

INVITATION FOR TENDER FOR SUPPLY OF EQUIPMENT

Sealed tender offers are invited in two separate sealed covers (Technical and Commercial offers) from eligible manufacturers/suppliers or their direct Indian agents for the supply of the following.

30kWp power stack and its console

Please send offers, in two separate envelopes for technical and commercial along with descriptive catalog/brochure. The validity of the bid should be at least four months (120 days) or more from the date of the opening of this tender please ensure that your quotation reaches not later than 29.01.2018 at 15:00 hours at the following address:

**Prof. Chandan Chakraborty,
Department of Electrical Engineering
Indian Institute of Technology Kharagpur
Kharagpur 721 302, India**

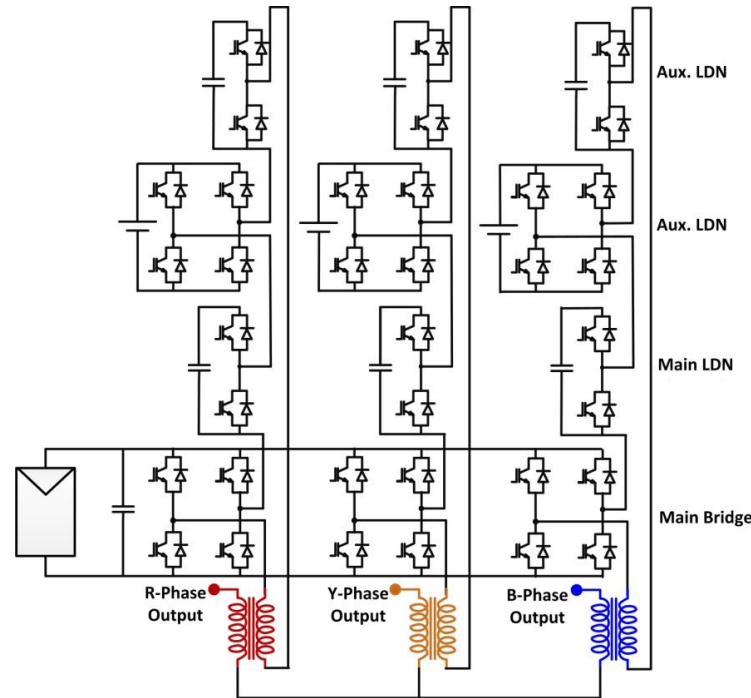
Earnest money of **Rs. 3000/-** is to be deposited in the form of Account payee Demand Draft in favour of IIT Kharagpur, payable at Kharagpur, India. Any bid which is not accompanied with an EMD shall be summarily rejected. Earnest money deposited will be forfeited if the tenderer withdraws or amends its tender or impairs or derogates from the tender in any respect within the period of validity of its tender. No interest will be paid on the earnest money of the unsuccessful bidders.

| | |
|---|---|
| Tender reference | IIT/SRIC/EE/RER/CC//2017 -18/EQ- 4 Dated, 26.12.2017 |
| Price of the tender document | Nil |
| Last date and time for submitting the tender document | 29.01.2018 at 15.00 hrs (Indian standard time) |
| Time and date of opening of bids | 29.01.2018 at 16.00 hrs (Indian standard time) |
| Place of opening tender offers | Department of Electrical Engineering Indian Institute of Technology Kharagpur Kharagpur 721 302, India |
| Address of communication | As stated above |
| Contact telephone numbers | 03222-283096 |
| Email | cc@ee.iitkgp.ernet.in |

Tendering Document for 30kW power Stack and its console

Requirement of 30kW power stack with its console consisting power stack with cooling arrangement and gate-driver circuit, bus-bars, cables (wherever applicable), voltage and current sensors, dedicated power supply of the gate-drivers and sensors, proper terminal connectors. Following specifications must be satisfied for the same:

1. Circuit Diagram



2. **Switches:** for the main bridge: 1700V, 100A IGBT: SKM100GB17E4 or equivalent

For Main LDN: 1200V 100A IGBT: SKM100GB12V or equivalent

For Auxiliary Bridge: 600V 100A IGBT: SKiiP 28GH066V1 or equivalent

For Auxiliary LDN: 200V 100A MOSFET: SKM 180 A020 or equivalent

3. **Voltage sensors:** All voltage sensors should be LEM make Hall-effect sensor or equivalent. Location of the sensors: should be available across each capacitor.

