राष्ट्रीय प्रौद्योगिकी संस्थान हमीरपुर हमीरपुर177005-(हि .प्र.)
NATIONAL INSTITUTE OF TECHNOLOGY HAMIRPUR (H.P.)-177005
[An Institute of National Importance under Ministry of Education (शिक्षा मंत्रालय)]

E-TENDER NOTICE

Sealed online e-Tender in two bid system are hereby invited by the undersigned for the supply of following items on behalf of the Director, NIT, Hamirpur from the Eligible/ Experienced/ Resourceful, manufacturer's dealer/authorized distributor etc. having experience in appropriate field and who have successfully completed works of similar type, so as to reach in the office of the undersigned as per date & time mentioned below.

Sr. No.	Name of works/item	Qty/ No.	Earnest Money In Rs.	Time Limit
1	**Supply and installation of EV Motor Drivetrain with Electrical Loading Facility** For detailed specifications etc please refer to SBD	1	20400	60 days

1. Availability of bid document and mode of submission:-The bid document is available online and bid should be submitted in online mode on website http://www.eprocure.gov.in/ and http://www.nith.ac.in/. Bidder would be required to register in the web-site which is free of cost. For submission of bids, the bidder is required to have Digital Signature Certificate (DSC) from one of the authorized certifying authorities (CA).

2. Key dates: (1)

1	Date of online publication	20.08.2024 at 6.00 PM
2	Document download start and end date	20.08.2024 to 12.09.2024 10.30 AM
3	Bid submission start and end date	20.08.2024 to 12.09.2024 10.30 AM
4	Physical submission of EMD, technical documents and cost of tender document etc.	On or before 05.30 PM on 12.09.2024
5	Date of opening of technical bid	13.09.2024 at 11.30 AM

(II) Objections/representation if any against the bidders will be entertained only within three days after publication/uploading of technical bid opening summary on net and thereafter that the date of opening of financial bid of technically qualified bidders will be published /uploaded on net.

3. Tender Details:-The tender Documents shall be uploaded in 2 cover:-

Cover 1:-Shall contain scanned copies of all "Technical Documents/Eligibility information".

Cover 2:- Shall contain "BOQ/Financial Bid", where supplier will quote his offer for each item.

(a) Submission of Original Documents: The bidders are required to submit (a) original demand draft towards the cost of bid document if any and (b) original bid security/Earnest Money deposit (EMD) and other technical documents in the Store & Purchase section, NIT Hamirpur-177005 (HP) as specified in the key dates of **Sr. no.2**

on tender opening dates & schedule, failing which the bids will be declared non-responsive. EMD in the form of DD/FDR must be attached with in favour of Director, NIT, Hamirpur (H.P) -177 005. The EMD should remain valid for a period of 90 days beyond the final bid validity period. EMD of unsuccessful bidders shall be returned after the expiry of the final bid validity or before the 30th day of the award of contract. The EMD of the successful bidder shall be released after successful execution of supply order.

4. BID OPENING DETAIL: - The bids shall be opened as per schedule specified in the key dates of **Sr. no.2.** in the store & Purchase section, NIT, Hamirpur by the authorized officer. In their interest the tenderer are advised to be present along with original documents at the time of opening of tenders. If the office happens to be closed on the date of opening of the bids as specified, the bids will be opened on the next working day at the same time & venue.
5. The bids shall remain valid for acceptance for a period of not less than 120 days after the deadline date for bid submission. Other details can be seen in the bidding documents. The officer inviting tender shall not be held liable for any delays due to system failure beyond its control. Even though the system will attempt notify the bidder of any bid updates. The Employer shall not be liable for any information not received by the bidder. It is the bidders responsibility to verify the website for the latest information related to the tender.
6. The copy of enlistment order & renewals, Copy of PAN issued by Income tax Department and copy of GST Certificate must accompany in the cover-1
7. The bidder preferably must have successfully supplied similar items in recent years. The bidders shall have to produce supporting documents giving date of award, date of commencement and completion from the concerned competent authority and should be included in cover-1
8. Destination: F.O.R. destination i.e. NIT, Hamirpur (HP) and the rates must include the charges for Packing, Forwarding, Freight, etc., if any.
9. Price/Rate: The price of items may be quoted in Indian rupees.
10. GST:- All the firms may invariably mention their GST/PAN numbers on tender failing which quotations may not be considered valid. Further, this Institution does not issue any Concessional form, so the GST applicable as per actual rates must be mentioned in the offer. In case GST is not mentioned, the rates shall be treated as inclusive of all taxes.
11. The bidders/firms have to supply the complete catalogue/brochure of the products to be supplied along with the Technical bid.
12. The technical bids will be evaluated on the basis of terms & conditions of the tender and details of the product to be supplied as per condition 11 of the tender notice. The committee reserves the right to reject any technical bid on the basis of technical specifications/catalogue/brochure submitted.
13. Conditional/ telegraphic tenders shall summarily be rejected.
14. For any clarifications bidders are requested to contact FI (Purchase), NIT Hamirpur at his E-mail ID i.e. fip@nith.ac.in.
15. The tender/bid shall be kept in a sealed envelope superscribed as "Tender for (Name of work and date of opening_____".
16. The jurisdiction of the law of court shall be at Hamirpur (HP).

