Revision No. : 03 Issue No : 2

Dt of Revision : 25.07.2017 Issue Dt. : 30.06.2003

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Section : Formats Documents : PPM

Topic : e-Tender Technical Specification Document FORMAT NO.:CPRI/PUR/CTBID/GTP

# **Section II - Technical Specification**

CENTRAL POWER RESEARCH INSTITUTE, BANGALORE Web: www.cpri.in, www.tenderwizard.com/CPRI, Tele: 080-2207 2271

Tender Enquiry No.: CPRIBLR20UHVRL109S593

Description of the Equipment/Goods/Services: Design, Development, Supply, Installation and Commissioning of customized Data Acquisition System (DAS)

- 2) All blue fields are mandatorily to be filled in.
- 3) Pre-despatch Inspection & Training expenses shall be borne by CPRI. Information regarding the readiness of the equipment/machinery for the Pre-despatch Inspection should be communicated in writing by the supplier at least 70 (Seventy) days in advance, to obtain clearence from the Ministry, Government of India for deputation of nominated CPRI officers.

Name of the Vendor					
<b>Quotation Num</b>	ber and Date				
Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Scope	Design, Development, Supply, Installation and Commissioning of a customized Data Acquisition System (DAS) to be used along with test setup of artificial pollution test on HVDC insulators. The proposed customized DAS acquire leakage currents and polarity sensitive test voltage of HVDC insulators along with ambient conditions, viz. pressure, temperature and humidity during testing.	1		
II.	Data Acquisition System Module				
A. 1	Analog Module to acquire ambient atmospheric conditions from test setup of artificial pollution test on HVDC insulators	A stand-alone, user friendly, software reconfigurable and controllable high speed data acquisition module compatible with customized application software to acquire ambient atmospheric conditions for long duration. This analog module shall be compatible to interface with compact and rugged data acquisition system.			

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Name of the Ve	ndor				
<b>Quotation Num</b>	Quotation Number and Date				
Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
2	Number of Analog input channels	Eight (Pressure indicator – 02 Channels, Temperature Indicator – 02 Channels and Humidity indicator – 02 Channel, Spare – 02 Channels)			
3	Measurand (Parameter/quantity intended to be measured)	Pressure, temperature and humidity			
4	Analog to Digital Converter (ADC) Resolution	≥ 24 bits			
5	Sampling Mode	Simultaneous			
6	Software configurable Sampling Rate	Upto 100 Samples/ Sec/Channel			
7	Supported Measurements	i. Voltage			
		ii. Current			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
		iii. Thermocouple			
		iv. 4 wire resistance / RTD			
		v. 2 wire RTD			
		vi. Full bridge / half bridge circuitry			
		vii. Digital In			
		viii. open contact circuitry			
8	Input range				
	Voltage range(s)	±125 mV to ±60 V in suitable steps			
	Current Range	± 25 mA			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Thermocouple	±125 mV			
	4 wire and 2 wire resistance	10 kΩ and 1 kΩ, respectively			
	Digital In	0 V to 60 V			
9	Input Impedances				
	Voltages (±60 V to ±1 V) and Digital In	1 ΜΩ			
	Current	< 40 Ω			
	±125 mV and all other measurement types	>100 ΜΩ			
10		Every channel shall have individual suitable inbuilt protection system for the input ranges specified			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
11	Accuracy (at operating temperature of	f 25°C)			
	Voltage range of 60V	≤ ± 0.3 % of reading			
	Thermocouple (±125 mV)	≤ ± 0.1 % of reading			
	Current (± 25 mA)	≤ ± 0.1 % of reading			
12	Isolation voltage between channel to channel and channel to ground	≥ 250 V <sub>rms</sub> AC (Continuous)			
13	Environmental Conditions				
	Operating temperature	+5 to +45 °C			
	Operating humidity	10% RH to 90% RH, noncondensing			

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<b>Quotation Nur</b>	nber and Date				
Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	Specify deviations/ Remarks if any
14	Input terminal Connectivity	Spring Terminal Connectivity with back-shell for 6-pos connector block - <b>08 Nos</b>			
15	Pressure Sensor - <b>02 Nos.</b>				
	Pressure Sensor shall have provisions	> to display set value and present value			
		➤ to change display pressure SI units to bar, kPa, etc.			
		> to hold high /low peak values			
		> easily mountable			
	Measurement Range	-750 mm of Hg to 750 mm of Hg			

