INDIAN INSTITUTE OF TROPICAL METEOROLOGY, PASHAN, PUNE – 411 008, INDIA

File No.PS/128/75/2008

TECHNICAL SPECIFICATIONS FOR UNINTERRUPTABLE POWER SUPPLY SYSTEM:

1. **GENERAL:**

This section includes specifications and description of requirements of 3 phase uninterruptable supply (UPS) for providing high quality A.C. power for HPC Rack (8.4TF).

2. **SCOPE: -**

The scope shall include design, supply, installation, testing and commissioning of the complete UPS system and related accessories including

I) Supply of complete UPS system as per specifications.
ii) Supply of Load and Battery sharing panels / Battery circuit breakers as required.
iii) Supply of sealed maintenance free Batteries with Battery racks for 15 minutes Backup for additional HPC Rack.
iv) Complete shop testing of all systems including harmonic analysis, UPS operation under linear and non-linear load condition etc.
v) Delivery at site, handling, installation of complete system including interconnection from the UPS system to batteries and to input / output panels switches. All interconnections shall be done using multistrand Flexible Cu. conductor cables of appropriate sizes. Outgoing neutral cables shall be of double capacity.
vi) Complete testing of system on load.
vii) Supply, installation, testing and commissioning of incoming switchgear box for UPS as per detail and SLD.
viii) Supply, laying, testing and commissioning of incoming and outgoing cables of UPS as per attached SLD & detail specifications.
ix) Supply, installation and commissioning of PDU's as per detailed SLD and specifications.
x) Service backup by engineer till system is fully operational as and when required.
xi) Supply & installation of cable trays with supports as per SLD.

3. **FUNCTIONAL & STATUTORY REQUIREMENTS :**

a) The system shall be 3 phases Input / 3 phases Output, static ON LINE configuration UPS with all latest functional facilities.
b) The system shall confirm all IEC regulation minimum for installation and relevant IS standards, statutory requirements.
c) Complete Electronic and switching assemblies shall be mounted in one single metal cabinet 14SWG CRCA sheet fabricated and powder coated (RAL 7032) finish with due ventilation. The degree of protection unless otherwise specified shall be IP 52.
d) The operating height for UPS should not be more than 1800 mm from finished floor level.

4. **SYSTEM SPECIFICATION :**

a) The system requirement are as follows:

1No. X 200KVA UPS 2 Nos. (To be used as main & alternate) 3 phase input - 3 phase output with 15 Minutes Battery backup for additional HPC rack.

HPC UPS systems shall be IGBT based with latest facilities and RS 232 interface card with potential free contacts for attaching it to BMS system for central monitoring and should have dial out facility with GSM model. Necessary software shall be provided for central BMS system. The system should have tuned inbuilt isolation transformer at output.

b) Configuration: The system shall have following operation features.

- Normal Condition: Supply the load with power flowing from the normal A.C. source through rectifier and inverter with battery-connected parallel with rectifier output.
- Abnormal Condition: Whenever supply deviates on voltage, frequency or waveform beyond the specific limits, the battery bank supplies constant output for load through inverter.
  - i) The output supplied to the loads shall be constant without switching or disturbance, when the main A.C. Supply fails.
  - ii) The same way when normal supply returns the inverter is synchronized with external source and load is transferred.
  - iii) The rectifier shall also charge the discharged batteries on return of normal supply and shall automatically shift to float charge when batteries are fully charged.
  - iv) When any UPS element fails and normal supply is available the static by pass switch shall switch the load directly.
  - v) The bypass switch operates in same way as above in case of UPS system fault and returns load to UPS system once fault is cleared.
  - vi) UPS should not go to bypass automatically when battery test failure.

c) SYSTEM FOR NEW HPC RACK UPS

i) Service Conditions: System should be able to operate in following environmental conditions without derating or damage.

