

## INVITATION FOR TENDER FOR SUPPLY OF EQUIPMENT

Sealed tender offers are invited from eligible manufacturers/suppliers or their direct Indian agents for the supply of the following equipment.

### Supply of Motors and Motor Controllers

Please send offers, along with catalogues or brochures and technical specifications for quoted items. Interested vendors are requested to submit envelopes containing earnest money deposit (EMD) amount of Rs.2000/- (Envelope-I), Technical Bid (Envelope-II) and Commercial Bid (Envelope-III) placed in a larger sealed envelope super scribing with reference number IIT/SRIC/ME/BPD/VR/2018-19/EQ-1 Dated: 21st January, 2019. Validity of bid should be four months (120 days) or more from tender opening date. Please ensure that your quotation reaches below address by 14th February, 2019 3:00 PM:

**Prof. Vikranth Racherla,**  
**Associate Professor, Mechanical Engineering Department,**  
**Indian Institute of Technology Kharagpur – 721 302, West Bengal, India**

Earnest money deposit (EMD) of Rs. 2,000/- must be sent along with commercial and technical offers. EMD must be in the form of account payee demand draft in favour of “IIT Kharagpur”, payable at “Kharagpur, India”. Any bid not accompanied with an EMD will be rejected. EMD of unsuccessful bidders will be returned. No interest will be paid on the earnest money of the unsuccessful bidders. EMD will be forfeited if tenderer withdraws or amends its tender or impairs or derogates from tender in any respect within period of validity of its tender.

<b>Tender Reference</b>	<b>IIT/SRIC/ME/BPD/VR/2018-19/EQ-1, Dated: 21.1.2019</b>
<b>Price of Tender Document</b>	<b>NIL</b>
<b>Last Date and Time for submitting the tender document</b>	<b>14.2.2019 at 15:00 Hrs (Indian time)</b>
<b>Time and Date of Opening of Technical Bids</b>	<b>14.2.2019 at 16:00 Hrs (Indian time)</b>
<b>Place of Opening Tender</b>	<b>Office of Prof. Vikranth Racherla, Mechanical Eng. Indian Institute of Technology Kharagpur – 721 302, West Bengal, India</b>
<b>Address of Communication</b>	<b>As stated above</b>
<b>Contact Telephone Numbers</b>	<b>+91- 3222 – 282900 (Prof Racherla)</b>
<b>E-mail</b>	<b>vikranth.racherla@mech.iitkgp.ernet.in</b>

## TECHNICAL SPECIFICATIONS

Sl. No.	Item	Specifications	Qty. required	Estimated total Cost (Rs.)
1.	7.5 kW BLDC Motor	<ul style="list-style-type: none"> <li>• Power Rating: 7.5 kW</li> <li>• Back EMF: 72V RMS @ 3000 RPM</li> <li>• Rated Speed: 3000 RPM</li> <li>• Current Rating (Continuous): 105 A or higher</li> <li>• Torque Rating (Continuous): 24Nm or higher</li> <li>• Peak Torque Rating (10 seconds or longer): 1.5 times or higher of continuous rating</li> <li>• Copper wires used for each phase must have around 25 mm<sup>2</sup> or higher conductor cross-sectional area.</li> <li>• 4 pole pair or higher</li> <li>• Efficiency in range of 1000 to 3000 rpm must be higher than 85%</li> <li>• Peak efficiency must be higher than 92%</li> <li>• IP54 or better protection (protected from water spray and dust)</li> <li>• 65 dB or lower operating noise</li> <li>• 'F' class insulation and with vacuum impregnation of resin</li> <li>• Bottom mounting (preferred)</li> </ul>	03	1,50,000
2	BLDC Motor Controller	<ul style="list-style-type: none"> <li>• Input Voltage Range: 24V to 96V or wider</li> <li>• Motor Current Rating Continuous: 140A or larger</li> <li>• Motor Current Rating, peak, 30 seconds: 350A or larger</li> <li>• Throttle Input: 0-5V (1-4V). Producing 0-5V(1-4V) signal with 3-wire pot or a pedal supplied by you</li> <li>• Current control loop</li> <li>• Hardware over-current protection</li> <li>• Hardware over-voltage protection</li> <li>• Support torque mode, speed mode control</li> <li>• Configurable limit for motor current and battery current</li> <li>• LED fault code</li> <li>• Software for configuring the motor controller must be provided or made available for free</li> <li>• Should be compatible with motor being</li> </ul>	02	1,00,000

