



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI - 620 015
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

NOTICE INVITING QUOTATIONS

File No.	NITT/R&C/SEED GRANT/2023-24/PROJ.NO.9/1(A)	Date:	20-09-2024
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To

(Supplier Address)

Sealed quotations are invited from reputed Authorized Dealers / manufacturers for the supply of the Items.

Name of the Item : Switched Reluctance Motor Drive (Loading Setup with Converter)

Specification & Quantity : (As per enclosed Schedule Annexure – I) & 01

1. Quotation Reference No. : NITT/ R&C/SEED GRANT/2023-24/ PROJ.NO.9/1(A)
2. Last date and Time for receipt of quotation : **11-10-2024 at 5 PM**
3. Date & Time of opening of Quotation : **14-10-2024 at 2.30 PM**
4. EMD Amount : 2%
5. Validity (Days) : 120 days
6. Address to which quotations are to be sent

The Director,

National Institute of Technology,

Tiruchirappalli – 620 015, Tamil Nadu, India

Kind attention to : Dr. Jose Thankachan/ Assistant Professor/ EEE

Phone : **8755629211**

E-mail : **joset@nitt.edu**

7. Quotations should be submitted in the format given in Annexure – I and Annexure-II
8. The envelope should contain the following details:

<p style="text-align: center;">QUOTATION AGAINST ENQUIRY Switched Reluctance Motor Drive (Loading Setup with Converter), NITT/ R&C/SEED GRANT/2023-24/ PROJ.NO.9/1(A)</p> <p><u>Kind attention to:</u> Dr. Jose Thankachan/ Assistant Professor/ Principal</p> <p>Investigator/EEE/NIT Tiruchirappalli</p> <p>Last date and Time for receipt of quotation : 11-10-2024 at 5 PM</p>
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Terms and Condition

1.	The quotation must be in the format furnished by NIT Tiruchirappalli and should be free from corrections/erasures. In case there is any unavoidable correction it should be properly attested. If not the quotation will not be considered. Quotation written in pencil and incomplete will be rejected.
2.	Earnest Money Deposit (EMD) is to be submitted by way of Demand Draft drawn on any Nationalized bank in India in favor of "The Director, NIT, Tiruchirappalli" payable at Trichy. The bids submitted without EMD will be treated as non-responsive and will be rejected. EMD shall bear no interest. Bidder must fill the EMD returning Form (Annexure-III) and submit along with the quotation. EMD amount of 2% of estimate value is applicable, however UDYAM & NSIC registered Micro & small enterprises are exempted as per Govt.norms proof to be attached.
3.	You are invited to submit your most competitive quotation for the supply of goods according to the specifications and delivery terms as given. Bank guarantee submitted for EMD shall be valid for 45 days beyond bid validity period.
4.	Bidders may send the quotations in sealed covers with the quotation reference number and last date for receipt of quotations duly superscribed on the cover. Kind Attention to: Dr. Jose Thankachan/ Assistant Professor/ Principal Investigator/EEE/NIT Tiruchirappalli NB: Mention the company Contact Number / E-mail id on the cover.
5.	Quotation will be opened on due date at 2.30 PM at the Research and Consultancy Section/EEE, NIT, Tiruchirappalli in presence of the tenderers or their representatives who may wish to be present. (Any change in the date, time and venue of the quotation opening will be informed to the bidders through telephone / E-mail)
6.	The National Institute of Technology, Tiruchirappalli reserves the right to accept or reject any quotations, and to cancel the bidding process, and reject all quotations at any time prior to the award of order without assigning any specific reason thereof.
7.	Manufacturer's name and country of origin of materials offered must be clearly specified. Printed brochures, Purchase preference is only for Micro & Small enterprises (MSE's) register in UDYAM Portal or NSIC as per Ministries policy for MSE's . Proof to be attached
8.	Samples must be submitted where specified along with the quotations. Samples must be carefully packed, sealed and labelled clearly with enquiry number, subject and sender's name for easy identification. Rejected samples will be returned at your cost if insisted
9.	All supplies are subject to inspection and approval before acceptance. Manufacturer / supplier warranty certificates and manufacturer / Government approved lab test certificate shall be furnished along with the supply, wherever applicable
10.	National Institute of Technology, Tiruchirappalli reserves the right to modify the quantity specified in this enquiry.
11.	Startup company exempted from prior turnover & prior experience (startup certificate registered with DIPP should be enclosed)
12.	The bidder has to submit the bids in sealed envelope, (separate for each tender). Further Bidder should not send clubbing many tenders in one envelope, in such case all the bids will be rejected.