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<b>Quotation Nur</b>	nber and Date		•		
Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Measurand	Pressure at two locations of steam leak proof tent used for HVDC insulator testing			
	Analog Outputs from pressure sensor	Voltage / Current - suitable for data acquisition analog module in Sl. No. II.A.1 to 14			
	Voltage Output	1-5 V DC ± 2.5%FS			
	Voltage- Linearity	Within ± 1.0%FS			
	Current Output	DC 4-20 mA ± 2.5%FS			
	Current -Linearity	Within ± 1.0%FS			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Connectivity/Connector / Output connection	≥ 20 m, industrial grade cable and suitable connector to connect it to data acquisition analog module			
	Power Supply	12-24 V DC			
	Environmental Conditions /Suitability	Suitable to measure pressure in leak proof (closed) steam room (tent), where there is a possibility for condensation of steam. Possible steam temperature is 60°C to 70°C			
	Material of Sensor casing / sensor	Non corrosive, insulating materials, viz. polycarbonate, etc. / Brass-nickel coated			
	Manufacturer Certificate	Valid manufacturer certificate to be provided for the entire range of pressure to be measured.			
16	Humidity Sensor - <b>02 Nos.</b>				

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<b>Quotation Num</b>	Quotation Number and Date				
Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Measurement Range	10 to 100 % Relative Humidity (RH)			
	Measurand	Relative Humidity at two locations of steam leak proof tent used for HVDC insulator testing			
	Analog Outputs from pressure sensor	Voltage / Current- Suitable for data acquisition system analog module described in Sl. No. II.A.1 to 14			
	Voltage Output	1-5 V DC ± 2.5%FS			
	Current Output	DC 4-20 mA ± 2.5%FS			
	Accuracy	≤ 3.5% of RH @20°C			
	Connectivity/Connector / Output connection	≥ 20 m, shielded cable and suitable connector to interface/connect it to data acquisition system analog module			

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Name of	the Vendor				
Quotatio	on Number and Date				
Sl.N	o. Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Power Supply	8 -12 V DC			
	Environmental Conditions /Suitability	Suitable to measure relative humidity in a leak proof (closed) steam room (tent), where there is a possibility for condensation of steam. Possible steam temperature 60°C to 70°C			
	Material of Sensor casing / sensor	Non corrosive, insulating materials			
	Manufacturer Certificate	Valid manufacturer certificate to be provided for the entire range of relative humidity to be measured.			
17	Temperature Sensor - <b>02 Nos</b>	•			
	Measurement Range	-10 to 120°C			
	Measurand	Temperature at two locations of steam leak proof tent used for HVDC insulator testing			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Type and Accuracy	RTD and 0.2% @0°C			
	Sensing Element	100 Ω at 0°C			
	Length of sensing element /type	≥2" long / stainless steel probe			
	Analog Outputs from pressure sensor	Suitable for data acquisition analog module described in SI. No. II.A.1 to 14			
	Stability	≤ 0.2% drift in a year			
	Connectivity/Connector / Output connection	≥ 20 m, Industrial grade, either of 2/4 wire shielded cable and suitable connector to connect it to data acquisition system analog module			

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Quotation Number and Date					
Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Environmental Conditions /Suitability	Suitable to measure temperature in leak proof (closed) steam room, where there is a possibility for condensation of steam. Possible steam temperature is 60°C to 70°C			
	Manufacturer Certificate	Valid manufacturer certificate to be provided for the entire range of relative humidity to be measured.			
II.B.1	voltage, leakage currents and load current transients from test setup of artificial pollution test on HVDC insulators	A stand-alone, user friendly, software reconfigurable and controllable high speed data acquisition module compatible with customized application software used to acquire test voltage, leakage currents and load current transients from test setup of artificial pollution test on HVDC insulators for long duration. his analog module shall be compatible to interface with compact and rugged data acquisition system.			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
2	Number of Analog input channels	Sixteen (Leakage currents from strings – 08, Test voltage - 02, Current transients -02, Spare – 04 Channels )			
3	Measurand (Parameter/quantity intended to be measured)	Test voltage, leakage currents from individual insulator strings (measured as voltage) and load current transients (measured as voltage) test setup			
4	Analog to Digital Converter (ADC) Resolution	≥ 16 bits			
5	Sampling Mode	Simultaneous			
6	Software configurable Sampling Rate	upto 100 kilo-Samples/ Sec/Channel			
7	Supported measurement	Voltage			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
8	Input Voltage Range	± 10 V			
9	Over voltage protection	≥ ± 30 V			
10	Input Impedance	≥ 1 GΩ			
11		Suitable front mountable terminal block to get input from and interface with test voltage and leakage current acquisition setup described in SI.No.II.B.15 and 16			
12	Accuracy (@ 25 ± 2°C)				
	Gain Error	≤ 0.15%			
	Offset Error	≤ ±0.08%			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
13	Isolation voltage between channel to ground	≥ 250 V <sub>rms</sub> AC (Continuous)			
14	Environmental Conditions				
	Operating temperature	+5 to +45 °C			
	Operating humidity	10% RH to 90% RH, noncondensing			
15	Test Voltage measurement setup - <b>08 Nos</b>	Polarity sensitive, linear DC voltage divider to measure / acquire voltage			
	Ratio:	Input: ±1000 V; Output: ±10V, Ratio:100:1			
	Accuracy:	within ±0.5 %			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	Specify deviations/ Remarks if any
	Response Time	< 1µs			
	Output Connector	BNC type connector			
	Calibration Certificate:	Calibration Certificate shall be provided to prove linearity and voltage ratio along with suitable 50 m noise free co-axial cable used for measurement from reputed test laboratory			
	Protection	Suitable over-voltage protection for 2 kVrms			
16	Leakage Current measurement setup - 08 Nos	Resistive type current shunt			
	Specifications	20 Ω / 2 A, 100 W (continuous)			