Ambient temperature : O^0C to 50^0C
Humidity : O to 95% relative.
Altitude : Upto 1000 mtr above mean sea level.

ii) Characteristics for

(1) Input voltage shall be 415 V 4 wire + Earth, 50 Hz.
(2) Output voltage 415 V 3 phase, 4 wire + Earth, 50 Hz.

iii) The system performance under steady state and transient load conditions shall remain within specified limits for entire backup period when supplied through batteries.

iv) The system performance under steady state and transient load conditions shall remain within specified limit for steady AC input voltage and frequency variations of ± 10% and ± 5% respectively of rated values and harmonic contents upto 5% (max.) for nonlinear loads.

d) LOAD COMPATIBILITY

The UPS system shall be compatible with following loads and load characteristics.

Rack Load: There is one additional rack for HPC (8.4TF) of 124.1 KW.

Computer & electronic Load with high harmonics upto 15% individual harmonics 5% of fundamental with aggregate load consisting 90% of UPS capacity.

e) PERFORMANCE:

i) Overall system efficiency shall be as follows.
   At 100% Load : 93% or more
   At 75% Load : 92.5% or more
   At 50% Load : 92.5% or more

ii) Noise level: The normal noise level emanating from machine when measured at 1.2 mtrs under normal conditions shall be less than 60 Db.

iii) Maximum inrush: Maximum inrush charging current shall be 6 times full load current.

iv) Output voltage and frequency should be 400V± 2% and 50± 0.5% respectively with an option to select 380/400/415 Volts as the nominal output voltage. This voltage & frequency tolerance should not be exceeded over the full range of load (balanced or unbalanced) and full range of battery voltage.

v) Maximum Harmonic contents shall be 3% of RMS total and 2% of RMS for single Harmonic on input of UPS.

vi) Overload Capacity: 125% of full load for 10 minutes and 150% for 30 seconds.

vii) Transition Response Time (TRT):- 15 ms.

f) SYSTEM COMPONENTS

i) The device shall include solid-state rectifier / Battery Charger, Inverter, Static bypass, system controls with hermetically sealed components. These components shall have suitable independent housing in cabinet.

ii) All assemblies shall be arranged for easy maintenance & plug-in modules & shall have adequate supports.

iii) Transient voltage surge suppressors shall be provided for protection of components from transient & switching surges.

g) RECTIFIER CHARGER:

i) The rectifier shall be of adequate capacity to supply inverter under full load conditions & simultaneously charge the batteries from full discharged state.

ii) Inherent harmonics suppressions in the Rectifier design shall reduce the harmonic to less than 10% under all load conditions.

iii) Float charging requirements for battery bank as per manufacturer's recommendations for voltage & charging current shall be fulfilled.

iv) 3 phase self-cooled double winding dry type transformer with grounded electrostatic insulated shield between the windings shall be provided at output (tuned isolation transformer).

v) Input power factor: Unity

h) BATTERY:

Batteries shall be sealed maintenance free Lead-Calcium or NI-CD unit with life expectancy of minimum 8 Years, mounted on racks with battery disconnect & intercell connectors. Scope includes battery bank connections and providing safety Barriers for all busbars and cable connection leads on battery racks. Battery MCCB should be provided with reverse polarity protection. Time required for charging the battery when batteries are fully discharged is 15 Hrs without interruptions.

i) INVERTER:

Pulse - width modulated with sinusoidal output.

i) Static bypass switch shall be full rated continuous duty rated switch.
ii) Maintenance bypass: The switch shall be located behind lockable door. Key interlock shall be provided for the bypass with the static bypass such that it can be operated only when SBS is in service.

j) INDICATIONS & CONTROL:

All displays, indications, & basic system controls shall be provided on common control panel on front UPS cabinet, as listed bellow & shall be supported by sensors, transducers, Relays, wiring terminals as required. All indications shall be labeled with LED displays or plain language / LCD displays.

5. Quantity Indications:

a. Input voltage phase & line.
b. Input current phase & line.
c. Bypass input Voltage & frequency.
d. System output voltage phase & line.
e. System output current phase & frequency.
f. D.C. Bus voltage.
g. Battery current & direction.
h. Battery discharge elapsed time.