13.	<p>Bid Price</p> <p>a. The contract shall be for the full quantity Bidders must quote for entire quantity. Each bidder shall submit only one quotation in Indian Rupee only.</p> <p>b. Post work orders & completion certificate should be submitted, wherever applicable.</p> <p>c. The rates quoted by the bidder shall be fixed for the duration of the contract and shall not be subject to adjustment on any account.</p> <p>d. GST, packing, forwarding and delivering other allied items at the destination shall be included in the price. All such price components may be shown in the quotation. If there is no indication regarding above charges. It will be considered as inclusive of all charges.</p> <p>e. If any arithmetic mistake in total / GST calculation is observed, the same shall be corrected by the purchaser with an intimation to bidder</p> <p>f. In case the items in the enquiry are covered by any rate contract or any other state or central Government, it should be specified in your quotation and accepted contract rates should also be mentioned. It should be confirmed whether you could supply at the RC rates outside rate contract</p> <p>g. Quotations containing conditions like “subject to prior sale” may not be considered.</p> <p>h. Delivery period required for supplying the material should be invariably specified in the quotation</p> <p>i. Bids without quoting GST (unless exempted) will be treated as invalid & disqualified.</p> <p>j. If there is a discrepancy between unit price and total price, the unit price will be considered. If there is any mismatch between figure and word, the amount in word shall prevail.</p>
14.	<p>Evaluation of quotations: Quotations will be evaluated item-wise or lump sum basis. The purchase committee will evaluate and compare the quotations determined to be substantially responsive i.e. (i) are properly signed; (ii) Conform to the terms & conditions and specifications; and (iii) price offered are competitive.</p>
15.	<p>Award of contract</p> <p>a. The National Institute of Technology, Tiruchirappalli will award the Order for supply of Goods / Services to the bidder whose quotation has been determined to be substantially responsive, and who has offered the lowest evaluated quotation price.</p> <p>b. The Bidder should furnish the contract agreement and performance security within 15 days from the date of receipt of the order for supply of goods / services, failing which the order will be cancelled without further notice and awarded to next eligible bidder.</p> <p>c. Notwithstanding the above, National Institute of Technology, Tiruchirappalli reserves the right to accept or reject any quotations, and to cancel the bidding process, and reject all quotations at any time prior to the award of order without assigning any specific reason thereof.</p> <p>d. National Institute of Technology, Tiruchirappalli, prior to the expiration of the quotation validity period, will notify the bidder whose bid is accepted for the award of contract. The terms of accepted offer shall be incorporated in the purchase order.</p>
16.	<p>Warranty: (As mentioned in Annexure-I) shall be applicable to the supplied goods and installation work. Bidder should clearly indicate the arrangements for support and maintenance during the period for which the warranty shall be in force.</p>
17.	<p>Performance Security: Security deposit should be 3% of purchase order value in case of Performance Bank Guarantee should be valid for 60 days beyond the guarantee & warranty. The successful bidder need to submit performance security <u>(As mentioned in Annexure –I)</u> of purchase order value either in the form of bank guarantee or crossed demand draft drawn on any Nationalized bank in India in favor of “The Director, NIT, Tiruchirappalli” payable at Trichy. The bank guarantee / Demand Draft will be returned to the supplier after 60 days from date of successful completion of supply, installation, and the warranty period.</p>