4. **Current Sensors:** LEM make Hall-effect current sensors or equivalent. Location of the sensors: should be able to measure PV array input current and all three-phase output current

5. **Capacitors:** Main Bridge capacitor: 1000V 6500 μ F equivalent (EPCOS/ALCON/SIC-SAFECO make)

Main LDN capacitor: 500V 6500 μ F equivalent (EPCOS/ALCON/SIC-SAFECO make)

Aux Bridge capacitor: 200V 10000 μ F equivalent (EPCOS/ALCON/SIC-SAFECO make)

Aux LDN capacitor: 100V 20000 μ F equivalent (EPCOS/ALCON/SIC-SAFECO make)

6. **Connectors:** All power terminals in the above figure should be accessible through connector with 100A current carrying capacity. All signal level terminals should be accessible through Connect-Well or equivalent screw-on connector.

7. Gate Drivers: All gate-drivers should be Semikron/Concept make

Note: All gate drivers must be active high with inherent dead-time.

8. Transformers: All three open-winding transformers should have 12kVA rating with primary voltage 280V and secondary voltage 240V. Transformer insulation class: F. With integrated temperature sensor/thermostat that can send cut-off signal at 120°C. Transformer core must be CRGO.

9. PV array side DC breaker: 1000V 50A dc breaker

10. Heat Sink and fan assembly: Semikron make

11. Cabinet: IP55 complied using rubber gasket and more than 2mm thick sheet-metal with appropriate cooling vents.

12. General arrangement and drawing: On suppliers' scope. All bus-bar terminals and components should be accessible for replacement

Other important Features/Protections of Inverter:

1. Over load capacity (for 10 sec) should be 200% of continuous rating.
2. The Inverter shall be self-commuted and shall utilize a circuit topology and components suitable for meeting the specifications listed above at high conversion efficiency and with high reliability.
3. Inverter shall provide panel for display of PV array DC voltage, current and power, AC output voltage and current (All 3 phases and lines), AC power (Active, Reactive and Apparent), Power Factor and AC energy (All 3 phases and cumulative) and frequency. Remote monitoring of inverter parameters should also be available.
4. The inverter shall include adequate internal cooling arrangements (exhaust fan and ducting) for operation in a non-AC environment.
5. Max. Permissible DC input voltage shall be 1000-1500V.
6. Three separate isolated bi-directional ac-dc converter of 1kW rating (for each) has to be provided in the power cabinet along with its controller the converters should be able to link between 120V dc source and 220V ac source.

Factory Testing:

1. Factory testing shall not only be limited to measurement of phase currents, efficiencies, harmonic content and power factor, but shall also include all other necessary tests/simulation required.

Operation and Maintenance (O&M)

The repair/replacement work shall be completed within 48 hours from the time of reporting the fault.

Warranties

1. Warranty for Inverters - 5 years
2. On rest of the components back-to-back warranty from vendors.
 - a. Defect Notification Periods for Specific Materials:

