

	BHARAT HEAVY ELECTRICALS LIMITED		Enquiry No. :		
	HEAVY POWER EQUIPMENT PLANT		Due Date :		
	RAMACHANDRAPURAM,		Supplier Qtn. No.:		
	HYDERABAD - 502 032		Date :		
TENDER DOCUMENTS TO BE FILLED BY THE SUPPLIER FOR SUPPLY OF					
LOCAL AUTOMATION MODULE FOR DATA ACQUISITION SYSTEM					
The "Offered" Column and where applicable, the "Deviations" & "Remarks" Column of this format shall be filled in by the Vendor and submitted along with the offer. Inadequate / incomplete, ambiguous, or unsustainable information against any of the clauses of the specifications/requirements shall be treated as non-compliance.					
ADDRESS OF THE SUPPLIER :					
TELEPHONE NOS.:					
FAX NOS.:					
E-MAIL ADDRESS :					
S.No	PARAMETERS	To be Specified / Confirmed by Vendor	Offered	Deviations	Remarks
Title	LOCAL AUTOMATION MODULE FOR DATA ACQUISITION SYSTEM				
1	Scope:				
1.1	This specification is intended to cover the design, Supply, Installation, commissioning, and training for One LAM for existing Data Acquisition System of Steam Turbine Test Plant, BHEL in all respects for successful and trouble free operation.	To be Confirmed by Vendor			
1.2	The system shall essentially consist of the following:- 1. Agilent (now Key sight) 34970A – 1 no 2. 34901A 20ch mux – 3nos 3. E5810a LAN GPIB Extender – 1 no 4. Power supply U8001a -1 no 5. Signal conditioners for speed and flow 6. Standard Laptop with latest OS- 1no 7. Required authorised software licences with IO libraries suitable for both existing LAM and new LAM (existing software is compatible with windows XP)	To be Confirmed by Vendor			
1.3	8. Wired and wireless connectivity setup between LAM and Main Control Unit. 9. Instrumentation rack with accessories for mounting DAS equipment in hazardous environment near the test beds. 10. 4 1/2 digit, True RMS Digital multi meter- 2nos (detailed at 3) 11. Portable Function/ Arb wave form Generator -1 nos.(detailed at 4) 12. Installation and commissioning	To be Confirmed by Vendor			
1.4	Various instruments and sensors required for testing shall be connected to the Local Module. The local module shall be compact, lightweight portable units capable of signal conditioning, excitation, multiplexing, digitizing and communicating with the existing main control unit and Laptop mentioned at point 2.1.6/2.2.0.	To be Confirmed by Vendor			
2	Main Control Unit : The main control unit shall be a industrial standard laptop of following features 1. Intel core i5 3rd gen or better processor 2. 4 GB RAM , 1 TB hard disk or better 3. Operating system with windows 7 or latest, which should have compatible drivers for existing LAMs.	To be Confirmed by Vendor			
3	Hand held Digital Multimeters: 4.5-digit , True RMS type Measurement Functions: Voltage, Current, Resistance, Continuity Check, Diode Test, Frequency, Capacitance, Temperature Safety Features: Category IV 600V, Category III 1000V Make:Fluke/key sight/yokogawa	To be Confirmed by Vendor			
4	Function/ Arb Waveform Generator , 20 MHz, 2-Channel with DC offset Range $\pm(5 \text{ VDC} - \text{Peak AC})$ into 50Ω $\pm(10 \text{ VDC} - \text{Peak AC})$ into open circuit. Make: Rigol / Tecktronix / Keysight 33512B	To be Confirmed by Vendor			
5	Local Automation Modules : Local module shall be compact, rugged, portable units to be kept in the Test Bed. The various instruments and sensors shall be terminated in the local module. This module should be able to connect and communicate with the existing LAM and Main Controller network.	To be Confirmed by Vendor			

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6	<p>The module must accommodate and have following salient features:</p> <ol style="list-style-type: none"> 1. Agilent (now Keysight) 34970A – 1 no 2. 34901A 20ch mux – 3nos 3. E5810a LAN GPIB Extender – 1 no 4. Power supply U8001a -1 no 5. Signal conditioners for speed and flow – 1no 6. Industrial cabinet with accessories for mounting DAS equipment in hazardous environment 7. The terminal connectors shall be highly ruggedized Push fit (Wago) type, as they may be subjected to frequent connection / disconnection. The field terminal blocks should be suitably protected to avoid physical damage due to external handling and malicious works. 8 The local module enclosure should be waterproof and should safeguard it from water or oil spillage. The local module termination box should be at least 3 feet above the ground in the industrial cabinet for better operation and maintenance of terminations. 	To be Confirmed by Vendor																											
7	<p>The following type of instruments shall be connected to local modules :</p> <ol style="list-style-type: none"> a) 2 wire / 4 wire resistance temperature detectors b) Thermocouples (all types) c) Pressure transmitters: two wire type, 4 - 20 mA with 24 volts DC excitation. d) Turbine type Flow meters e) Key Phasor speed sensors. 	To be Confirmed by Vendor																											
8	Instruments and Measuring channel quantities:																												
8.1	<p>The required number channels are:</p> <p>Resistance Temperature Detectors/ Thermocouples: 20 / 40</p> <p>Pressure Transmitters 10</p> <p>Flow 5 , Speed 2 , Analog Inputs 3nos</p>	To be Confirmed by Vendor																											
9	Data acquisition and Presentation software:																												
9.1	<p>The windows 7 or better Software shall provide many power full, easy to use capabilities within a familiar, user friendly environment. It should be able to communicate with the existing main controller (desktop PC) cater to Data acquisition , control , alarm management, communication , graphics and other requirements. It shall have the following features:</p> <ul style="list-style-type: none"> • Windows –7 or better operating software • Presentation software is built on NI LAB VIEW or equivalent. • Caters to analog, digital signals, thermocouples , frequency , RTDs etc. • Real time graphical displays and tables, with print option. • User programmable mimic displays and report formats • Selectable Triggering - automatic , based on time , speed, other parameter or manual. • Selectable data storage modes -delta speed , delta time ,event based or manual. In manual o data storage mode , a set of readings shall be logged at the press of a key / click of mouse button and displayed in the required format. Facilities shall be provided to store/print or cancel 	To be Confirmed by Vendor																											