18.	Payment: 100% will be paid after Installation and satisfactory working/date of completion of service if the documents are in order. The bill should be raised in favor of "The Director, National Institute of Technology, Tiruchirappalli, Tamil Nadu, India." with institute GST No. 33AAATN5491Q1ZZ.No advance will be provided to the supplier and installer.
19.	Liquidity damages If the bidder / supplier, after accepting the Purchase Order or supply of Goods / Services, fails to deliver any or all of the Goods or to perform Services within the period(s) specified in the Order, The National Institute of Technology, Tiruchirappalli shall impose penalty without assigning any reasons to the bidder / supplier a sum equivalent to 0.50 % of the total cost as indicated in the Purchase Order (which will be deemed as agreed price) for each week or part thereof of delay until actual delivery or performance is completed and such penal charges shall be limited to a maximum of 5% of the agreed price. Once the maximum is reached The National Institute of Technology, Tiruchirappalli, may proceed on its own to consider the termination / cancellation of the Order and may inform the bidder about the cancellation of the said purchase order. unless extension is obtained in writing from the office / Department on valid ground before expiry of delivery period
20.	If the deliveries are not maintained and due to that account Procuring Entity is forced to buy the material at your risk and cost from elsewhere, the loss or damage that may be sustained there by will be recovered from the defaulting supplier
21.	Dispute clause: Any dispute relating to the Enquiring /Tender of the indented item shall be under the Hon'ble Court having its jurisdiction over Tiruchirappalli only
22.	Startup company exempted from Prior Turnover & Prior Experience (Startup certificate registered with DIPP should be enclosed)
23.	NIT Trichy has DSIR, so it's eligible for 5% in concession of GST and also exempted from Custom's Duty tax.
24.	Performance Bank guarantee should be valid for 60 days beyond the guarantee & warranty and the BG submitted for EMD shall be valid for 45 days beyond bid validity period.
25.	Bids submitted without EMD (unless exempted) will be treated as disqualified.
26.	The successful bidder should submit Security Deposit/PBG within 15 days from the date of placement of order. The EMD shall be returned only after receipt of SD. If the bidder fails to deliver the material, then the EMD/SD shall be forfeited.
27.	In LTE, bidder has to submit in sealed envelope (separate for each tender). Further Bidder should not send clubbing many tenders in one envelope, in such case all the bids will be rejected.

For any details / clarifications regarding could be obtained, Research and Consultancy Section/EEE from the National Institute of Technology, Tiruchirappalli on all working days during 10 AM to 5 PM.

For further detail kindly contact : **Dr. Jose Thankachan/ Assistant Professor/ EEE**

Phone : **8755629211**

E-mail : **joset@nitt.edu**

(NB: Mention the Contact Number / E-mail on the cover. Any change in the date, time and venue of the tender opening will be informed to the bidders through telephone / E-mail)

Enclosures:

Specifications of the equipment	Annexure - I
Price Format	Annexure - II
Bid Security Declaration Form	Annexure – III
Bank Mandate Form	Annexure – IV



Annexure-I

Specifications of the Equipment

Ref: NITT/ R&C/SEED GRANT/2023-24/ PROJ.NO.9/1(A)

Date:

Sl. No.	Specification of NIT-T	Specification of the Supplier	Reasons (if there is difference in specification)
1.	<p><u>IGBT based Front End SR Inverter Stack-5KW : ASYMMETRIC TYPE</u></p> <ul style="list-style-type: none">• 8 numbers 1200V/ 150A, Peak SEMIKRON IGBT & 8 numbers of High frequency Diode module used to form power circuit.• 4nos drivers with built-in opto isolator used to drive the PWM signals• All IGBTs Collector and emitter terminals brought out and terminated in front panel.• All the gate and emitter terminals are brought out and terminated on front panel to view driver output fault output• 8nos GATE DRIVER based negative turn off (-8v to +15v) with short circuit protection driver circuit used.• Gate Driver: 8nos. Skyper32 Based smart driver with inverting, non-inverting, auto-reset, & shutdown capabilities and “Soft” turn-on/turn-off features, Integrated fail-safe IGBT protection, Desat (VCE) detection, hysteresis Under Voltage Lock-Out protection (UVLO), VCC range: 15 to 30 Volts, -40°C to +100°C operating temperature range, 15 kV/μs min. Common Mode Rejection (CMR) at VCM=1500V• LED indication available for PWM input and power supply input and fault signal.• IGBTs are mounted in Proper heat sink and cooling fan also will be provided.• Temperature protection available.• PWM inputs are terminated in Front Panel, user can give PWM signals from any controller.• Common +15V Power supply provided for all the driver circuit.• Over current protection and short circuit protection provided for all individual IGBT module.• Reset key used to clear the fault.• Snubber capacitor provided for dv/dt protection for all IGBT module.		