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Topic : e-Tender Technical Specification Document FORMAT NO.:CPRI/PUR/CTBID/GTP

#### **Section II - Technical Specification**

CENTRAL POWER RESEARCH INSTITUTE, BANGALORE Web: www.cpri.in, www.tenderwizard.com/CPRI, Tele: 080-2207 2271

Tender Enquiry No.: CPRIBLR20UHVRL109S593

Description of the Equipment/Goods/Services: Design, Development, Supply, Installation and Commissioning of customized Data Acquisition System (DAS)

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<b>Quotation Nur</b>	Quotation Number and Date				
Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Accuracy	within ±0.1 % of specified nominal value			
	Response Time	< 1µs			
	Output Connector	BNC type connector			
17	Calibration Certificate	Certificate to be provided for test voltage and leakage current measurement setup as described in SI. No. II.B. 15 and 16 from reputed laboratory			
II.C	DAS measurement, analyzing and	acqusition platfrom/chasis for Analog modules			
1	DAS platform/chasis	Data acquisition platform / chasis used to interface with these proposed Analog module shall			
		➤ be compact, rugged, portable			

: 2 Revision No. : 03 Issue No

**Dt of Revision** : 25.07.2017 Issue Dt. : 30.06.2003

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		> integrates connectivity,			
		> acquire measurement data			
		> perform signal conditioning			
		> Suitable for data acquisition software to acquire, analyze, visualize, and manage the measured data			
2	Number of slots	≥ 8			
3	Network interface Protocol	TCP/IP			
4	Time based triggers and time stamp	os for inputs and outputs of Analog, digital and counter/timer			
	Number of time based triggers	≥ 04			

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	Number of time stamps	≥ 03			
5	Ethernet port Characteristics				
	Number of Ports	2 ports			
	Network Interface	1000 Base-TX, full-duplex; 1000 Base-TX, half-duplex; 100 Base-TX, full-duplex; 100 Base-TX, half-duplex; 10 Base-T, full-duplex; 10 Base-T, half-duplex			
	Communication rates	10 /100/1000 Mbps – auto negotiable			
	Maximum cabling distance	100 m/segment			
6	Time and Synchronization	•			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
	Protocol	IEEE 802.1AS for network synchronization over 1000 Base-TX, full-duplex			
	Network synchronization accuracy	≤ 1µs			
7	Programmable Line Interface Charac	teristics			
	Cable length	3 m (10 feet)			
	Cable impedance	50 Ω			
8	Environmental Conditions				
	Operating temperature	+5 to 45 °C			