GENERAL TERMS & CONDITIONS

PLEASE SPECIFICALLY INDICATE THE FOLLOWING POINTS IN YOUR QUOTATIONS AND COMPLY THE TERMS AS MENTIONED HEREUNDER:-

1. TENDER ARE INVITED COMPLYING THE REQUIREMENT FOR TENDER AS DETAILED IN THE TENDER SPECIFICATION TO BE SUBMITTED IN THE COMPANY'S / FIRM'S LETTERHEAD NEATLY PRINTED / TYPED DULY SIGNED BY AUTHORIZED PERSON WITH THE SEAL OF THE BIDDERS. ALL ENVELOPS CONTAINING THE TENDER SHOULD BE PROPERLY SEALED. SEPARATE ENVELOPS SHOULD BE USED FOR TECHNICAL AND PRICE BID AND INDICATION TO THEIR EFFECT MAY PLEASE BE SUPERSCRIBED ON THE ENVELOP.
2. TECHNICAL CATALOGUE/LEAFLET SHOULD BE ENCLOSED WITHOUT FAIL. PROVIDE COMPLIANCE STATEMENT WITH RESPECT TO THE TECHNICAL SPECIFICATIONS MENTIONED ABOVE.
3. PLEASE CONFIRM WHETHER YOU ARE AUTHORISED TO QUOTE ON BEHALF OF YOUR PRINCIPALS AND IF SO, PLEASE ENCLOSE A COPY OF SUCH AUTHORISATION WITH YOUR QUOTATION.
4. **PERIOD OF VALIDITY:** BIDS SHALL REMAIN VALID FOR ACCEPTANCE FOR A PERIOD OF 120 DAYS FROM THE DATE OF OPENING.
5. **SCOPE OF SUPPLY:** SHOULD INCLUDE INSTALLATION AND COMMISSIONING
6. PAYMENT TERMS:
 - a) RUNNING BILLS PROPORTIONATE TO THE PROGRESS OF WORK WILL BE PAID CULMINATING TO A MAXIMUM OF 75% OF THE JOB VALUE.
 - b) 90% OF THE PAYMENT WILL BE MADE FOR ALL ITEMS AFTER COMPLETION OF THE WORK.
 - c) 10% OF THE WORK ORDER VALUE WILL BE RELEASED AFTER 6 MONTHS FROM THE DATE OF COMPLETION OF THE WORK.
 - d) THE BANK GUARANTEE (5% OF THE WORK ORDER VALUE) AS PER FORMAT ENCLOSED WOULD SERVE AS A PERFORMANCE GUARANTEE UPTO 5 YEARS AFTER COMPLETION OF THE WORK.
 - e) YEARLY MAINTENANCE AND OPERATION CHARGES TO BE CLAIMED EVERY YEAR AFTER COMPLETION OF YEARLY MAINTENANCE.
 - f) NO MOBILIZATION ADVANCE.
7. ARRANGEMENT FOR SAFETY PROVISIONS:

IN RESPECT OF ALL LABOUR DIRECTLY OR INDIRECTLY EMPLOYED IN THE WORK FOR THE PERFORMANCE OF THE CONTRACTOR'S PART OF THIS CONTRACT, THE CONTRACTOR SHALL AT HIS OWN EXPENSE ARRANGE FOR THE SAFETY PROVISIONS AS PER SAFETY CODE FRAMED FROM TIME TO TIME AND SHALL AT HIS OWN EXPENSE PROVIDE FOR ALL FACILITIES IN CONNECTION THEREWITH. IN CASE THE CONTRACTOR FAILS TO MAKE

ARRANGEMENT AND PROVIDE NECESSARY FACILITIES AS AFORESAID, HE SHALL BE LIABLE TO PAY A PENALTY OF RS.500/- FOR EACH DEFAULT AND IN ADDITION THE EMPLOYER SHALL BE AT LIBERTY TO MAKE ARRANGEMENT AND PROVIDE FACILITIES AS AFORESAID AND RECOVER THE COST INCURRED IN THE BEHALF FROM THE CONTRACTOR.