6. Visual Indications :

a) Normal operation.
b) Load on battery.
c) Inverter OFF.
d) Alarm condition.

7. Alarm Indications:

Alarm system should have audio (Hooter, with a manual alarm silence option), visual indications (LED) for following failures and reporting over digital interface.

a) Input & Bypass A/C under voltage, over voltage, under frequency & over frequency.
b) Input / bypass input & inverter out of Synchronization.
c) Input & Bypass single phasing.
d) Input & Bypass reverse phase sequence.
e) Battery system alarm.
f) Control power failure.

g) Fan failure.
h) UPS overload.
I) Battery Operation end.
j) Battery under voltage shut down.
k) Battery charging control fault.
l) Isolation Transformer overheat.
m) Inverter overload.
n) Static bypass overheat.
   a. Inverter fuse blow.
   b. Inverter power supply fault.
   c. Inverter O/P under voltage / over voltage.
   d. Inverter contactor open.
   e. Inverter sensor fault.

8. Control on front board.

a) Inverter ON - OFF.
b) UPS start.
c) Battery test - On line.
d) Alarm accepts / reset.
e) Output voltage adjustment.

9. Complete mimic including single line diagram of UPS shall be provided on front board.

10. The metering instruments used shall be digital with 0.5 class accuracy.

11. On line battery-testing facility shall be provided as a feature when UPS is operating on normal mode. If the battery bank fails on test the load shall be automatically transferred to static bypass with alarm.

12. REMOTE MONITORING & CONTROL :

Facility & interface with modem & connectors for data transmission via RS 232 or equivalent link upto computer & BMS. Any software required for this shall be also is in scope along with training to clients system Engineers.
Interface card with potential free card shall also be provided as part of supply.
Dial out facility with GSM model shall be provided.

13. MECHANICAL FEATURES :

The enclosures shall be 14 SWG CRCA sheet treated & powder coated pertaing to IS 8623 and the colour shall be RAL 7032 unless otherwise specified.
Also redundant fans & blowers shall be provided such that fresh air is drawn from bottom & let out from top rear.

14. QUALITY TESTS :

Entire system shall be completely checked & tested for all functions, displays including;

a. Full load test.
b. Transient Analysis.
c. Over voltage test.
d. Power failure test.
e. Efficiency at 25%, 50%, 75% & 100% loads.

15. EXECUTION :-

a. INSTALLATION :

i. The entire system shall be installed as per manufacturer's recommendations & instructions including all interconnections for supply & control circuits.

ii. A minimum working space shall be maintained around the equipment as per shop drawings, Consultant's reference drawings & relevant standards.

iii. All components shall be clearly identified using labels including battery cells individually.

iv. Services of authorized representative or manufacturer for supervision of installation, connections, testing, & adjustments shall be provided.

v. All cables shall be properly routed through cable trays and connected using proper lugs. All battery terminals need to be shrouded.

b. TESTING & COMMISSIONING :

i. Under supervision of manufacturer's representative all system functions, operations, protective features shall be checked & preset to ensure compliance or specifications.

ii. Test the system as per recommendations & test listed bellow using precalibarated instruments preferably by third party inspection agency.

1. Load simulation.
2. Simulation of malfunctions to verify protective device operations.
3. Duration of supply on emergency. Low battery voltage alarm & shutdown, transfer & restoration of normal supply.
4. Harmonic contents of input & output current under all load conditions.
5. Remote status & alarm tests.

In case of test any shortfalls / faults, the same shall be rectified & test procedure shall be again repeated to establish satisfactory performance.

iii. Record individual cell voltage & equalize the charging of the cells as per manufacture's recommendations.

c. CLEANING :-

On completion of installation, testing of the system all components, cabinets etc. shall be cleaned & unwanted material, debris shall be removed from site. Scratches dents if any shall be cleaned & touched up to match the original finish.

d. DRAWINGS & MANUALS :

Following drawings & manuals / information shall be submitted in at least THREE copies at appropriate stages & for handing over the system.

i. Manufacturer's data for product, features, components & performance along with the offer.

ii. Operation & maintenance manual with;
    1. List of recommended spares & replacement components.
    2. Detail operating instructions covering operations in normal & abnormal conditions.
    3. Shop drawings showing detail fabrication, assembly of components, internal & interconnecting wiring, dimensions, plans & views, installation details access & clearance etc for approval.
    4. Product certificates for Brought out items.
    5. Factory test certificates & Inspection report.
    6. Field test reports.

