

	<u>BHARAT HEAVY ELECTRICAL LIMITED</u>				Enquiry No. :
	<u>UNIT'S ADDRESS:</u>				Due Date :
	<u>UNIT'S PHONE NO.:</u>				Supplier Qtn. No.:
	<u>CONTACT PERSON'S NAME/DESIGN./PHONE NO./E-MAIL (FROM PURCHASE DEPT.)</u>				Date :
<u>SPECIFICATION CUM COMPLIANCE CERTIFICATION FOR DATA ACQUISITION SYSTEM</u>					
NOTE:-					
1. Vendor must submit complete information against all Clauses. Only the offer meeting clause no.4 Qualifying criteria would be processed further.					
2. 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.					
3. The offer and all documents enclosed with offer should be in English language only.					
ADDRESS OF THE SUPPLIER :			ADDRESS OF LOCAL (BHOPAL/MP) AGENTS :		
TELEPHONE NOS.:			TELEPHONE NOS.:		
FAX NOS.:			FAX NOS.:		
E-MAIL ADDRESS :			E-MAIL ADDRESS :		

SITATION SYSTEM AS SPECIFIED BELOW

SNO	DESCRIPTION FOR BHEL REQUIREMENT	SPECIFIED / TO BE CONFIRMED BY	OFFERED	DEVIATIONS	REMARKS
1.0	PURPOSE : Data acquisition is required for acquiring data from different transducers situated at different locations at Hydro Lab BHEL Bhopal. This would be used during model testing of hydro turbine.				
2.0	SCOPE OF SUPPLY : As per specifications given in clause 3.0				
2.1	DAS (Data Acquisition System): Details of modules/card/terminal block/connection cable etc are given in 2.2 to 2.5	01 Set typically 2 systems with suitable interfacing having one controller and minimum 11 slots in total (total of both the system).	Vendor to confirm		
2.2	40 channel multiplexer module / Modules for 40 channels in total out of which minimum 16 for voltage, 4 for current and 4 for frequency measurement	01 Set	Vendor to confirm		
2.2.1	Terminal Block for above modules along with cable for all inputs connection to DAS	1 Set as applicable	Vendor to confirm		
2.3	Counter/totalizer and Digital input/output card	Total 16 nos. of counter and 64 Digital input outputs, Vendor to specify no of cards required	Vendor to confirm		
2.3.1	Terminal block for connection as per 2.3 above along with cable for all inputs connection to DAS	1 Set as applicable	Vendor to confirm		
2.4	Modules for measuring Voltage, resistance, RTD, thermocouple, and current - Min 8 channels required	1 Set	Vendor to confirm		

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2.4.1	Terminal block for above module alongwith cable for RTD input connection (minimum 8 channels) to DAS	1 Set as applicable	Vendor to confirm			
2.5	Rackmount Kit for forward or reverse mount in 19" rack.	1 Set to accomadate both system as required in 2.1	Vendor to confirm			
2.6	Application software	As per clause 3.1.6	Vendor to confirm			
3.0	SPECIFICATION : Supplier to quote for any other hardware required for making a complete stand-alone system. Suitable connectors/leads for providing input to the Data Acquisition System are to be included. Data acquisition system could comprise of two different systems but data has to be acquired from the Data Acquisition units/two multifunction switch simultaneously- Data Acquisition System should be either of Agilent or National Instruments or Yokogawa make only. Vendor to specify the make.		Vendor to confirm			
3.1	Data Acquisition system (multifunction switch /measure mainframe/controller) :	Similar to Agilent make 34980A multifunction switch /measure mainframe/controller. For similarity it needs to comply with atleast the below mentioned specs				
3.1.1	Stand alone system		Vendor to confirm			
3.1.2	Power Supply 220 V AC \pm 10 %,50 Hz		Vendor to confirm			
3.1.3	Internal DMM 6.5 digit or ADC 16 bit		Vendor to confirm			
3.1.4	The whole system comprising of two units of data acquisition system should have provision for total 11 modules or more for future use		Vendor to confirm			
3.1.5	Interface:					

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3.1.5.1	Standard USB	Vendor to confirm			
3.1.5.2	Ethernet	Vendor to confirm			
3.1.5.3	IEEE 488.2 GPIB	Vendor to Confirm			
3.1.6	Application Software: Vendor to provide application written in LabVIEW or Agilent VEE or Yokogawa specific software. LabVIEW(version 8.6) software is already available with BHEL. Application software should be ready to run. In case of LabVIEW source code needs to be provided whereas in case of application written in Agilent VEE /Yokogawa specific software ,executable file is to be provided. The application will do the following- Configuration of all modules provided, Data Acquisition from all channels to be readily available in required sequence/parallelly. Output data to be written in typically tab seperated file format to computer drive (hard disk/pendrive) in consultation with BHEL. Vendor to explain application software and submit flow chart.	Vendor to confirm			
3.1.7	Drivers:	Vendor to confirm			
3.1.7.1	Labview Plug and Play driver	Vendor to confirm			
3.1.7.2	System should also support SCPI commands or equivalent commands to be sent by Visual Basic or C or HP Basic. Alternatively drivers to interface hardware with Visual Basic and C	Vendor to confirm			
3.1.8	Operating Temperature Range 5 to 50°C	Vendor to confirm			
3.1.9	. Power supply cord should be suitable for use in India.	Vendor to confirm			

