



An ISO 9001
Company

Bharat Heavy Electricals Limited

(High Pressure Boiler Plant)

Tiruchirappalli – 620014, TAMIL NADU, INDIA

RESEARCH and DEVELOPMENT

SUPPLY OF DATA ACQUISITION / SWITCH UNIT AS PER THE TECHNICAL SPECIFICATION	Phone: +91 431 257 8608 Fax : +91 431 252 0696 Email : saru@bheltry.co.in Web : www.bhel.com
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Reference Number: BHEL/R&D/MM/2811000002	Date: 02/03/2010	Due date for submission of quotation : 30/03/2010 by 13.30 Hours
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You are requested to quote the Enquiry number date and due date in all your correspondences. *This is only a request for quotation and not an order.*

BHEL/Trichy is looking for vendors for supply of DATA ACQUISITION / SWITCH UNIT as per the technical specification and commercial terms & conditions attached.

Interested Manufacturers / stockists / Authorised dealers may send the offer on or before 30/03/2010, 13.30 Hours in two parts as requested in the specification.

S ARUMUGAM
SDGM/ R&D



Specification for Data Acquisition/ Switch Unit

Annexure –A: Technical Specification

Spec No:R&D:HFS:002 Rev 00 dt 02.12.2009

Sl.No	Characteristics	Requirement	Vendor compliance
1.0	General Specifications		
1.1	Information	Portable High precision data acquisition switch consists of internal DMM capable of measuring multifunction with add-on modules. It should have facilities to connect and retrieve data at computer	
1.2	Power Supply for the instrument	Capable of operating with 220/240V±10%, 50HZ±5% power supply	
1.3	Operating Environment	0°C to 55°C with 80% Relative Humidity	
2.0	Scope of supply		
2.1	Data Acquisition Switch	Vendor has to fill the model No	
2.2	Add on module for Data Acquisition Switch for the measurement inputs	Vendor has to fill the model Name and Number of modules offered	
2.3	PC Interface cable/Mechanism	Interface cable/mechanism between the instrument and Computer is to be provided (vendor has to fill the details)	
2.4	Data logger software	Vendor has to fill the details	
2.5	Manuals	Minimum One Set	
2.6	Certificates	1.Factory inspection Certificates for the instrument and measurement modules 2.Guaranty or Warranty certificates for the minimum period of one year from the date of delivery	
2.7	Commissioning	Instrument is to be demonstrated at BHEL-Tiruchirappalli at free of cost (No Daily allowance, Travel allowance and accommodation will be provided by BHEL)	



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3.0	Specification for Data Acquisition Switch		
3.1	Resolution	6 ½ digits (22bits) with internal DMM	
3.2	No of slots to support add in modules	Minimum 2 slots (DMM should be internal)	
3.3	Interface ports (on Instrument side)	RS232/GPIB/Ethernet/USB	
3.4	Maximum capable Scan Rate	250ch/sec	
3.5	Measurement functions	Temperature (with Thermocouples, RTDs and Thermistors) Voltage (dc and ac) Current (dc and ac) Resistance (2-wire and 4-wire) Frequency Period	
3.6	Minimum accuracy	0.004% for dcV 0.06% for acV 0.01% for resistance 0.01% for Frequency and period 0.05% for dc current 0.1% for ac current 1°C for thermocouple 0.06°C for RTD 0.08°C for Thermistor	
3.7	Internal memory	Non-Volatile memory capable of storing minimum 50K time stamped readings	
3.8	Real Time clock	Battery backed real time clock for pacing scans and time stamping readings	
3.9	Measurement capability	Capable to measure at least 120 single ended channels and 60 2-wire channels and capability for 96 matrix cross points	
3.10	System features Per channel math Power fail recovery Alarm	Individual Mx+B scaling and Min/Max/Average calculated in real time Resumes scanning automatically HI/LO alarm limits on each input channel with 4 TTL alarm outputs	