8. SUBMISSION OF LABOUR RETURN:

THE CONTRACTOR SHALL SUBMIT A STATEMENT TO THE CONCERNED ENGINEER AS FOLLOWS:

1. THE NUMBER OF LABOURERS EMPLOYED BY HIM ON THE WORK
2. THEIR WORKING HOURS
3. THE WAGES PAID TO THEM

9. RULES, FRAMED BY GOVT. TO BE COMPLIED:

IN RESPECT OF ALL LABOUR DIRECTLY OR INDIRECTLY EMPLOYED IN THE WORKS FOR PERFORMANCE OF THE CONTRACTORS PART OF THIS CONTRACT, THE CONTRACTOR SHALL COMPLY WITH OR CAUSE TO BE COMPLIED WITH ALL THE RULES FRAMED BY GOVERNMENT FROM TIME TO TIME FOR THE PROTECTION OF HEALTH AND SANITARY ARRANGEMENTS FOR WORKERS EMPLOYED BY THE CONTRACTORS.

10. TIME AND EXTENSION FOR DELAY :

THE EXECUTION OF THE WORK SHALL COMMENCE FROM THE DATE OF HANDING OVER THE SITE. IN CASE, DELAY IN EXECUTION MUST BE COMMUNICATED TO THE ENGINEER (AUTHORITY) WELL IN ADVANCE WITH PROPER REASONS LIKE : ABNORMALLY BAD WEATHER, SERIOUS LOSS OR DAMAGE BY FIRE, CIVIL COMMOTION, LOCAL COMMOTION OF WORKMEN, STRIKE AFFECTING ANY OF THE TRADES EMPLOYED ON THE WORK.

11. L.D.CLAUSE : @ 0.5% OF THE CONTRACT VALUE PER WEEK OF DELAY SUBJECT TO MAXIMUM OF 10% OF CONTRACT VALUE.

12. COUNTRY OF ORIGIN OF THE GOODS IS TO BE MENTIONED.

13. THE INSTITUTE SHALL PROVIDE THE CONCESSIONAL CUSTOMS DUTY AND EXCISE DUTY EXEMPTION CERTIFICATE AS PER GOVT. NOTIFICATION NO. 51/96 CUSTOMS DATED: 23.07.1996 AND CENTRAL EXCISE DUTY EXCEMPTION IN TERMS OF GOVT. NOTOFICATION NO. 10/97 – CENTRAL EXCISE DATED: 01.03.1997 AS AMENDED FROM TIME TO TIME.

14. **LIQUIDATED DAMAGES:** THE STORES SHOULD BE DELIVERED / DISPATCHED TO DESTINATION AND READY FOR OPERATION NOT LATER THAN THE DELIVERY DATE SPECIFIED. IF THE SUPPLIER FAILS TO DELIVER ANY OR ALL THE STORES OR PERFORM THE SERVICE BY THE SPECIFIED DATE, LIQUIDATED DAMAGES AT 1% PER MONTH OR PART THEREOF IN RESPECT OF THE VALUE OF STORES WILL BE DEDUCTED FROM THE CONTRACT PRICE SUBJECT TO A MAXIMUM OF 5%. ALTERNATIVELY, THE ORDER WILL BE

CANCELLED AND THE UNDELIVERED STORES PURCHASED FROM ELSEWHERE AT THE RISK AND EXPENSE OF SUPPLIER.