FI (Purchase)

No: NIT/HMR/DoEE/S&PS/ 2024/2964—66 **Dated: 20-08-2024**

Copy forwarded to the following for information please:-

1. The HOD, DoEE, NIT, Hamirpur

2. Dr Jiwanjot Singh, Assistant professor, DoEE, for information please.
3. The FI (CC), for getting the advertisement displayed in the Institute website for wider publicity under head: - **Supply and installation of EV Motor Drivetrain with Electrical Loading Facility for Electrical Engineering Department of NIT Hamirpur.**

FI (Purchase)

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NIT-SBD

Subject: - Supply & installation of EV Motor Drivetrain with Electrical Loading Facility for DoEE of NIT Hamirpur.

Sealed online E-Tender in two bid system are hereby invited by the undersigned for the supply of following items on behalf of the Director, NIT, Hamirpur from the Eligible/ Experienced/ Resourceful, manufacturer's dealer/authorized distributor etc. having experience in appropriate field and who have successfully completed works of similar type, so as to reach in the office of the undersigned as per date & time mentioned in the tender notice.

Sr. No.	Name of works/item	Qty/ No.	Earnest Money In Rs.	Time Limit
1	**Supply and installation of EV Motor Drivetrain with Electrical Loading Facility** For detailed specifications etc please see below	1	20400	60 days

Item Name: EV Motor Drivetrain with Electrical Loading Facility – Experimental Setup for 2 / 3 Wheeler EV Motor Application with Programmable Controller LIVE Experimental Setup with Data Acquisition, Data-Logging Variable Loading Functionality. [Complete Setup with Hardware & Software Interface]

Sr.	Item Name & Brief Description	Qty.
01	**EV Motor Drivetrain with Electrical Loading Facility** – Experimental Setup for 2 / 3 Wheeler EV Motor Application with Matlab based Programmable Controller LIVE Experimental Setup with Data Acquisition, Data-Logging Variable Loading Functionality. [Complete Setup] **EV Motor Drive Train Technical Specification** • Motor Type: PMSM & BLDC Motor with Hall Sensor • Output Power: 2.0 KW PMSM Motor or more & 1000-watt BLDC or more mid drive Inner rotor motor, 3000 rpm with interchangeability • Max Torque: approx. 20.0 Nm (PMSM Motor) approx. • Speed (RPM): 1500 rpm or more approx.. • Voltage Range 48V-60 V DC • Ampere: 42 amp • No. of Pole Pairs: 10 • Efficiency: 85~92% • Waterproof Grade: IP65 or better • Working Temperature: 70-120℃ **Configurable Motor Controller for EV Motor:** • Peak Current: 220A peak to peak • Supply Voltage Range: 8-60V DC • Continuous Current: 120A DC • Max. Continuous Output Power: 5000 Watt • Selectable output PWM switching frequency: From 8kHz to 80kHz **Hardware Protections:** • Bus over-voltage, Bus under-voltage, over-current and overtemperature and more protections **Additional features:** • Automatic self-tuning and identification of Motor parameters • Closed-loop Torque, Speed or Position control • Advance Field Oriented Control • PWM and Analogue voltage input for Controlling Speed and Torque	01

- Pure Analogue feedbacks output for Speed and Torque
- Optically isolated Encoder and Hall Sensor Input with up to +12Vsupply
- +5V/1A (5W) and +12/0.25A (3W) outputs to supply external modules