16. AFTER SALES SERVICE :-

a) Round the clock Service shall be guaranteed by supplier during defect liability period / guarantee period.
A certain minimum stock of spares shall be maintained by supplier at site.

b) Supplier shall also quote for 24 x 7 services through their authorized service engineer for a period of at least 3 years after guarantee period.

17. Supplier shall offer an unconditional guarantee / warranty of equipment for a Period of 36 months against any failure.

Approved List of Materials as detailed below or equivalent make

Contactors, OL Relays	:	Siemens / Schneider (MG) / L&T
Meters (Analog)	:	Rishabh (L&T) / AE. / SECURE.
CTS'	:	AE / Kappa / C & S
Indicating Lamps (LED only)	:	Altos / RASS / Teknik
Relays (Protections)	:	EE / AVKSEGC / ESSUN. / ABB / L & T
MCCB & Accessories	:	GROUP SCHNEIDER (MG) / ABB. / SIEMENS / L&T
Wires (HRFR)	:	Finolex / LAPP / RR
Connectors (Color coded)	:	Wago Control / Connectwell / ELMEX
Selector switches	:	Kaycee / Sulzer / Teknik
Insulators	:	Vinayak or equiv.
Batteries	:	Exide / Amaron / National Panasonic
Cables Cu Conductor	:	FINOLEX / RR / LAPP / GEMSCAB / POLYCAB

INDIAN INSTITUTE OF TROPICAL METEOROLOGY PUNE 411 008

TERMS & CONDITIONS

ENQUIRY NO: **PS/128/75/2008**

1) The Tenderers are requested to give detailed sealed tender in their own forms in two Bids i.e.
   Part – I Technical Bid.
   Part - II Commercial Bid, both the bids addressed to the Director, Indian Institute of Tropical Meteorology, Dr. Homi Bhabha Road, NCL Post, Pashan, Pune – 411 008, INDIA.

2) This tender is not transferable.

3) **If a request is made to IITM for Tender Documents a sum of Rs.300 (Rs. Three Hundred only) (Non-refundable) has to be paid in the form of Demand Draft drawn in favour of "The Director, Indian Institute of Tropical Meteorology, Pune". In case the bidders download the Tender Documents from the website of the Institute, the document fee Rs.300 (Rs. Three Hundred only) in the form of Demand Draft is required to be enclosed while submitting the tender. Otherwise tender will not be considered.**

4) Tenders addressed to the Director, Indian Institute of Tropical Meteorology, Pune 411008 are to be submitted for each item in duplicate in double cover, under two bids system. Superscribed with Tender No. **PS/128/75/2008** for purchase of **"UNINTERRUPTABLE POWER SUPPLY SYSTEM" – Qty 02 Nos.** due on **18th March 2009.**

5) You have to submit two separate bids in two separate envelopes and you may keep both the bid envelopes in an envelope for sending to us.

   One envelope will contain only the TECHNICAL SPECIFICATIONS of the indented equipment.

   Another envelope will contain only the financial bid in which price and any other information, which has financial implications, will only be given.

   The main envelope, which will contain both the bids, should be super scribed with our tender enquiry No.**PS/128/75/2008** due on **18th March 2009.**

6) Please indicate page nos. on your quotation ex. If the quotation is containing 25 Pages, please indicate as 1/25, 2/25, 3/25 ----------25/25.

7) Cost of the items should be mentioned clearly in the Commercial Offer (Part-II) only. The optional and any other essential items / accessories required for the

maintenance of the equipment for the next three years should also be specified in the offer separately.