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3.11	Display	LED display to monitor any selected input channel, continuously updating the display with new readings. Also display of 3 character engineering labels like 'RPM' and 'PSI' to identify measurement units	
3.12	Front panels	Fully featured for standalone configuration, trouble suiting and data viewing	
3.13	Scan method	Scan to be initiated through either by pressing front-panel button or by sending software command or external TTL trigger pulse	
4.0	Specification for Add in modules		
4.1	Type	Analog Multiplexer channel type capable measuring multifunctions	
4.2	Isolation	300V optically isolated and shielded from equipments earth -referenced circuitry and computer interface	
4.3	Module type	2-wire armature (4-wire selectable)	
4.4	No of channels	20 (minimum)	
4.5	No of channels capable of measuring temperature	19 (minimum)	
4.6	Maximum acquisition rate	60ch/sec	
4.7	Measurement functions (Selectable)	Voltage (up to 300V ac/dc) Current (up to 1A ac/dc) Temperature - Thermocouples(B,E,J,K,N,R,S,T) Temperature -RTD (2 and 4 wire) Temperature-Thermistor Resistance-2and 4 wire Frequency Period	
4.8	Cold Junction compensation	It should be inbuilt and the thermal offset is to be less than 3μV.	



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4.9	DC Voltage Measurement Method	Continuously integrating multi slope III A-D Converter	
	Ranges	100mV,1V,10V,100V,300V	
	A-D Linearity	0.0002% of readin+0.0001% of range	
	Input Resistance	10MΩ ±1%	
	Input Bias Current	<30pA at 25°C	
	Input Protection	300V all Ranges	
	Range	0.1μV to 300V	
4.10	True RMS AC Voltage Measurement Method	Measures the AC component of the input with up to 300Vdc bias of bias on any range	
	Crest Factor	Max at 5:1 at full scale	
	Input impedance	1MΩ±2% parallel with 150pF	
	Input protection	300V rms all Ranges	
	Range	0.1μV to 300V	
4.11	Resistance Measurement Method	Selectable 4-wire or 2 wire ohms current referenced to LO input	
	Offset Compensation	selectable on 100Ω, 1kΩ,10kΩ ranges	
	Maximum Lead resistance	10% of range per lead for 100Ω and 1KΩ ranges; 1KΩ on all other ranges	
	Input protection	300V on all ranges	
	Range	0.1μΩ to 100MΩ	
4.12	Frequency Measurement method	reciprocal counting techniques	
	Voltage ranges	same as AC voltage function	
	Gate time	1s,100ms, or 10ms	
	Measurement timeout	selectable 3 hz, 20hz,200hz LF limit	
	Range	3Hz to 300kHz	
4.13	DC Current Shunt resistance	5Ω for 10mA, 100mA; 0.1Ω for 1A	
	Input Protection	1A 250V fuse	
	Range	10nA to 1A	
4.14	True RMS AC Current Measurement method	Direct coupled to the fuse and shunt. AC coupled True RMS measurement (measures the ac component only)	
	Shunt resistance	5Ω for 10mA ; 0.1Ω for 100mA ,1A	
	Range	10nA to 1A	



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4.15	Thermocouple Types of thermocouples Conversion Reference junction type	B,E,J,K,N,R,S,T ITS 90 software compensation Internal, fixed or external	
4.16	Thermistor Types	44004,44007,44006	
4.17	RTD Types	$\alpha = 0.00385(\text{DIN})$ & $\alpha = 0.00391$	
4.18	Measurement noise rejection	DC CMRR=140dB AC CMRR 70dB	
4.19	AC characteristics	Bandwidth-10MHz Ch-Ch cross talk -45dB at 10MHz capacitance (HI-LO) is <50pF Capacitance (LO-earth) is <80pF Volt-Hertz Limit is 10^8	
4.20	DC Characteristics	Offset Voltage- <3 μ V Isolation ch-ch,ch-earth- >10G Ω Initial closed channel R- <1 Ω	
5.0	Specification for Interface Mechanism		
5.1	Interface ports(On PC side)	Ethernet (Suitable adaptor cable should be provided if the instrument has other than Ethernet port)	
5.2	Interface ports (on Instrument side)	RS232/GPIB/Ethernet/USB	
5.3	Interface mechanism	The interface mechanism should be capable enough to connect the instrument to computer through computer network. (Ethernet). The data is to be updated in real-time	
6.0	Specification for Data logger software		
6.1	Capability	It should be capable to update data online	
6.2	Operating system	Should support Windows 98, 2000, XP, Vista and new operating systems like windows 7.	
6.3	Computer	Pentium IV or greater with 512MB RAM and 40GB hard disk	