15. **PATENT RIGHTS:** THE SUPPLIER SHALL INDEMNIFY THE PURCHASE AGAINST ALL THIRD PARTY CLAIMS OF INFRINGEMENT OF PATENT, TRADEMARK OR INDUSTRIAL DESIGN RIGHTS ARISING FROM USE OF THE GOODS OR ANY PART THEREOF IN INDIA.
16. ONLY THOSE BIDDERS WHO'S BIDS HAVE BEEN TECHNICALLY FOUND ACCEPTABLE WILL ONLY BE INVITED FOR PARTICIPATION IN THE PRICE BID.
17. THOSE BIDDERS WHO DO NOT RECEIVE ANY COMMUNICATION FOR PARTICIPATION IN PRICE BID OPENING MEETING MAY PRESUME THAT THEIR BID HAS NOT BEEN ACCEPTED BY THE INSTITUTE.
18. CONDITIONAL OFFER WILL NOT BE ACCEPTED.
19. LATE TENDERS I.E. TENDER RECEIVED AFTER THE DUE DATE AND TIME OF SUBMISSION AS MENTIONED ABOVE SHALL NOT BE ACCEPTED.
20. BIDDERS TO ENCLOSE THE FOLLOWING DOCUMENTS:-
 - A) CURRENT INCOME TAX AND SALES TAX CLEARANCE CERTIFICATES AND PAN NO.
 - A) BANKER'S SOLVENCY CERTIFICATE
 - C) SUMMARY OF AUDITED STATEMENT OF ACCOUNTS FOR THE LAST THREE YEARS TO BE ENCLOSED AND FINANCIAL HIGHLIGHTS AND THE KEY PERFORMANCE DURING THE LAST THREE QUARTERS TO BE ENCLOSED AS PER FORMAT:-

COMPANY'S KEY PERFORMANCE

| DESCRIPTION | JAN. TO MARCH | APRIL TO JUNE | JULY TO SEPT. |
|--------------------|---------------|---------------|---------------|
| GROSS REVENUE | | | |
| PROFIT BEFORE TAX | | | |
| PROFIT AFTER TAX | | | |
| RETURN ON INVESTED | | | |
| CAPITAL (ROIC) | | | |

- D) CUSTOMER SATISFACTION CERTIFICATE FROM ONE SUCH ORGANIZATION IS TO BE ATTACHED WITH THE TECHNICAL BID AND PRICE BID.
- E) NAME AND ADDRESS OF MINIMUM THREE CLIENTS TO WHOM SUCH EQUIPMENT HAVE BEEN SUPPLIED SHOULD BE MENTIONED.
21. **WARRANTY / GUARANTEE:** THIS COMPREHENSIVE WARRANTY / GUARANTEE SHALL REMAIN VALID FOR **60 MONTHS** AFTER THE GOODS (OR ANY PORTION THEREOF AS THE CASE MAY BE) HAVE BEEN DELIVERED AND COMMISSIONED TO THE FINAL DESTINATION.
22. THE INSTITUTE DOES NOT BIND ITSELF TO OFFER ANY EXPLANATION TO THOSE BIDDERS WHO'S TECHNICAL BID HAS NOT BEEN FOUND ACCEPTABLE BY THE EVALUATION COMMITTEE OF THE INSTITUTE.

ALL TENDERS (UNLESS OTHERWISE SPECIFIED) ARE TO BE SUBMITTED / HANDED OVER TO **PROF. CHANDAN CHAKRABORTY , DEPARTMENT OF ELECTRICAL ENGINEERING, INDIAN INSTITUTE OF TECHNOLOGY, KHARAGPUR - 721 302** AND ACKNOWLEDGEMENT TO BE OBTAINED.

IMPORTANT

1. IIT Kharagpur authority may accept or reject any or all the bids in part or in full without assigning any reason and does not bind itself to accept the lowest bid. The Institute at its discretion may change the quantity / upgrade the criteria / drop any item or part thereof at any time before placing the Purchase Order.
2. Promptly make arrangements for repair and / or replacement of any damaged item (s) irrespective of settlement of claim.
3. In case of any dispute, the decision of the Institute authority shall be final and binding on the bidders.
4. For any query pertaining to this bid document correspondence may be addressed to **Prof. Chandan Chakraborty**, at the address mentioned above.

LAST DATE FOR SUBMISSION OF SEALED BIDS: 29.01.2018

- 1) Please Note that the Institute remains closed during Saturdays & Sundays and all specified government holidays.
 - 2) Fax, e-mail Tender will not be accepted.
 - 3) The General Terms and Conditions as stated above relate to supply of stores / equipment /assets etc. and for specific service other terms and conditions of the Institute will apply.
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