8) Last date for the receipt of completed tender is up to 17:00 hrs. on **18th March 2009.** Tenders will be opened at 15:00 hrs. on **19th March 2009** in the presence of the representatives of the vendors present.

9) The tender must be valid for a period of at least 90 days from the date of opening.

10) The purpose of certain specific conditions is to get or procure best Equipment / service etc. for IITM. The opinion of Technical Committee shall be guiding factor for Technical short listing.

11) Supplier shall finally warrant that all the stores, equipment and components supplied under the SUPPLY ORDER shall be new and of the first Quality according to the specifications and shall be free from all the defects (even concealed fault, deficiency in the design material and workmanship).

12) Tender must clearly indicate the features offered, unit price, VAT tax, transport, transit-insurance, installation charges. Institute cannot furnish any certificate for exemption or reduction in VAT tax or any other duty/tax. The vendor should mention the price of the equipment and the duties/taxes to be paid such as customs duty/excise duty/VAT taxes etc. separately.

13) The complete equipment including operational manuals should be supplied within stipulated period mentioned in the supply order and the vendor should install and commission the equipment within **ten days** after the delivery of the equipment.

14) i) As this Institute is exempted from payment of Custom Duty and Excise Duty, exemption certificate will be issued on request.

ii) The Institute is exempted from payment of Octroi Duty. Necessary certificate will be issued on request, if required.

15) i) The equipment must carry on-site warranty for **Three Years** from the date of taking over of the equipment after the acceptance tests. Warranty period will stand extended for a period of total downtime of the UPS System.

ii) The batteries must carry on-site warranty for minimum period of 12 months from the date of installation.

16) The vendor has to furnish a Bank Guarantee to the extent of 10% of the order value from a nationalized bank in the prescribed format valid for the entire period of warranty including extension if any.

17) No advance can be paid.

18) The payment terms shall be as follows:

i) 50% payment against delivery.

ii) 40% payment after satisfactory installation, commissioning and successful completion of acceptance tests and training.

iii) 10% payment after execution of Bank Guarantee from a Nationalized Bank and successful completion of acceptance test. The Bank Guarantee will remain valid until the expiry of warranty period including the extensions if any.

19) The prices quoted should be firm and irrevocable and not subject to any change whatsoever, even due to increase in cost of raw material components and fluctuation in the foreign exchange rates and excise duty.

20) Vendor should arrange appropriate training to the users free of charge.

21) Indicate the names of the Indian reputed Organizations where you have supplied the similar equipment and may attach the satisfactory performance report of the equipment from user Organization.

22) a) If you have supplied identical or similar equipment to other Institutes under Ministry of Earth Sciences and Ministry of Science & Technology, the details of such supplies for the preceding three years should be given together with the prices eventually or finally paid.

b) Based on the above information IITM will have its option to obtain details of the equipment, their performance, after sales services etc. for evaluation of the tender, directly from the concerned Labs. /Scientists etc.

23) The Institute is autonomous scientific research organization under the Ministry of Earth Sciences and is a recognized center for studies leading to M.Sc. and Ph.D. of the University of Pune and various other Universities. As such, all possible concessions / discounts / rebates applicable for educational Institutions may be given.

24) Any upgrade of OS and associated other software during the warranty period should be supplied free of charge.

25) The vendor should have appropriate facilities and trained personnel for supply, installation, commissioning and warranty-maintenance of the equipment to be supplied. Detailed information in this regard may be furnished.

26) Kindly attach a of copy of your latest DGS&D, New Delhi registration Certificate under the compulsory Scheme of Ministry of Finance regarding the registration of Indian Agent of foreign supplier wherever it is applicable.

27) The Tenderer is required to furnish the Permanent Account Number (PAN) Allotted by the Income Tax Department. If registered with the National Small Industries Corporation, the registration number, purpose of registration and the validity period of registration' etc. should also be provided in Technical Bid for Indian Agents.