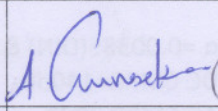
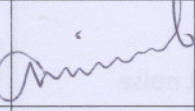
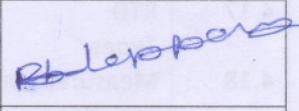


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7.0	Packaging	Should be packed properly and capable enough withstand any vibration occurs during transportation	
8.0	Documents Along with offer	Catalogues	

Note: Vendor has to fill the data sheet and should submit along with offer

00	02/12/09	Initial Release			
Rev No	Date	Description	Prepared (A.Gunasekaran)	Checked (V.Nirmala)	Approved (R.Kaliappan)



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Bharat Heavy Electricals Limited
Research & Development(MHD Complex)
Tiruchirappalli-620014, Tamil Nadu, India

SPECIFICATION FOR DATA ACQUISITION / SWITCH UNIT

ANNEXURE-B

COMMERCIAL TERMS AND CONDITIONS FOR SUBMISSION OF OFFER

1.0 QUOTATIONS

Bidders shall submit the offer in **TWO INNER ENVELOPES** as indicated below which shall be sealed in one outer envelope.

Envelope I This sealed envelope should contain all the copies of technical bid together with un-priced commercial bid. This envelope should be clearly marked **"Part I - Technical and unpriced commercial bid"**, indicating Enquiry No., Due Date and Address & Reference of the Bidder.

Envelope II This sealed envelope should contain **price details**. This envelope should be clearly marked **"Part II - Price bid"**, indicating Enquiry No., Due Date and Address & Reference of the Bidder.

Both the envelopes (Part I & II) shall be put in one cover, duly sealed, superscribing as Part I and Part II of Enquiry No., due date of opening and the address and reference of the Bidder.

The above offer should reach this office on or before the due date by 14.00 Hrs (IST). Late offers will not be considered. We suggest you to send the offer by SPEED POST.

Tender should not be addressed to any Individual's name but only by designation to:

**SDGM / MM / R&D
MHD Complex
BHARAT HEAVY ELECTRICALS LIMITED
TIRUCHIRAPALLI - 620 014
TAMIL NADU, INDIA**

Tenders should be free from **CORRECTION AND ERASURES**, Corrections if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words shall prevail.

Offers should be in **ENGLISH** and accompanied by detailed technical literature, catalogue and details of process facility in **ENGLISH**.



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Research & Development(MHD Complex)
Tiruchirappalli-620014, Tamil Nadu, India

SPECIFICATION FOR DATA ACQUISITION / SWITCH UNIT

2.0 PART I (TECHNICAL & COMMERCIAL BID)

2.1 Technical

This part shall include / indicate the following:

Offer should contain complete scope of supply with all technical details, specifications, delivery and other commercial terms and conditions.

2.2 Commercial

This part shall include / indicate the following:

- 2.2.1. Port of shipment / Station of despatch
- 2.2.2. Terms of payment
- 2.2.3. Taxes & duties applicable.
- 2.2.4. Delivery Schedule
- 2.2.5. Offer validity
- 2.2.6. Country of origin
- 2.2.7. A copy of "Un-Priced Part II" i.e., a copy of the Price Bid **without the price details** to be enclosed.

3.0 PART II (PRICE- BID)

This part should contain the schedule of price particulars and to be co-related to the technical details provided in Part I.

4.0 OPENING OF TENDERS

The Part I - Technical & commercial bid alone would be opened on the Tender opening date.

The Part II - Price bid of Technically suitable Bidders alone would be opened. The Technically suitable Bidders would be informed about the tender opening date. Clarifications if any required by BHEL for Technical evaluation would be sought from Bidders before opening of Part II - price bid.

5.0 GENERAL

5.1. Incomplete offers will not be considered.

5.2. **Terms of Delivery:** Bidders are required to quote their best delivery period. Foreign Bidders should submit their offer for net **FOB - Nearest Sea Port / Air Port**. Indian Bidders should submit their offer for **Ex-Works basis**. Delivery shall be counted from the date of Letter of Intent.