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	Operating humidity	10% RH to 90% RH, noncondensing			
9	Location	DAS measurement, analyzing and acqusition platfrom/chasis along with analog modules mounted/fixed in a rugged carry case located outside the steam leak proof steam tent prepared to perform pollution test in an ambient atmospheric conditions.			
III	Workstation / DAS Application sof	tware controller			
1	Processor	Intel core i7, 8th generation, 8 core processor or higher			
2	Memory	High speed 32 GB, DDR4 RAM			
3	Hard Disc	1TB High Speed HDD with minimum 7200 rpm or better with option to add SSD's in future			
4	Display	≥ 14" LED backlight display			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
5	User interference ports	USB / LAN -suitable to inteface the acquisition platform / chasis described in SI.No.II.C			
6	Keypad	LED backlight alpha numeric keypad			
7	Operating System	Windows 10 professional 64 bit version or higher			
8	Ethernet	1 Gigabit Ethernet			
9	Wireless	Wireless LAN 802.11			
10	Location of software controller	Placed inside the environmental controlled room located at distance of 20 m (approx) from the leak proof tent and DAS analysis, measurement platform / chasis			
IV.	Application Development Softwa	are			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	Specify deviations/ Remarks if any
1	Operating System (OS) support	The DAS application software shall work with Windows 10 Pro 64 Bit version Operating System. All required drivers to interface proposed modules shall be provided. The supplier must have experienced and OEM certified development engineers for support/service in Hyderabad.			
2	Software requirements / GUI shall have	<ul> <li>to work on Windows based operating system</li> <li>Provision to acquire / capture, analysis, perform math functions and export the signal</li> <li>Oscilloscope like GUI for continuous display of data/signal or transients recorded/captured/acquired</li> </ul>			
		➤ Hard disk / SSD to streaming up the signal/data			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	Specify deviations/ Remarks if any
		➤ Provision to acquire, analyse, perform user defined functions, viz. addition, subtraction, comparison, etc., and replay the data/signal including automatic data sorting and data analysis			
		Provision to splitting long record into user defined periods /samples without loss of any data/samples			
		Provision to define the system international unit of data acquired, viz. voltage, current, pressure, humidity, temperature, etc., as per user requirement			
		> to acquire/capture/record continuously in adjustable sampling rate, dynamic rate, over the period of testing duration			

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by the Bidder Guaranteed Specify deviations Technical Remarks if any Particulars (GTP)	
		storage should scatter for at least 360 minutes of test without any lag in writing speed			
		Provision to enter test sample details and customer information / requirements	1 Unit		
		> shall have provision to enter/read the value of current shunt used for leakage current measurement during test			
		Provision to generate report along with graphs as per CPRI requirements			
		➤ Customization as per CPRI requirements			
3	Customization	The software shall have provision to be modify / customize as and when required as per CPRI requirement			

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4		LabVIEW/ MATLAB based DAS application software with its complete editable / re-configurable source code to be supplied in protected USB storage media.			
5	Software licenses	Latest version of DAS application development software, viz., LabVIEW / MATLAB professional version along with report generation kit			
		Windows 10 Professional version for 64 bit or higher			
6	. •	Shall be a provision of lifetime upgradation of licensed software as per OEM terms and conditions			
V	General				

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Sl.No.	Parameters	CPRI Specification / Requirements	Qty	To be completed by Guaranteed Technical Particulars (GTP)	the Bidder Specify deviations/ Remarks if any
1	Mounting Cabinet	Suitable shock proof, movable ruggedized cabinet shall be provided for DAS analysis, measurement platform / chasis			
2	Pre-dispatch Inspection	Pre-dispatch inspection shall be carried out at the supplier premises to demonstrate/verify basic functionality of the DAS. The expenditure in connection with to and fro travel, boarding and lodging for CPRI officials shall be borne by CPRI			
3	Installation	Developed system along with sensors and other accessories is to be installed in CPRI-UHVRL, indoor laboratory			
4	Qualifying requirements of Bidder	The bidder shall be of OEM or an authorized distributor of OEM. In case of authorized distributor, the bidder shall provide an OEM authorization letter from their Indian office specific to this tender towards support & post-warranty from OEM.			

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5	Commissioning	CPRI requirements specified in SI. No. II, III and IV shall be commissioned and demonstrated			
6	· ·	Four days training to CPRI officials at CPRI UHVRL premises shall be provided for proper acquisition, analysis of DAS			
7	Guaruntee / Upgradation	12 months from data of commissioning			
8	Place of Supply, Installation, Commissioning and training	CPRI, UHVRL, Hyderabad			

PN: 1) Bidder shall indicate complete details/information how the CPRI GTP are complied with against each and every specification parameters & mere statement of **'complied'** do not suffice the requirement.

- 2)A detailed technical/catalogue/literature/phamplet and any other details shall be submitted in hard copy in a sealed cover superscribing enquiry number and due date so as to reach the following address within the due date and time.
- 3) The Indian representative of the foreign/overseas firms shall submit the Letter of Authorization issued by their principals.
- 4) The bidder shall submit the quotation / offer in the above prescribed format of Section IA, IB and II only. Informations any other forms shall shall be rejected.

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#### PROCUREMENT PROCEDURE OF CPRI (NON WORKS)

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				Guaranteed	Specify deviations/
				Technical	Remarks if any
				Particulars (GTP)	

Address: Joint Director (Purchase), Purchase Authority, Central Power Research Institute, Sadashiva Nagar P.O., P.Box.No.8066, Bengaluru-560 80.

Telefax: 080-2207 2010., email: purchase@cpri.in , web: www.cpri.in