28) Vendor should clearly mention the following:

- **Make and model of every item quoted.**
- Delivery period.
- Company profile with a list of those institutes/users should be attached where vendor has supplied the equipments in question in past.
- A letter of AUTHORISED REPRESENTATIVE from the Principal should invariably be attached with quotation
- A copy of latest Income Tax clearance Certificate from Income Tax Department (INDIA)

29) Discount offered should be mentioned clearly in the commercial bid only.

30) The Tenderers are requested to quote for Educational Institutional Price for Equipment and Software, since we are eligible for the same.

31) Acceptance tests to be prescribed later will be carried out after installation and the items will be taken over only after successful completion of the acceptance tests.

32) The Equipments are required to be installed at **IITM**, **Pune** and subsequently Training is to be provided to the concerned persons of the Institute.

33) The item should be supplied with manuals and the manuals including technical / Electronic drawings / circuit diagrams should be complete in all respects to operate the system without any problem.

34) The Tenderer has to state in detail the Electrical Power/UPS requirements, floor Space, head room, foundation needed and also to state whether Air-conditioned environment is needed to house the system and to run the tests. i.e. pre-installation facilities required for installation may please be intimated in the technical bid.

35) Goods should not be dispatched until the Vendor receives a firm order.

36) The Date and Time of opening for Part-II (Commercial Bid) will be intimated only to pre-qualified and technically acceptable Tenderers for the item at a later date.

37) **Earnest Money Deposit:**

a) The Earnest Money Deposit of Rs.1,00,000/- (Rs. One Lakhs only) must be paid / sent along with your technical bid in the form of a Demand Draft, Banker cheque or Bank Guarantee (from a Nationalized Bank only) drawn in favour of The Director, Indian Institute of Tropical Meteorology, Pune payable at Pune,

otherwise your technical & financial bids will not be considered at all. The Earnest Money of successful bidder will be returned only after installation, commissioning, satisfactory demonstration and on acceptance of the equipment by the user Scientist / HOD as per the terms of our purchase order. If the successful bidder fails to fulfill the contractual obligations before the due date, he will forfeit the EMD.

The Earnest Money of the unsuccessful bidder whose technical bid has not been found suitable will be returned within 15 days after receipt of Technical Committee recommendations.

b) Those who are registered with Central Purchase Organization (e.g. DGS&D), National Small Industries Corporation or the concerned Ministry / Department need not to furnish EMD along with their bids.

c) Though EMD has to be submitted by Demand Draft, Banker's Cheque or Bank Guarantee, we prefer to have Bank Guarantee for easy return to the bidders once a decision is taken by IITM. (Specimen of Bank Guarantee is enclosed at Annexure 'A').

d) Tenders not accompanied with Demand Draft I Bank Guarantee towards "Earnest Money Deposit" will summarily be rejected.

38) Part and incomplete tenders are liable to be rejected.

39) Conditional Offers will not be considered.

40) The tenders must be clearly written or typed without any cancellations / corrections or overwriting.

41) **Fax** / **E-mail** / **Telegraphic** / **Telex tenders will not be considered.**

42) IITM will not be responsible:
   a) For delayed / late quotations submitted / sent by Post / Courier etc.
   b) For submission / delivery of quotations at wrong places other than the Office of Director, IITM, Pune

43) If the supplier fails to Supply, Install and Commission the system as per specifications mentioned in the order within the due date, the Supplier is liable to pay liquidated damages of one percent value of the Purchase Order awarded, per every week delay subject to a maximum of 10% for every week beyond the due date and such money will be deducted from any money due or which may become due to the supplier.

44) In case of any dispute regarding part-shipment, non-compliance of any feature etc., the Director, Indian Institute of Tropical Meteorology, Pune will be the final authority to decide the appropriate action and it will be binding on the vendor.

45) Director reserves the right to reject any or all tenders without assigning any reason.

46) Last Date and Time for receipt of Tenders: **Upto 17:00 hrs. on 18th March 2009.**

47) Date and Time of opening of Tenders:**At 15:00 hrs. on 19th March 2009.** (Part - I Technical Bid only)

(S. R. Nirgude)
Senior Technical Officer-II
For Director
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