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5.3. Taxes and Duties : All Taxes and Duties payable as extra to the quoted price should be specifically stated in offers along with CST & TIN No etc., failing which the purchaser will not be liable for payment of such Taxes and Duties.

Note : We are not eligible to issue C Form.

5.4.Liquidated damages : It is clearly understood among the parties to the contract the **" Time is the essence of the contract "**. Therefore, the delivery of the goods specified in the purchase order should be made within the time prescribed. Failure to dispatch the materials in the time as per the delivery quoted in our Purchase Order would make the supplier liable to an un-conditional penalty at the rate of 1/2% of the value of goods for each week of delay subject to a maximum of 15% of the order value.

5.5.Risk purchase : Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or despatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefor. The supplier shall be liable for any loss, which the Purchaser may sustain by reason of such risk purchases.

5.6.Test certificates: The Bidders shall clearly mention in their offer that Test Certificates as called for in the Technical Specification, in the required number of copies will be provided at no extra cost.

5.7 The Tender specification is also hosted in website <http://www.bhel.com> in the Tender Notifications link

5.7 Non-Disclosure of BHEL information – The information provided by BHEL to the vendor during the various stages of execution is for the purpose of better understanding of BHEL's requirement and shall not be disclosed outside for the purpose of marketing / Business improvement



BHARAT HEAVY ELECTRICALS LIMITED

R&D

TIRUCHIRAPALLI – 620 014.

MATERIAL MANAGEMENT DEPARTMENT

ANNEXURE C TO PURCHASE ENQUIRY

Please ensure that the following details are incorporated in your **Offer**.

1. PRICE : **Ex-Works / Ex-Godown**
(or) **F.O.R. – DESTINATION**
2. DISCOUNT : % (or) Lumpsum amount – Rs.....
3. PACKING & FORWARDING : % (or) Lumpsum amount – Rs.....
4. TAX : **TNGST % / CST %**
without concession and with concession
(since, we are not eligible for Form-C please, FULL TAX may be mentioned) (Rates
of applicable Taxes & Duties and whether inclusive
or exclusive should also be mentioned)
5. SURCHARGE : %
6. DUTIES : %
7. FREIGHT & INSURANCE : %
8. DELIVERY PLACE :
9. DELIVERY PERIOD :
10. LD / PENALTY FOR DELAY IN DELIVERY : @ 0.5% PER WEEK SUBJECT TO A
MAXIMUM OF 15% IS APPLICABLE.
CONFIRM YOUR ACCEPTANCE.
11. OFFER VALIDITY :
12. PAYMENT TERMS : **BHEL Payment terms are –**
 - 1) **90% Payment through Bank against proof of despatch documents. Balance 10% after receipt and acceptance of materials.**
 - 2) **100% payment within 45 days after Receipt and Acceptance of Material.**
13. GUARANTEE / TEST CERTIFICATE:

SIGNATURE OF SUPPLIER WITH SEAL

NOTE : Please do not Quote as EXTRA,
Quote the Rate in % / The Amount in Rupees.



BHARAT HEAVY ELECTRICALS LIMITED
R&D / PURCHASE
TIRUCHIRAPALLI - 620 014.

PURCHASE ENQUIRY - TERMS & CONDITIONS

1. a) QUOTATIONS : Each tender should be sent in double cover, inner cover should be sealed with tenderer's distinctive seal and super scribed with correct tender No. item of supply and due of opening. The outer should only bear the address of this office and should not have any indication that a tender is within. Two or more quotation should not be sent in one cover but the quotation against each tender should be sent separately to avoid confusion. Tender should not be addressed to any individual's name but only by designation.

b) Tender should be free from CORRECTION AND ERASURES. Correction if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amount quoted in words and figures, amount quoted in words prevail.

c) PRICE should be nett F.O.R. dispatching station inclusive of risk in transit and remain valid for 60 days from the due date.

