



**NATIONAL INSTITUTE OF TECHNOLOGY
ROURKELA – 769 008, ODISHA**

Advertised Tender Enquiry

Department: Mechanical Engineering

Tender Notice No: NITR/PW/ME/2018/78

Date: 12/11/2018

To

Important Dates

**Through
CPP Portal
(E-procurement)**

Event	Date	Time
Pre-bid Conference	19/11/2018	11:00 AM
Last Date of submission of bid	03/12/2018	11:00 AM
Opening date of technical bid	04/12/2018	11:00 AM

Dear Sir,

We intend to purchase the commodities specified below and invite quotations in accordance with the terms and conditions detailed in the bid document. If you are interested, kindly send your offer with prices and complete terms within the time mentioned above.

For any technical query contact to

Head, Department of Mechanical Engineering
Attention: Prof. Suraj Kumar Behera
National Institute of Technology
Rourkela – 769 008, Odisha
Phone: 0661 – 2462508
Email: beherask@nitrrkl.ac.in

Yours sincerely,

Name: Prof. Suraj Kumar Behera
(PIC)

Encl:

- 1) Schedule of requirement, specifications, dates etc.
- 2) Bid document containing detail terms and conditions.

1. Schedule of requirements

Sl. No.	Description of Goods/Service	Quantity
1	Turboexpander Monitoring System	1 Set

Details of ONE set Turboexpander Monitoring System supply by the vendor is as following:

Sl No	Parts of Turboexpander Monitoring System.	Quantity
01	Control panel	01
02	valve	01
03	Vibration sensor	04
04	Speed sensor	04
05	Temperature sensor	04
06	Power Supply for the Unit.	01
07	Display unit	01
08	Digital Oscilloscope	01

2. Specifications and allied Technical Details

Total system will have a subsystems of vibration, speed and temperature measurements with analogue output for the oscilloscope

A. Specifications for Tracking / Reference signal to be used for reference and frequency measurement.

The vibration analyzer will accept the Frequency input from eddy current/Magnetic pickup having one or 2 pulses per rotation. The frequency and rate of change of frequency will be measured simultaneously when the rotating machine is accelerating or decelerating.

Type of Sensor	: Non contact type inductive proximity or Magnetic signal
Amplitude range	: 0-30 V P-P AC signal superimposed on the DC of 0 to 24V DC
Type of signal	: 1 or 2 pulses (in one cycle).
Sensitivity	: Speed signal of minimum 100 mV, superimposed on DC value of 0 to 24V.
No of Reference Input	: 1 No.
Frequency Range	: 0-4999Hz

B. Vibration Signals Specifications

Type of Sensor	: Non contact type inductive proximity signal
Sensor Sensitivity	: 4mV / 8mV /micron (Settable for Each channel through Modbus registers or configuration utility.
Max. Input	: 53 volts AC+DC
Amplitude ranges	: 0 – 8 Volts (0- 500 micron) p– p super imposed on DC of the range 0 to 32V(Sensitivity is selectable through PC utility).
Frequency Response	: 0 – 10000 Hz
No of Vibration Inputs	: 4 Nos.
Input signal for tracking reference	: From corresponding reference/speed signal.

C. Specifications for frequency measurement & Display.

Display	:	4 Digit
Range	:	0 to 4999 Hz
Accuracy	:	Better than +1%
Resolution	:	1 Hz
Refresh time	:	1 Sec.
Internal measurement time	:	100 mSec.

D. Acceleration / Deceleration Rate:

Display	:	4 digits (3 digit plus 1 digit for sign).
Range	:	9.99 to – 9.99 Hz / sec
Accuracy	:	± 0.1 Hz / sec
Resolution	:	0.01 Hz / sec
Refresh time	:	Maximum 1.0 sec
Internal Measurement time	:	100 mSec

E. Parameters to be measured for each of Vibration measurement channel.

Total of 4 parameters is measured for each channel, they are

1. Track-1 Amplitude : Amplitude of the first fundamental.
2. Track -1 Angle : Angle of first fundamental from the reference.
3. Track -2 Amplitude : Amplitude of Second Harmonics.
4. Trackv-2 Angle : Angle of Second Harmonics from the reference.
5. DC Value : Static Gap between Sensor and Rotor Surface.
6. Overall : Overall Vibration amplitude from raw signal.

F. Temperature sensors with signal processor, indicator and digital output: total 4 nos

- a. Gas inlet temperature: 1 no.
- b. Gas outlet temperature: 1 no.
- c. Turboexpander Cooling water inlet temperature: 1 no.
- d. Turboexpander Cooling water outlet temperature: 1 no.
 - (i) Range of measurement : 200 degree K to 350 degree Kelvin.
 - (ii) Type of the Sensor : As per the location of the sensor and range of measurement required that location.
 - (iii) Resolution : 1 Degree K.
 - (iv) Display : 4 Digit LED/LCD Display.
 - (v) Output : Digital output on Serial communication for recording data by main system controller .