Controller Simulink Block set:

- The Controller should have a complete library that should call controller Simulink block set, where all the commands that are existing on UART, USB, and CAN open protocols of controller in form of Blocks, and user should be able to just drag them into his models and use them with Controller to practically do any possible action that he need within his program, Controller Simulink block set is built on top Of the C++ DLL that is a powerful tool for integration of Controller in various software.
- Motor Controllers: Should have their Digital Control using UART, ARDUINO Library, Python and C++ Library Configuration which can be called in Math Works MATLAB Simulink & Lab VIEW
- Motors supported: DC brushed, BLDC, PMSM, EC Coreless or more
- Supply Voltage Range: 8-60V DC approx..
- Peak Current:220A peak to peak
- ContinuousCurrent:120A DC,
- Max. Continuous Output Power: 6000 Watt or more
- Hardware Protections: Bus over-voltage, Bus under-voltage, overcurrent and over temperature
- Selectable Output PWM switching frequency from 8kHz to 80kHz approx
- Automatic self-tuning and identification Motor parameters
- Closed-loop Torque, Speed or Position control.
- Advance Field Oriented Control
- PWM and Analogue voltage input for Controlling Speed and Torque

Swinging Field Type Electrical Dynamometer:

- Air Cooled Complete with as follows.
- Electrical Dynamometer Type: Swinging Field Type, DC Generator/ Equivalent
- Capacity: 2.2KW, 220V DC or more
- RPM: 0 to 1500 rpm
- Maximum Torque: 20.0 Nm approx
- Direction of Rotation: Bi-directional
- Power transmission: Through highly precise load cell
- Loading & unloading: By Manually switching on the Load Switches
- RPM Display: 4 Digit display with proximity sensor
- Mounting Type: The Dynamometers & DUT should be mounted on a single MS frame channel & DUT should be connected to loading dynamometer using Flexible Universal Shaft

Resistive Load Bank: 2.2KW@230V

- Enclosed in an Aluminum extrusion Profile stand
- Variable Load switches of 100 Wx4, 200Wx4 & 500Wx2 are provided on the load bank with proper nomenclature
- All The resistive loads are well ventilated using Powder coated MS Mesh with 10 mm of mesh approx.
- For Cooling of load two ventilation/ cooling fans are mounted on the load bank frame.

Other Features

- High Accuracy Electrical Dynamometers for Load testing needs.
- Precise Control even at low loads and rapid changes in demands.
- Balanced Rotor shaft assembly on precision.
- Bearings to ensure smooth operation.
- Both the motors can be interchanged on the same Dynamometer Frame.

Lithium Ion Battery with Battery Charger:

- LFP Battery: EV standard battery (Separate)

Battery Capacity:

- 48V 42Ah with SoC Display, MCCB and metal casing 15S05P with Smart BMS and CAN Communication port compatible with BLDC / PMSM Motor & Controller
- The Battery is equipped with Smart BMS with advanced sensors and communication modules that allow real-time monitoring of battery parameters. These parameters include voltage, current, temperature, and state of charge (SoC).

Automatic Battery Charger:

- 54.4V @12Amp EV Battery charger with Reverse Polarity, short circuit, over-voltage, and over-load Protection & Buzzer for alert.

Control Panel Features:

- The control panel will consist of measuring meters for different parameters such VDC, IDC, Throttle Voltage, rpm, Torque etc. Also, the Controller will be mounted in the Panel & its Connection terminals will be brought out on the Panel for easy connections.

Data Logging Feature with software

- The Data-logger with Modbus Connectivity will be Provided along with software for data-logging facility with Graph plots & report generation for further analysis

Other Features:

	1.3. Non meshed coils 1.4. Thin regions represented by surface models 1.5. Fast evaluation of geometry skewing effect 1.6. Non-linear anisotropic material behavior 1.7. Hysteresis modeling 1.8. Skin and proximity losses in windings 1.9. The tool should have capability to model Shell Elements, wherein the thin regions are represented by surface models. Thermal Analysis capabilities: 9.1 The tool should provide steady state thermal and transient thermal application in 2D and 3D framework. 9.2 Thermal coupling in 2D environment 9.2.1 Steady state AC magnetic coupled with transient thermal 9.2.2 Steady state AC electric coupled with transient thermal 9.2.3 Electric conduction coupled with transient thermal 9.3 Thermal coupling application in 3D environment 9.3.1 Steady state AC magnetic coupled with transient thermal etc.	