		<p>supplied</p> <ul style="list-style-type: none"> <li>• Thermal protection: current cut back, warning and shutdown on high temperature</li> <li>• Support motors with any number of poles</li> <li>• Configurable high pedal protection</li> <li>• Supports regenerative braking</li> </ul> <p>Reference Model - KBL96351E,24-96V,350A,BLDC CONTROLLER/WITH REGEN</p>		
--	--	--	--	--

**IMPORTANT POINTS:**

- **The company must have service centers in India and must replace or repair the motors in 10 working days during the warranty and/or AMC period**
- **At least three references must be provided with whom we can independently confirm the quality and performance of motors being supplied**
- **Detailed technical specifications, data sheets, test reports, certifications, efficiency charts, etc. must be provided with the technical bid.**
- **Motor and motor controller manufacturer must be ISO/IEC (or equivalent) certified. Copy of the certificate must be provided with the technical bid.**
- **During delivery, motor must be run with motor controller for demonstration and testing of products. Requisite power supply, foot pedal, and wiring will be provided by us.**
- **Delivery must be within 90 days of issuance of PO**

## **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.

### **THE FOLLOWING DOCUMENTS ARE REQUIRED FROM THE INDIAN AGENTS OF FOREIGN FIRMS:**

1.1 FOREIGN PRINCIPAL'S PROFORMA INVOICE INDICATING THE COMMISSION PAYABLE TO THE INDIAN AGENT AND NATURE OF AFTER SALES SERVICE TO BE RENDERED BY THE INDIAN AGENT.

1.2 COPY OF THE AGENCY AGREEMENT WITH THE FOREIGN PRINCIPAL INDICATING THE NATURE OF AFTER SALES SERVICES, PRECISE RELATIONSHIP BETWEEN THEM AND THEIR MUTUAL INTEREST IN THE BUSINESS.

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. **PRICE BIDS FOR FOREIGN FIRMS:** PRICES ARE TO BE QUOTED ON 'EX-WORKS' DULY PACKED OR ON "FCA/FOB" INTERNATIONAL PORT" BASIS AND ALSO INCLUDING

AGENCY COMMISSION PAYABLE TO YOUR INDIAN AGENTS, IF ANY SHOWING CLEARLY THE FOLLOWING BREAK UP:-

- I) EX-WORKS PRICE
- II) PACKING & FORWARDING
- III) FREIGHT
- IV) ANY OTHER RELEVANT EXPENSES.
- V) TAXES PAYABLE BY THE INSTITUTE

INSURANCE WILL BE PAID BY OUR INSTITUTE SEPARATELY AND SHOULD NOT FORM PART OF THE QUOTED PRICE.

**PRICE BIDS FOR INDIAN FIRMS:** PRICES ARE TO BE QUOTED ON F.O.R., IIT KHARAGPUR, ON DOOR DELIVERY BASIS CLEARLY SHOWING THE BREAK UP.

5. **PERIOD OF VALIDITY:** BIDS SHALL REMAIN VALID FOR ACCEPTANCE FOR A PERIOD OF 120 DAYS FROM THE DATE OF OPENING.

6. INDIAN AGENTS ADDRESS AND PERCENTAGE OF AGENCY COMMISSION INCLUDED IN ABOVE F.O.B./EX-WORKS PRICE. (THIS WILL BE PAID TO THE INDIAN AGENTS IN INDIAN RUPEES ONLY AND NOT IN **FE**). PLEASE ENCLOSE COPY OF AGENCY AGREEMENT ENTERED INTO WITH YOUR PRINCIPALS INDICATING THE NATURE OF AFTER SALES SERVICES OF INDIAN AGENTS, PRECISE RELATIONSHIP & MUTUAL INTEREST IN THE BUSINESS.

7. **MEASUREMENTS/WEIGHT:** NETT/GROSS OF THE CONSIGNMENT. IN CASE OF AN ORDER, YOU SHALL USE AIR WORTHY PACKAGE (AS APPLICABLE) DULY CERTIFIED WITH DOCUMENTS – PLYTO – SANITARY CERTIFICATE (AS PER QUARANTINE ORDER 2003).