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	3.2 Multiplexer modules 40 channel for measurement of voltage current & frequency (Similar to Agilent make 34921A module). For similarity it needs to comply with atleast the below mentioned specs Scanning speed - 100 channels /sec i.e 2.5 readings/Channel/s	Vendor to confirm			
3.2.1	Channel configuration:	Total 40 channels or more	Vendor to Confirm		
3.2.2	Current Measurement				
3.2.2.1	No. of channels	Minimum 4 No. vendor to specify maximum no. of channels	Vendor to Confirm		
3.2.2.2	Current Measurement is to be direct without the use of shunt.		Vendor to Confirm		
3.2.2.3	Max Input DC Current:	20 mA or above.	Vendor to Confirm		
3.2.3	Voltage Measurement				
3.2.3.1	Max Input Voltage	DC Voltage: 10 V or more	Vendor to Confirm		
3.2.3.2	No. of channels for voltage measurement	Minimum 16 No. vendor to specify maximum no. of channels	Vendor to Confirm		
3.2.4	Frequency Measurement	Minimum 2 No. of channels. Vendor to specify maximum measurable frequency vendor to specify maximum no. of channels	Vendor to Confirm		
3.3	Terminal block for multiplexer modules (along with required cable for connecting to modules)	As applicable for above modules	Vendor to Confirm		

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3.4	Counter/totalizer and Digital input/output card with memory	Similar to Agilent make 34950A module. For similarity it needs to comply with atleast the below mentioned specs	Vendor to Confirm		
3.4.1	Digital input output characteristics:				
3.4.1.1	Input Voltage:	0 - 5 V.	Vendor to Confirm		
3.4.1.2	Output Voltage:	Vendor to specify	Vendor to Confirm		
3.1.4.4	Maximum output current	24 mA	Vendor to Confirm		
3.4.2	Counter/Totalizer characteristics:	Total 16 counters (Multiple modules can be given)	Vendor to Confirm		
3.4.2.1	No. of counters per module		Vendor to Specify		
3.4.2.2	Resolution:	32 bits or more	Vendor to Confirm		
3.4.2.3	Maximum count	$2^{32} - 1$ or more	Vendor to Confirm		
3.4.2.4	Maximum input frequency	10 MHz or more	Vendor to Confirm		
3.4.2.5	Input Voltage	0-5V TTL (typical) with 0-12 Volt in atleast 8 channels for which an external/internal PCB to be provided.	Vendor to Confirm		
3.4.2.6	Gate Input	TTL	Vendor to Confirm		
3.4.3	Clock characteristics for counter:				
3.4.3.1	Max Frequency	20 MHz or more	Vendor to Confirm		
3.4.3.2	Resolution		Vendor to Specify		
3.4.3.3	Voltage level	TTL	Vendor to Confirm		
3.4.3.4	Accuracy:	100 ppm or better	Vendor to Specify		
3.5	Suitable Terminal block for item at Clause 3.4	along with required cable for connecting all 16 counters and 64 DIO	Vendor to Confirm		

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3.6	Minimum 8 channels for RTD measurement. Card should also be capable of measuring current, voltage	Similar to Agilent make 34925A module. For similarity it needs to comply with atleast the below mentioned specs.	Vendor to Confirm		
3.6.1	4-wire RTD to directly connect to module		Vendor to Confirm		
3.6.2	Maximum Voltage Range	50V or above	Vendor to Specify		
3.6.3	Maximum Current	20 mA or above.	Vendor to Specify		
3.6.4	Minimum Scan Rate	1000 channels/sec i.e. 25 Reading/channel/sec	Vendor to Specify		
3.7	Suitable Terminal block for above modules (3.6)	along with required cable for connecting atleast 8 channels for RTD measurement.	Vendor to Confirm		

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	4.0 QUALIFYING CRITERIA				
4.1	The supplier should be a OEM or its authorized party and should have supplied earlier atleast 2 numbers of Data acquisition system (Make: Agilent/National Instruments/Yokogawa) along with customized application software developed on LabVIEW/Agilent VEE/Yokogawa specific software. The above said system should be working satisfactorily for atleast one year on the date of tender. A list of customers is to be given by the vendor.	Vendor to Confirm and Submit			
4.2	Copy of purchase order (P.O.) and performance certificate (issued in year 2010) from atleast one Customer listed in clause 4.1, with date of purchase order within last five years.	Vendor to Submit			
	5.0 ERECTION AND COM MISSIONING				
5.1	Erection and commissioning of Data acquisition system shall be done by Vendor. Commissioning would be complete only after succesful demonstration of application software acquiring the data from the data acquisition system and writing to file.	Vendor to Confirm			
	6.0 DOCUMENTATION	Vendor to Confirm			
6.1	Supplier to supply catalogue along with the offer. 1No.	Vendor to submit			
6.2	Supplier to supply manual (operation/maintenance) at the time of supply of the item.The maintenance manual shall comprise of circuit diagrams trouble shooting charts error codes etc.One copy of the manual in CD comprising of format details along with configuration data file,application software etc shall also be supplied. 2 Set	Vendor to Confirm			

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7.0	GUARANTEE :				
7.1	The supplier should give guarantee of proper functioning of Data acquisition system for 12 months from the date of commissioning. Any defect during this period will be rectified by the supplier free of cost.	Vendor to confirm			
8.0	SPARES:				
8.1	Itemised breakup of spares required for the Data acquisition system in sufficient quantity as per recommendation of Vendor for two years of trouble free operation should be offered by vendor besides the standard spares. Unit Price of each item of spare should be specified for future procurement.	Vendor to confirm			