G. Speed Control Valve

- a. Suitable control signal shall be provided to control flow of the Gas to control the speed of Turbo Expander. 0-5 volt signal shall be provided by the frequency counter to the stepper motor controlling the valve opening.
- b. Speed control valve will have automatic control mode as well as manual control over ride mode in case of erratic speed sensor .

H. Digital Communication interface

Communication Module should collect data from individual modules over RS-485 Port and send to

PC on MODBUS through RS-232 or LAN Port.

Number of Communication Ports : 3

Type of Ports

1. One RS485 for Modbus RTU for collecting data from modules.
2. One RJ45 (10/100base TX) for MODBUS over Ethernet on TCP/IP protocol
3. One RS-232 port for configuration through PC.
4. IP Address : User Settable.

I. Power Supply for the Unit.

Total control system shall work on 100V to 265V AC, 50 Hz. One SMPS shall be used to generate 24V DC and shall be supplied to all the modules. All modules shall have their own isolated DC-DC convertors of various voltages as required by the modules.

J. Specifications for PCBs and EMI Compliances

On-Chip clock/System clock	: More than 120 MHz.
Clock Stability	: Better than 50PPM over working range.
Free On-Chip Memory	: More than 25% of flash and RAM memory will be free for future up gradation/addition.
Temperature on IC and PCB	: Maximum 50 degree C.
Heat Sink	: No external heat sinks are required.
EMI susceptibility	: All care will be taken to reduce the EMI susceptibility of the instrument.
PCB Designing.	: Due care will be taken while designing PAB layout to have maximum noise immunity and to provide isolation whenever is required.

K. Data Monitoring and storing On PC.

The Software shall be designed 100% as per NIT Rourkela specifications and finalized with user before start of development work. It shall be developed using VB, Dot Net, C Sharp platform or NI Lab View. No license shall be required for installations or number of tags.

1. Software shall be developed in VB, .Net, C# or LAB View Language.
2. Source code along with brief comments for each function will be supplied along with software.
3. Separate configuration window shall be designed for configuration of parameters, like IP address, Sensor sensitivity etc.
4. All measured parameters described under various technical specifications shall be stored in standard Database like MS Excel, MS Access etc. The data should be available to accessed by users directly from the SW or through MS office outside runtime environment. Data access need to be restricted with password.
5. All Modules are to be connected to single PC via communication module and all data is to be stored in single file or individual file as per user's desire on same PC, same folder.
6. Data refresh rate shall be less than 1 second. However data storage in the file will be at programmed interval. There will be 2 type of logs in each file.
 - a. Time Log:- This log will contain data stored at pre-programmed regular time interval of 1 second to 600 seconds(10 minutes).
 - b. Frequency Log:- Data will be stored at every pre-programmed change of rotor frequency. User can programmed different interval from 0.2 Hz to 100 Hz in 5 different ranges. Range itself is programmable.
7. All data need to be displayed in tabular form as well in Graphical forms. The tables and Graphs required will be provided to the successful bidder.

L. Digital Oscilloscope.

No of Channel	: 4 channel
Bandwidth	: 60 MHz
Sample Rates	: 1 GS/s

Input Sensitivity range	: 2 mV to 5 V/div with calibrated fine adjustment
Power supply	:230 V AC Indian plug
Record Length	:2.5 K Points
Coupling Type	:AC, DC, GND
Time Base	: 5 ns to 50 s/div
DC gain accuracy	: ±3%, from 10 mV/div to 5 V/div
Display	:Above 5.5 inch with Color Display (Bench Type)

3. **Format of Quotation** (tick appropriate box)

It is a two-part bid with separate technical and price bids.

4. The Bid should be submitted through <https://eprocure.gov.in/eprocure/app>

5. Quotations should be valid for a period of **90 days** from the closing date of the bid.

6. **Some important dates:**

i.	Pre-bid Conference:	19/11/2018	11:00 AM
ii.	Last date for submission of bid	03/12/2018	11:00 AM
iii.	Opening date of technical bid	04/12/2018	11:00 AM

7. **Warranty:** Warranty must be **01 year** onsite which should be clearly mentioned along with the quotation

8. **GST** should be charge according to applicable rates (if applicable).

9. **Tender Cost:** Tender Cost (Non- refundable) in the shape of **Demand Draft for INR 1000/- (Rupees One thousand only) in favour of Director, NIT Rourkela** Payable at Rourkela from any Scheduled Commercial Bank except Co-operative and Gramin bank. Tender Cost should reach physically through speed post/ register post/courier, containing in an envelope & superscripted with subject, tender reference number addressing to **Registrar, NIT Rourkela- 769008, Odisha; Attention: Prof. Suraj Kumar Behera(ME) on or before 03/12/2018 at 11:00 AM**

10. A Pre-bid conference will be held in the **Department of Mechanical Engineering, NIT Rourkela** as per Schedule given above for clarifying issues and clearing doubts, if any, about the specification & other allied technical details. The prospective bidders may attend the pre-bid conference at the appointed date, time and place.