8. **SCOPE OF SUPPLY:** SHOULD INCLUDE FREE INSTALLATION AND COMMISSIONING

9. **PAYMENT TERMS FOR FOREIGN FIRMS**

**The offer will be made on a single currency and only one PO will be issued for the entire scope of the supply.**

A) 90% PAYMENT THROUGH SIGHT DRAFT/FOREIGN DEMAND DRAFT/LC (EXCEPTIONAL CASES)/SWIFT TELE TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER AND CONDITION AND 10% AFTER SUCCESSFUL INSTALLATION & COMMISSIONING.

B) BANK CHARGES ON LC/SD (WITHIN INDIA APPLICANT ACCOUNT AND OUTSIDE INDIA TO BENEFICIARY ACCOUNT).

**PAYMENT TERMS FOR INDIAN FIRMS**

A) 100% PAYMENT THROUGH CROSSED ACCOUNT PAYEE CHEQUE / ELECTRONIC TRANSFER AFTER RECEIPT OF STORE IN GOOD ORDER & CONDITION AND SUCCESSFUL INSTALLATION & COMMISSIONING.

B) ENSURE MENTIONING

i) BANK DETAILS OF THE BENEFICIARY, GST NO. AND PAN NUMBER

ii) FULL NAME AND ADDRESS OF THE BENEFICIARY ON WHOM ORDER HAS TO BE PLACED

10. WHETHER ANY EXPORT LICENCE IS REQUIRED FROM YOUR GOVERNMENT, IF SO, PLEASE CONFIRM WITH DETAILS.

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

12. 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 EXEMPTION IN TERMS OF GOVT. NOTIFICATION NO. 10/97 – CENTRAL EXCISE DATED: 01.03.1997 AS AMENDED FROM TIME TO TIME.

13. **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.

14. **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.

15. ONLY THOSE BIDDERS WHO'S BIDS HAVE BEEN TECHNICALLY FOUND ACCEPTABLE WILL ONLY BE INVITED FOR PARTICIPATION IN THE PRICE BID.

16. 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.

17. CONDITIONAL OFFER WILL NOT BE ACCEPTED.

18. LATE TENDERS I.E. TENDER RECEIVED AFTER THE DUE DATE AND TIME OF SUBMISSION AS MENTIONED ABOVE SHALL NOT BE ACCEPTED.

19. BIDDERS TO ENCLOSE THE FOLLOWING DOCUMENTS:-

A) CURRENT INCOME TAX AND SALES TAX CLEARANCE CERTIFICATES (GST No.), AND PAN NO.

B) 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 SEP	OCT TO DEC
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.

20. **WARRANTY / GUARANTEE:** THE WARRANTY / GUARANTEE SHALL REMAIN VALID FOR 12 MONTHS AFTER THE GOODS (OR ANY PORTION THEREOF AS THE CASE MAY BE) HAVE BEEN DELIVERED AND COMMISSIONED AT THE FINAL DESTINATION.

21. 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.

22. ALL TENDERS (UNLESS OTHERWISE SPECIFIED) ARE TO BE SUBMITTED / HANDED OVER TO **DR. VIKRANTH RACHERLA, ASSOCIATE PROFESSOR, MECHANICAL**



**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 **Dr. Vikranth Racherla, Associate Professor** at the address mentioned above.

**LAST DATE FOR SUBMISSION OF SEALED BIDS: 14.2.2019**

- 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.
-

**Technical Compliance Sheet (to be submitted with technical bid)**

**Tender Ref No: IIT/SRIC/ME/BPD/VR/2018-19/EQ-1, Dated: 21.1.2019**

Sl. No.	Item with Make and Model	Specifications	Compliance (Met/Not Met) with Remarks
1.	_____ Motor	<ul style="list-style-type: none"> <li>• Power Rating: _____</li> <li>• Back EMF: _____ @ 3000 RPM</li> <li>• Rated Speed: _____ RPM</li> <li>• Current Rating (Continuous): _____ A</li> <li>• Torque Rating (Continuous): _____ Nm</li> <li>• Peak Torque Rating (10 seconds or longer): _____ Nm</li> <li>• Diameter of copper wires used for each phase: _____ mm<sup>2</sup></li> <li>• No. of pole pairs: _____</li> <li>• Min. efficiency in range of 1000 to 3000 rpm: _____</li> <li>• Peak efficiency: _____ %</li> <li>• Protection rating: IP _____</li> <li>• Operating noise: _____ dB</li> <li>• Insulation class: _____</li> <li>• Mounting type (Side/Bottom): _____</li> </ul>	
2	_____ Motor Controller	<ul style="list-style-type: none"> <li>• Input Voltage Range: _____ V to _____ V</li> <li>• Motor Current Rating Continuous: _____ A</li> <li>• Motor Current Rating, peak, 30 seconds: _____ A</li> <li>• Throttle Input: 0-5V (1-4V). Producing 0-5V(1-4V) signal with 3-wire pot or a pedal supplied by you</li> <li>• Current control loop (Yes/No): _____</li> <li>• Hardware over-current protection (Yes/No): _____</li> <li>• Hardware over-voltage protection</li> </ul>	