Note:

- Installation, commissioning & training for all the supplied items should be done and demonstrated onsite at NIT Hamirpur.
- Vendor participating will be responsible for the interfacing of the hardware with software i.e. complete integration & hardware plus software training has to be provided by the vendor.
- Vendor quoting must be the OEM or should have bid-specific OEM authorization for the quoted items.
- All hardware items must have standard one year OEM warranty with free updates, updates & upgrades during the warranty period.
- Software licenses must be fully featured (Industrial Grade) Perpetual Academic Research Licenses, Student Edition licenses with limited capabilities or features will not be considered.
- Vendors participating may be called for online / onsite technical presentation with demo unit for product verification purposes.

TERMS AND CONDITIONS:-

1. **Validity**: Minimum validity of the quotation will be 03 months from the date of opening of the quotation/tenders.
2. **Time Limit:** - The firm/supplier has to the supply and install the equipments within 60 days from the date of the award letter.
3. **Guarantee/warranty**: - The supplier has to provide equipment guarantee/warranty supplied for 01 year from the date of successful installation of the equipment supplied. (Certificate of the same to be given by the supplier)
4. **Demonstration & Training**:- The supplier will have to demonstrate and impart training to concerned users at NIT, Hamirpur after successful supply & installation. (Certificate of the same to be given by the concerned user/indenter).
5. **EMD**: **EMD in the form of DD/FDR /Bank Guarantee must be attached in favour of Director, NIT, Hamirpur (H.P) -177 005.** The EMD should be remained valid for a period of 120 days beyond the final bid validity period. EMD of unsuccessful bidders shall be returned after the expiry of the final bid validity or before the 30th day of the award of contract. The EMD of the successful bidder shall be released only after submission of 3 % **Performance bank Guarantee** which should be valid till expiry of warranty period. EMD/PBG exemption is permissible as per Govt. rules.
6. **Make in India preference**:- NIT Hamirpur shall compare all substantially responsive bids to determine the lowest evaluated bid. The Institute is following and abide with the revised Public Procurement (Preference to Make in India), Order No. P- 45021/2/2017 – PP (BE-II) dated 16.09.20 issued by DPIIT, Ministry of Commerce and Industry, Govt. of India & subsequent instructions of Ministry. Accordingly, preference will be given the make in India products while evaluating the bids. However, it is sole responsibility of the bidder(s) to specify the product quoted by them is of Make in India along with respective documentary evidence in the technical bid itself.

- Must have Active Brake Chopper
- Full Digital and Analogue Control
- Space Vector Modulation (SVM)
- Embedded Motion Profile (St-Curve) for Position and Speed
- Torque, Speed and Position controlling
- Four Quadrant Regenerative operations
- Automatic parameter Identification and self-tuning
- Isolated STO (Safe Torque off)
- Isolated USB, UART and CAN open
- Support for PT1000 temperature sensor / equivalent
- Commands and Feedbacks Source
- 0-10V Analogue/PWM inputs for Speed or Torque control
- Analogue torque and speed feedback
- Optically isolated quadrature Encoder and Hall sensor inputs
- Isolated UART, USB and CAN bus

Modes of Operation:

- Analogue or Digital commanding
- Torque Control
- Speed Control
- Position Controll

With finite element tool, for low-frequency electromagnetic and thermal simulations, in 2D, 3D & Skew. The tool with full range of physical models to simulate the low frequency behavior of electromagnetic devices:

1.1. Magnetic:
  1.1.1.1. Static, steady state AC magnetic, transient
  1.1.1.2. Circuit and mechanical couplings
1.2. Electric: Electrostatic, conduction
1.3. Thermic: Steady state AC thermal, transient
1.4. Thermal couplings: Electrothermal, magnetothermal
1.5. Partial Element Electrical Circuit (P.E.E.C.) method for conductor modeling
1.6. Skewed geometries
  1.6.1. The skew environment should have magneto static, steady state AC magnetic and transient magnetic capabilities.

Feature extended multiparametric analysis capabilities, electrical circuit and kinematic couplings, the tool allows to analyze, design and optimize the following in single package.