d) If any Sales Tax is payable as extra to the quoted price it should be specifically stated in quotations alongwith CST & TNGST No. failing which the purchaser will not be liable for payment of Sales Tax. Our T.N.G.ST. No. 356005, Dated 01-04-1995, C.S.T. No. 239383, Dated 11-06-1991.

e) NO REVISION OF PRICES will be entertained after tenders are opened.

f) Manufacturer's Name, Trade Mark or Patent No. if any should be specified. Illustrative leaflets giving technical particulars are required along with quotation wherever necessary.

g) Products with I.S.I. certification marks will be preferred.

h) The purchaser shall be under no obligation to accept the lowest or any other tender and shall be entitled to accept or reject any tender in part or full without assigning any reason whatsoever.
2. SAMPLES : Wherever possible, sample should be submitted separately whether specifically requested or not so as to reach the purchaser on or before the due date of the enquiry. They should be clearly marked with the Enquiry No. and the date on the outside cover to facilitate identification.
3. PACKING AND MARKING : The supplier shall arrange for securely protecting and packing the stores to avoid loss or damages during transit.
4. TERMS OF PAYMENT : Payment will be made within 45 days of satisfactory receipt of materials at site. Wherever required by the purchaser, the successful tenderer must send the operation and maintenance manuals, Test certificates, Drawings, etc., for the materials ordered. These should be sent immediately after dispatch of the materials and a statement to that effect should be made in the Invoice. Failure to comply with this provision will result in delay in payment of the Bills. Goods dispatched either by V.P.P. or by the document presented through bank will be accepted unless agreed to by the Purchaser.

The duplicate copy of the Invoice meant for the transporters should accompany the material as stipulated under C.E. Rules 52-A and 173-C (or) 57GG. A Photostat copy of the above Invoice for each delivery challan should be submitted alongwith the original bills router through Bank or submitted directly to BHEL Finance Department.
5. SECURITY DEPOSIT : For purchase over Rs. 5000/- the successful tenderer/s may be requested to furnish a BANK GUARANTEE / SECURITY DEPOSIT for an appropriate value as may be determined by BHEL.
6. LIQUIDATED DAMAGES / PENALTY AND INTEREST ON ADVANCEES FOR DELAY IN DELIVERY : "If the supplier fails to deliver the raw material / Equipment / Components within the period specified in the contract the purchaser shall deduct LIQUIDATED DAMAGES a sum equivalent to 0.5% of the Price for each week of delay upto a maximum of 15% of the price of the delayed / undelivered goods. In addition to the recovery of interest at normal cash credit rate plus 2% for the unadjusted portion of the advances. If the delay in delivery of a part contributes to delay in execution of total system. LD and interest on advances will be recovered on the total contract price / total advance paid".
7. RISK PURCHASE : Alternatively the purchaser at his option will be entitled to terminate the contract and to purchase elsewhere at the risk and cost of the seller either the whole of the goods or any part which the supplier has failed to deliver or dispatch within the time stipulated as aforesaid or if the same were not available, the best and the nearest available substitute therefore. The supplier shall be liable for any loss which the Purchaser may sustain by reason of such risk purchases in addition to penalty at the rate mentioned in clause 6 above.
8. PREFERENTIAL DELIVERY : It should be noted if a contract is placed on a higher tenderer as results of this invitation to tender in preference to the lowest acceptable offer in consideration of the earlier delivery, the seller will be liable to pay to the purchaser the difference between the contract rate and that of the lowest acceptable tender on the basis of final price F.O.R. DESTINATION, including of all elements of Frights, Sales Tax, Duties and other incidents, incidental in case of failure to complete supplies in terms of such contract within the date of delivery specified in the tender and incorporated in the contract.
9. MODVAT CREDIT : If any Excise Duty is payable, the chapter Head / Sub-Head reference and the rate of the duty should be quoted. If the tender is availing MODVAT credit for his input materials, the effect of Proforma credit should be passed on to the purchaser. Tenderer under "MODVAT" shall be preferred.
10. GENERAL : The purchaser reserves the right to split up the tender and place order for individual terms with different tenderers and also increase or decrease the quantity.

Any other Conditions which might have been quoted by the Seller and are in contravention to the terms prescribed in the order and which have not been specifically accepted in by Purchaser will not be applicable to the Contact.