provider are not responsible for this unforeseen circumstances. In order to ward-off such contingent situation bidders are requested to make all the necessary arrangements/ alternatives whatever required so that they are able to circumvent such situation and still be able to participate in the reverse auction successfully. Failure of power or loss of connectivity at the premises of bidders during the Reverse auction cannot be the cause for not participating in the reverse auction. On account of this, the time for the auction cannot be extended and neither BHEL nor **M/s.** _____ is responsible for such eventualities.

12. Proxy bids: Proxy bidding feature is a pro-bidder feature to safeguard the bidder's interest of any internet failure or to avoid last minute rush. The proxy feature allows bidders to place an automated bid in the system directly in an auction and bid without having to enter a new amount each time a competing bidder submits a new offer. The bid amount that a bidder enters is the minimum that the bidder is willing to offer. Here the software bids on behalf of the bidder. This obviates the need for the bidder participating in the bidding process until the proxy bid amount is decrementally reached by other bidders.

- When proxy bid amount is reached, the bidder (who has submitted the proxy bid) has an option to start participating in the bidding process. The proxy amount is the minimum amount that the bidder is willing to offer. During the course of bidding, the bidder cannot delete or change the amount of a proxy bid. Bids are submitted in decrements (decreasing bid amounts). The application automates proxy bidding by processing proxy bids automatically, according to the decrement that then auction originator originally established when creating the auction, submitting offers to the next bid decrement each time a competing bidder bids, regardless of the fact whether the competing bids are submitted as proxy or standard bids.

- However, it may please be noted that if a manual bid and proxy bid are submitted at the same instant manual bid will be recognized as the L1 at that instant. In case of more than one proxy bid, the system shall bid till it crosses the threshold value of 'each lowest proxy bid' and thereafter allow the competition to decide the final L1 price. Proxy bids are fed into the system directly by the respective bidders. As such this information is privy only to the respective bidder(s).

13. Bidders are advised to get fully trained and clear all their doubts such as refreshing of screen, quantity being auctioned, tender value being auctioned etc from **M/s.** _____ .

14. **M/s.** _____ , shall arrange to demonstrate/ train the bidder or bidder's nominated person(s), without any cost to bidders. **M/s.** _____ , shall also explain the bidders, all the business rules related to the Reverse Auction. Bidders are required to submit their acceptance to the terms/ conditions/ modalities before participating in the Reverse Auction in the process compliance form as enclosed. Without this, the bidder will not be eligible to participate in the event.

15. Successful bidder shall be required to submit the final prices (L1) in prescribed format (Annexure-VI) for price breakup including that of line items, if required, quoted during the Online Reverse Auction, duly signed and stamped as token of acceptance without any new condition (other than those already agreed to before start of auction), after the completion of auction **to M/s.** _____ besides BHEL within two working days of Auction without fail.

16. Any variation between the final bid value and that in the confirmatory signed price breakup document will be considered as tampering the tender process and will invite action by BHEL as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

17. Bidders' bid will be taken as an offer to execute the work/ supplies of the item as per enquiry no. ----- dt. ----- . Bids once made by the bidder, cannot be cancelled/ withdrawn and bidder shall be bound to execute the work as mentioned above at bidder's final bid price. Should bidder back out and not execute the contract as per the rates quoted, BHEL shall take action as per extant guidelines for suspension of business dealings (as available on www.bhel.com).

18. Bidders shall be able to view the following on their screen along with the necessary fields during Online Reverse Auction:

- a. Leading (Running Lowest) Bid in the Auction (only total price of package).
- b. Bid Placed by the bidder.
- c. Start Price.
- d. Decrement value.
- e. Rank of their own bid during bidding as well as at the close of auction.

19. BHEL's decision on award of contract shall be final and binding on all the Bidders.

20. BHEL reserves the right to extend, reschedule or cancel the Reverse Auction process at any time, before ordering, without assigning any reason, with intimation to bidders.

21. BHEL shall not have any liability to bidders for any interruption or delay in access to the site irrespective of the cause. In such cases, the decision of BHEL shall be binding on the bidders.

22. Other terms and conditions shall be as per bidder's techno-commercial offers and other correspondences, if any, till date.

23. If there is any clash between this business document and the FAQ available, if any, in the website of **M/s. _____**, the terms & conditions given in this business document will supercede the information contained in the FAQs. Any changes made by BHEL/ service provider (due to unforeseen contingencies) after the first posting shall be deemed to have been accepted if the bidder continues to access the portal after that time.

24. Bidder shall not divulge either his Bids or any other exclusive details of BHEL to any other party. If the Bidder or any of his representatives are found to be involved in Price manipulation/ cartel formation of any kind, directly or indirectly by communicating with other bidders, action as per extant BHEL guidelines for suspension of business dealings (as available on www.bhel.com), shall be initiated by BHEL.