9.2	<p>The displayed data as per the operator's choice. Point no. shall be automatically incremented by 1 for each set of stored readings.</p> <ul style="list-style-type: none"> • Scaling in engineering units & selectable gain/ offset setting for each channel in $Y = mX + C$ form. • Selectable alarm and danger set points, real time alarm display ,annunciation, print out , Acknowledge /reset facilities. Alarm status screen at the click of mouse or press of a key 	To be Confirmed by Vendor																											
9.3	<p>User programmable channel configuration screen.</p> <ul style="list-style-type: none"> • Editable Configurations dynamically while running the application. • Provision for display/print list of selected channels in the following format • Provision to verify instrument connections with a user friendly screen with OK / NOT OK information. The verification screen shall also provide probable cause of NOT OK channel in the following format. Print of the verification screen shall be user Selectable. <table border="1"> <thead> <tr> <th colspan="6">Verification of Instrument Connections</th></tr> <tr> <th>Sl. no.</th><th>Channel Description</th><th>Ch. no.</th><th>Reading</th><th>Status</th><th>Remark/Cause</th></tr> </thead> <tbody> <tr> <td>1</td><td>J Bearing Inlet Pr.</td><td>161</td><td>-1.5</td><td>NOT OK</td><td>DC power supply faulty</td></tr> <tr> <td>2</td><td>Drain Temp (TS)</td><td>105</td><td>-242</td><td>NOT OK</td><td>Connection faulty</td></tr> </tbody> </table>	Verification of Instrument Connections						Sl. no.	Channel Description	Ch. no.	Reading	Status	Remark/Cause	1	J Bearing Inlet Pr.	161	-1.5	NOT OK	DC power supply faulty	2	Drain Temp (TS)	105	-242	NOT OK	Connection faulty	To be Confirmed by Vendor			
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9.4	<ul style="list-style-type: none"> Provision for a run-time plot(X vs Y) screen for minimum four plot windows. X & Y- Selectable from any of the configured channels. Provision to print any of the plot screen at operator's choice. Post-acquisition data editing facility. Data shall be stored in a database format (ODBC) , easily accessible through Microsoft -Access or any other DATA BASE software After testing, data shall be retrieved and printed in the specific format. Pass word administration for security. Provision for software modification for future improvement. Animation facility like colouring, horizontal / vertical / angled movement, scaling for 3 D effects, rotation with real time data display. Display screen of test set-up (MRT / Performance Test) on operator's choice. 	To be Confirmed by Vendor			
9.5	<ul style="list-style-type: none"> Provision for changing Numeric data format during run time. Provision for Creating TEST SUMMARY SHEET for: MRT report: by printing minimum & maximum values of each parameter from the stored data in a given format. Provision for dynamically changing the configuration scale and offset in mx+c TRENDing of parameters eg: speed vs Time. 	To be Confirmed by Vendor			
10	Accessories and spares : <ol style="list-style-type: none"> Backup of all software shall be provided on CD Interconnecting, power, communication and interface cables for all peripherals and Modules. One set of spare fuses, One set of extra terminal leads for meters etc. Push fit Terminal strips- 300 nos. 	To be Confirmed by Vendor			
11	General Requirements: <ol style="list-style-type: none"> The supply,installation and commissioning of the system shall be in the scope of the supplier. After successful installation and commissioning the supplier shall provide training to the operating personnel. This shall consist of class room and hands on training in operational, hardware, maintenance and programming aspects. Easy to understand course material shall be provided for 10 persons. Vendor shall indicate their service agents, stationed at Hyderabad for the equipment offered. Vendor should have supplied two such systems in past 5 years. References of similar systems supplied earlier to be furnished with the offer. Necessary detailed technical literature, catalogues, write up, references etc., and shall be furnished with the offer. 	To be Confirmed by Vendor			
12	Where alternatives are offered,they shall be fully described and must be accompanied by all pertinent engineering information,to facilitate evaluation of alternatives.	To be Confirmed by Vendor			
13	It shall be the responsibility of the vendor to inform the purchaser of any errors,ambiguities,inconsistencies or discrepancies which may be found to exist in any document, specification or drawing submitted by the purchaser.Vendor shall be responsible for rectifying at their own cost, any errors and oversights in the system.Any work shown on the reference drawings and not particularly given in the specification or vice versa, shall be included by the Vendor.The omission from the specification of any items essential to the correct functioning of any part of the specified equipment shall be brought to the attention of the purchaser.Failure to do this shall not absolve the vendor from supply,installation and commissioning of any equipment or services required to achieve the full functioning of the system to the intent of this specification.	To be Confirmed by Vendor			
14	Detail User Manuals - Snos,Compact Discs- 2 Nos , containing all the above documentation on CD ROM, wherever possible	To be Confirmed by Vendor			
15	Software Licance CDs	To be Confirmed by Vendor			