- 100A / 3phase bridge rectifier and filter circuit available for power circuit input.
- 6nos LA-25-P Current sensor used to sense the DC link current and Output line currents.
- Ono HCPL-7840 Voltage sensor used to sense the DC link voltage
- Galvanized volt meter 0-900V
- 2nos 4700 μ F /450v electrolytic capacitors used as DC link capacitor.
- Acrylic type transparent Cabinet will be used
- Input Voltage: Vdc 650v/Idc 13A DC Max
- Output Voltage: 0-415v Variable DC & Variable Frequency
- Sensors: 5 Nos. of Smart current sensor LA25-P SC circuit-1 No
- Voltage Sensor HCPL-C870 with Signal circuit measurable DC Links.
- Advanced sigma-delta (Σ - Δ) modulation technology
- Unity gain 1 V/V, \pm 0.5% high gain accuracy
- 1-G Ω input impedance
- 0 to 2V nominal input range
- -35 ppm/ $^{\circ}$ C low gain frift
- 21 μ V / $^{\circ}$ C offset voltage drift
- 0.1% non-linearity max
- Active-high shutdown pin
- 100-kHz wide bandwidth
- 3V to 5.5V wide supply range for output side
- -40 $^{\circ}$ C to +105 $^{\circ}$ C operating temperature range
- 15 kV/ μ s common-mode transient immunity
- Compact, auto-insertable stretched SO-8 package
- Safety and regulatory approvals: IEC/EN/DIN EN 60747-5-5: 1414 Vpeak working insulation voltage.
- Protections: Over-voltage, over-current, under-voltage etc.
- Galvanized Voltmeter 0-500V.

Switched Reluctance Motor(Open End winding) coupled with PMSM motor arrangement: -

- Voltage: Input voltage (V) 230/380V
- Power: Output power (kW) 2.2
- Terminals Brought out : 16 leads.
- Base Speed (RPM): 2000/3000
- Current (A): 12A (peak current)
- Torque(Nm): 7.88N-m
- Stator Poles: 8
- Rotor Poles: 6
- Phase (Q): 4
- insulation class: 'H'

- Energy Efficiency Application: 1E2, IE3, IE4 class
- Angle of the Rotor Shaft : Electronic Position sensor /Hall sensor/Encoder
- Enclosure: SPDP/TEFC
- Duty: S1
- Energy efficiency application: IE class-F
- Switched Reluctance Motor parameters like Inductance profile, Rotor Stack length, Stator stack length, no. of turns, wire gauge, coil resistance, Rotor OD, Stator ID, open end winding connections should be provided while bid.

PMSM (Surface) motor with QEP sensor

- Type : PMSM - IEC-NEMA Standard Motor
- Design Basis : IEC
- Power supply : 380 V AC
- Rated Power : 3 hp/2.2 kW
- Rated Torque : 7 N-m
- Efficiency : Greater than or equal to 85%
- Protection : IP54
- Insulation : F
- Rated Speed : 1500/3000 rpm
- Maximum Speed : 3500 rpm
- Mounting : Flange mounting
- Feedback : 1024 QEP with speed feedback
- Acceptable power supply fluctuation
- Voltage within $\pm 15\%$,
- Frequency within $\pm 5\%$
- Operational Environment : General Indoor Ambient Temperature : 15°C-50°C
- Start-up Mode : Soft Start/Heavy /Light Load Start
- Stator Insulation : Class 'F' Insulation
- Screw Thread : International Standard ISO-M Metric System
- Automatic Motor Test report with CW/CCW should be provided along with Bid.
- Machine Drawing should be provided along with Bid.
- Both Motors is horizontal foot mounted fitted on MS frame/channel base, are directly Gear/jaw type coupled and fixed with Safety guard.

Real Time FPGA based PWM controller: -

- FPGA Xilinx ZynQ SoC /Artix 7 XC7A35T-1FTG256C, 33208
- Logic Elements, 1843200 bits of Block RAM or higher
- SDRAM: 32MB (256Mbit) SDRAM or higher
- SPI FLASH: 64 Mb FLASH for FPGA Configuration
- WiFi ESP-12F WIFI Modem