		<p>(Yes/No): _____</p> <ul style="list-style-type: none"> <li>• Support torque mode, speed mode control (Yes/No): _____</li> <li>• Configurable limit for motor current and battery current</li> <li>• LED fault code (Yes/No): _____</li> <li>• Software for configuring the motor controller must be provided or made available for free (Yes/No): _____</li> <li>• Compatible with motor being supplied (Yes/No): _____</li> <li>• Thermal protection: current cut back, warning and shutdown on high temperature (Yes/No): _____</li> <li>• Support motors with any number of poles (Yes/No): _____</li> <li>• Configurable high pedal protection (Yes/No): _____</li> <li>• Supports regenerative braking (Yes/No): _____</li> </ul> <p>Reference Model - KBL96351E,24-96V,350A,BLDC CONTROLLER/WITH REGEN</p>	
--	--	---	--

----- Dated  
signature & seal of the Vendor

**FORMAT FOR PRICE BID (to be submitted with price bid)**

Tender Ref No: IIT/SRIC/ME/BPD/VR/2018-19/EQ-1, Dated: 21.1.2019

Sl. No.	Item	Specifications	Qty. required	Make and Model	Per Unit Price	Taxes	Total Amount
1.	7.5 kW BLDC Motor	<ul style="list-style-type: none"> <li>• Power Rating: _____</li> <li>• Back EMF: _____ @ 3000 RPM</li> <li>• Rated Speed: _____ RPM</li> <li>• Current Rating (Continuous): _____ A</li> <li>• Torque Rating (Continuous): _____ Nm</li> <li>• Peak Torque Rating (10 seconds or longer): _____ Nm</li> <li>• Diameter of copper wires used for each phase: _____ mm<sup>2</sup></li> <li>• No. of pole pairs: _____</li> <li>• Min. efficiency in range of 1000 to 3000 rpm: _____</li> <li>• Peak efficiency: _____ %</li> <li>• Protection rating: IP _____</li> <li>• Operating noise: _____ dB</li> <li>• Insulation class: _____</li> <li>• Mounting type (Side/Bottom): _____</li> </ul>	03				
2	BLDC Motor Controller	<ul style="list-style-type: none"> <li>• Input Voltage Range: _____ V to _____ V</li> <li>• Motor Current Rating Continuous: _____ A</li> <li>• Motor Current Rating, peak, 30 seconds: _____ A</li> <li>• Throttle Input: 0-5V (1-4V). Producing 0-5V(1-4V) signal with 3-wire pot or a pedal supplied by you</li> <li>• Current control loop (Yes/No): _____</li> <li>• Hardware over-current protection (Yes/No): _____</li> </ul>	02				

		<ul style="list-style-type: none"> <li>• Hardware over-voltage protection (Yes/No): _____</li> <li>• Support torque mode, speed mode control (Yes/No): _____</li> <li>• Configurable limit for motor current and battery current</li> <li>• LED fault code (Yes/No): _____</li> <li>• Software for configuring the motor controller must be provided or made available for free (Yes/No): _____</li> <li>• Compatible with motor being supplied (Yes/No): _____</li> <li>• Thermal protection: current cut back, warning and shutdown on high temperature (Yes/No): _____</li> <li>• Support motors with any number of poles (Yes/No): _____</li> <li>• Configurable high pedal protection (Yes/No): _____</li> <li>• Supports regenerative braking (Yes/No): _____</li> </ul> <p>Reference Model - KBL96351E,24-96V,350A,BLDC CONTROLLER/WITH REGEN</p>				
<b>Total Amount in Word:</b>		<b>Total Amount in Figure:</b>				

----- Dated  
signature & seal of the Vendor