11. Please go through the enclosed “bid document” carefully for other bidding instructions.

12. Please send you quotation through <https://eprocure.gov.in/eprocure/app>

13. For technical details, you may contact

Prof. Suraj Kumar Behera National Institute of Technology Rourkela – 769 008, Odisha Phone: 0661 – 2462508 Mail: beherask@nitrrkl.ac.in or suraj.behera@gmail.com

NB: Please furnish your Dealership Certificate (must) and Proprietary Nature Certificate (If applicable)



NATIONAL INSTITUTE OF TECHNOLOGY ROURKELA – 769 008, ODISHA

BID DOCUMENT

1. Instructions to the bidders

- 1.1 Bids are invited on behalf of the Director, National Institute of Technology (NIT), Rourkela – 769 008, Orissa, from the intending bidders for supply of the goods/stores/ equipment for the Institute as detailed in the enquiry letter.
- 1.2 The bidders should quote their offer/rates in BOQ in clear terms without ambiguity.
- 1.3 In case of any discrepancy between the rates in figures and that in words, the rate in words will be accepted as correct.
- 1.4 The last date for receipt of the bid is marked in the tender document.
- 1.5 The Bid should be uploaded in <https://eprocure.gov.in/eprocure/app>. Please follow the guideline of the site.
- 1.6 If a prospective bidder requires any clarification in regard to the bidding documents, he may make a request the concerned officer or faculty member at least 15 days before the deadline for receipt of bids.
- 1.7 Bids received after the deadline of receipt indicated in Para1.4 above shall not be taken in to consideration.
- 1.8 Each bidder shall submit only one bid. A bidder, who submits more than one bid, shall be disqualified and considered nonresponsive.
- 1.9 The bids may be submitted in two parts, viz., technical bid and financial bid.
- 1.10 The bidder has to sign in full at all pages of the scanned part of the bidding document. No over-writing in those pages are acceptable.
- 1.11 The bidder should quote for the “Turboexpander Monitoring System” and selection process will be based on both quality and cost.

2. Terms Conditions of the bid

- 2.1 The rates quoted should preferably be net, inclusive of all taxes and duties, packing, forwarding, freight, Insurance and all other incidental charges. In case these charges are quoted extra in addition to the quoted rates, the amount thereof or Ad Valorem rate must be specified. Packing, forwarding, freight etc., when quotes separately are reimbursable at actuals. If external agencies are employed, their receipts must be enclosed with the invoice.
- 2.2 Duties and Taxes are to be quoted separately. Ad Valorem rates thereof should be clearly indicated with reference to the relevant Acts and Rules.

It may be noted that the Institute is exempt from paying Excise Duty vide Government Notification No. 10/97 dated 01.03.1997 [Registration No.: TU/V/RGCD (227)/2011, dated 10.10.2011]. GST may be charged at applicable rates.

- 2.3 The goods are required to be delivered at the indenting Department of NIT, Rourkela, and must be reached within **90 days** from the date of placement of the supply of order under the risk and arrangement of the bidder and offers with delivery beyond the above period shall be treated as unresponsive. In case the delivery time is higher, the same must be mentioned clearly in the quotation.
- 2.4 The bid should remain valid for a period of **90 days** from the date of opening. In case your offer has a different validity period that should be clearly mentioned in the quotation.
- 2.5 Conditional discount, if any, offered by the bidder shall not be considered at the time of evaluation.

- 2.6 The goods offered should strictly conform to the specification and technical details.
- 2.7 The Institute may like to conduct pre-dispatch inspection of goods, where applicable.
- 2.8 Period of guarantee/warranty, where applicable, should be specified in the bid.
- 2.9 If the successful bidder, on receipt of the supply order, fails to execute the order within the stipulated period, in full or part, it will be open to the Director, NIT Rourkela to recover liquidated damage from the firm at the rate of 1 percent of the value of undelivered goods per month or part thereof, subject to a maximum of 5 percent of the value of undelivered goods. Alternatively, it will also be opened to the Director, to arrange procurement of the required goods from any other source at the risk and expenses of the bidder.
- 2.10 The successful bidder may be required to execute a contract, where applicable.
- 2.11 The bidder has to furnish up to date Income Tax Clearance Certificate along with the bid.
- 2.12 Payment (100 percent) will be made by Account Payee Cheque/Bank Draft, within 30 days from the date of receipt of the goods in good condition or receipt of the bill, commissioning of the equipment, where applicable, whichever is later/latest.
- 2.13 In case of Advance payment, the payment will be made on either in Foreign Demand Draft or Wire Transfer only. The proforma invoice copy need to be sent for advance payment
- 2.14 In the event of any dispute arising out of the bid or from the resultant contract, the decision of the Director, NIT, Rourkela shall be final
- 2.15 The bid document/resultant contract will be interpreted under Indian Laws.

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