	<ul style="list-style-type: none"> • Front End Software support: USB/JTAG Enabled by ISE® Design Suite Linux and Windows by End user. • ADC : 4 channel. • DAC: 12-bit SPI DAC output at J7 Connector. • Audio: Stereo Jack. • Offset arrangements. • 7 segment Display: 4-Digit 7 Segment Display • LCD: 2x16 Character LCD • Slide Switch 16 Nos of SPDT, LEDs: 16 Nos of LEDs, Push Button: 5 Nos of Push Button • JTAG: USB JTAG for Programming and Debugging. Fully Compatible with Xilinx Vivado Tool. • UART: USB UART can communicate at different baud rate • Clock: 50 MHz Single Ended • Input voltage 220-240 V /Power consumption: 60 W/Inrush current 0.7 A • EMC performance IEC class A pass/Burst immunity IEC pass/Conducted immunity class A pass • Operating temperature 0 45 °C/Storage temperature -60 °C/Relative humidity Non-condensing 85 %/Absolute humidity 25 g/m³. • Programming Mode: Xilinx® Vivado® High-Level Synthesis (HLS) tool to transform a C specification into a register transfer level (RTL) implementation in Xilinx field programmable gate array (FPGA); OS support: Artix 7 controller should support Ubuntu /Linux/Windows based OS. 		
2.	Installation	Yes	
3.	Warranty (in Month)	12	
4.	Comprehensive AMC Charge per year	No	
5.	Delivery Period (Weeks)	6 to 8	
6.	Shipment terms	At NIT-T	
7.	Performance Security in %	03	

Signature & Seal of Vendor with Date



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI - 620 015
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Annexure- II

PRICE BID FORMAT FOR BIDDERS

Tender No. & Date :

Bidder's Offer No. & Date :

S. No.	Description of item	Unit (Set / No)	QTY	Rate / Qty in Rs. (excluding GST)	GST in Rs.			Total Value + GST in Rs.
					SGST	CGST	IGST	
1.	Supply portion (The price indicated shall be exclusive of all accessories, spares etc. as given in the scope of supply)							
2.	Other accessories / spares etc. as given in scope of supply (Individual item-wise break-up price shall be attached as an annexure to this price bid format.)							
3.	Installation and Commissioning (extra, if any)							
4.	Packing & Forwarding charges (extra, if any)							
5.	Freight & Transit insurance charges, extra, if any							
6.	Total price (delivery, installation and commissioning at NIT-T)							
7.	Value of Annual Maintenance Contract							
8.	Net cost to be paid by NIT-T							

Signature & Seal of Vendor

Note: The price bid should be submitted only as per the above format. No row shall be left blank. Please indicate NA, in case the item is "Not Applicable". If this format is not used or any column is left blank, then the bid will be rejected.

(TO BE PRINTED IN LETTER PAD OF THE FIRM)

EMD Returning Form

To
The Director
National Institute of Technology,
Tiruchirappalli – 620 015

Sub: Returning EMD amount

Sir / Madam,

Our firm has participated in the tender / quotation enquiry No mentioned below and produced the EMD amount through DD, details of the DD are given below.

Tender / Quotation Reference No	
EMD amount	
DD Number	
DD issued Bank	
Date of DD	

It is requested to return the EMD amount to our firm after completion of the purchase to the below mentioned Bank account.

Account Name	
Bank Account Number	
IFSC code	
Bank	

Signature with Seal and Date

MANDATE FORM FOR ELECTRONIC FUND TRANSFER/RTGS TRANSFER

Date: / /

To

The Director,
National Institute of Technology,
Tiruchirappalli – 620 015, Tamil Nadu

Sub	:	Authorization for release of payment / dues from National Institute of Technology, Tiruchirappalli through Electronic Fund Transfer/RTGS Transfer.
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1. Name of the Party / Firm / Company / Institute :
2. Address of the Party :
3. City _____ Pin Code _____
4. E-Mail _____ Mobile No: _____
5. Permanent Account Number _____
6. Particulars of Bank:

Bank Name:		Branch Name:	
PIN Code:		Branch Code:	
IFS Code:(11 digit alpha numeric code)			
Account Type	Savings	Current	Cash Credit
Account Number:			

DECLARATION

I hereby declare that the particulars given above are correct and complete. If any transaction delayed and not effected for reasons of incomplete or incorrect information I shall not hold Director, National Institute of Technology Tiruchirappalli responsible. I also undertake to advise any change in the particulars of my account to facilitate updating of records for purpose of credit of amount through NEFT/RTGS Transfer.

Place: _____ Date: _

Signature & Seal of the Authorized Signatory of the Party