2.1 Rotating machines
2.2 Linear actuators, solenoids
2.3 Transformers & inductances
2.4 Induction heating processes
2.5 Sensors
2.6 Cables, electric connections
2.7 Electromagnetic compatibility
2.8 Wireless chargers for EV's

The tool should have in-built overlays

3.1 It should provide in-built motor overlays such as BLDC, PMSM, and Induction Motor in 3D.
3.2 It should also provide in-built 2D overlays for BLDC Inner & Outer Rotor, PMDC, SRM, induction motor, induction motor outer rotor.
3.3 The overlays should consist geometry, mesh and windings
3.4 It should provide in-built overlay for 3-phase transformer to perform no-load and short circuit test.

The solver features:

4.1 The modelling of machines should have a rotor or stator with Skew slots
4.2 Non- meshed coils which allows to create complex coils, like circular coils, rectangular coils, composed coils, multi saddle coils, and saddle coils.
4.3 Mathematical model to consider thickness of lamination of both stator and rotor core.

The tool should provide the following productivity features:

5.1 Jiles Atherton model to calculate hysteresis losses
5.2 Provision for hysteresis modeling, based on Preisach's model, for accurate evaluation of iron losses and remanence effects
5.3 Preisach static vector model should be in available in 2D and 3D
5.4 Efficiency maps
5.5 The tool should provide dedicated macros for automated operations for:
  5.5.1 PMSM efficiency maps
  5.5.2 Finding out efficiency map max speed/ max torque point
  5.5.3 Finding out efficiency map corner point, Imax, and angle
  5.5.4 Halbach Magnetization For 2D and 3D.
  5.5.5 Create initial non meshed coil for radial motor etc.

The tool should provide demagnetization feature, to check demagnetization in permanent magnets at design stage.

Modeling techniques in the tool for accurate and fast results:

1.1. Back ground image modelling
1.2. Infinite box for open boundary problems

7. **Technical Evaluation**:- Technical evaluation of the participating firms will be done strictly on the basis of catalogues/brochures/literature/technical details of the product to be supplied along with relevant experience & fully complying all the terms & conditions of the SBD & tender notice. **It is mandatorily to physically submit the technical literature/catalogue of the product to be supplied along with make & model no. failing which the technical bid of the participating bidder will be straightforward rejected.** NIT Hamirpur also reserves the right to seek clarification from any of the participating firm during technical evaluation. The participating bidder has to submit undertaking that they fully complies to our above-mentioned technical specifications.
8. **Destination**: F.O.R. destination i.e. NIT, Hamirpur (HP) and the rates must be quoted inclusive of all taxes and charges.
9. **Penalty**: In case the firm/vendor fails to supply the equipments within the stipulated period penalty without assigning any reasons @ 1/2% (half percent) of the total value of the item covered in order as penalty per day subject to a maximum of 5% (five percent) will be imposed unless extension is obtained in writing from the office on valid ground before expiry of delivery period
10. **Price/Rate**: The price of equipment/items may be quoted as per BOQ clearly mentioning the Basic rate & GST in the specified columns of BOQ in Indian rupees. **Tender will be awarded to the participating bidder who will be lowest in terms of total of all items**
11. **GST:** - All the firms may invariably mention their GST/PAN numbers on quotation/tender failing which quotations may not be considered valid. Further, this Institution does not issue any C/D Concessional form, so the GST applicable as per actual rates must be mentioned in the offer. In case GST is not mentioned, the rates shall be treated as inclusive of all taxes.
12. **NIT/NIQ Opening**: Representative of the firm may be present at the time of opening of the Quotations, if it wishes.
13. **Payment:** 100% payment shall be made immediately after receipt of material in good condition and successful installation of the same.(Certificate of the same to be given by the indenter/inspection committee NIT, Hamirpur)
14. **Right of Acceptance/Rejection**: Right of acceptance and rejection of any tender/quotation in part or full without assigning any reason are reserved with the institution authorities. The number of items to be purchased could be increased or decreased depending on the requirement of end user.
15. In case of any dispute the jurisdiction of Hamirpur (HP) Courts shall apply.For any clarifications please contact:- Dr.Jiwanjot Singh (Mobile 9872581018)

25/8/21

FI (Purchase)