Indian Institute of Technology Kanpur

Materials Science & Engineering

Enquiry Number: MSE/SO/Nov-2017/01

Enquiry Dated: November 20th, 2017

Closing Time & Date: 5:00 PM, December 11th, 2017

We require the quotation for PC controlled multi-channel potentiostat complying with or better than all of the specifications mentioned in **Appendix A**. The closing time and date for the above item is **5:00 PM** on **December 11th, 2017.**

The prospective supplies are required to send quotation in two parts in sealed envelopes, as "Technical Bid" and "Financial Bid". The Technical Bid should contain detailed technical specification of the product being offered and should not mention any prices. Mark, for each line item whether the system quoted by you complies or not. The Financial Bid should include the detailed price quotation clearly including the cost of the equipment, taxes, service charges if any, shipping and handling charges. The two separate and sealed envelopes should be clearly marked appropriately as "Technical Bid" and "Price Bid".

Terms and Conditions:

1. Maximum education discount, if any should be offered
2. Validity of quotation should be at least for 60 days
3. All prices are to be quoted in FOB.
4. Price should include shipping charges, installation and training cost.
5. Vendor must provide at least 1 - year onsite warranty for all parts/components and servicing.
6. Normal payment terms for the Institute will be applicable.
7. Quotation should carry proper certifications like agency certificate, proprietary certificate, etc. Parent company should be an established company with good number of installations and after sales support in India as well: Attach details.
8. An undertaking that the vendor will supply all the spares and services for the equipment for at least one year from the date of commissioning at site.

Kindly send the Technical and Financial bids in sealed envelopes latest by 5:00 PM on 11th December 2017 to:

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Appendix A
Technical Specifications for Multi-channel Potentiostat

S.N.	Parameter	Required Specifications
1.	Description	• Multi-channel System for potentiostat/galvanostat in one single chassis. • System should be capable for electrochemical testing, such as, charge / discharge, potentiostatic, potentiodynamic, galvanostatic, galvanodynamic, fast cyclic voltammetry, open circuit, fast pulse and step techniques, ohmic-drop analysis and impedance. • All the channels can work simultaneously and independently for various battery testing and electrochemical properties measurements. • It should be possible to control all the channels from a single terminal, via GPIB or Ethernet/LAN connectivity. • Simultaneous DC and impedance testing on multiple cells can be possible. • Current booster of at least 50 A can be connected to each channel. • *In-situ* impedance spectra measurement should be possible during the charge-discharge characteristics studies of the battery cell. • High speed data acquisition (min. 8000 samples/sec) to capture rapid changes during experiment.
2.	No. of Potentiosat/Galvanostat Channels	At least 8
3.	Compliance Voltage	+10 V to -3 V or better
4.	Current per channel	± 4 A or better (without using booster is desirable)
5.	Maximum power per channel	40 W
6.	Maximum current ranges	50 µA - 5 A (or better)
7.	Polarization voltage	+10 V to -3 V or better
8.	Potentiostat Gain bandwidth	1 MHz or better
9.	Resolution of measured potential	3 µV or better
10.	Resolution of measured current	1.5 nA
11.	Input Impedance	>10 Gohm
12.	Electrode connection	4 terminal cell connections (WE, S, CE and RE)
13	PC communication	GPIB or Ethernet
14.	Frequency Response Analyzer	Instrument should have capability to do EIS measurements on at least one channel and options to field upgrade up to all the channels
15.	Number of FRA module required	At least 1
16.	Frequency bandwidth of FRA	10 µHz to 1 MHz or better

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17.	Frequency Accuracy in FRA	0.1%, 0.1°
18.	Frequency resolution in FRA	1 in 65,000,000
19.	Frequency error	±100 ppm
20.	Generator amplitude	50 µV to 3 V rms or better
21.	Output Waveform of FRA	Single sine, multi-sine with Linear / logarithmic sweep
22.	Maximum Voltage Resolution of FRA	1 µV or better
23.	Phase resolution	0.01º
24.	Software	• Software to be provided with the multichannel potentiostat/galvanostat should be comprehensive with three dimensional view of graphics. It should be at least compatible with Windows 10 (operating system). • Software should have capability to control and acquire the data from instrument's all channels simultaneously. • It should provide all facilities required for the detailed analysis of data. • It should be possible to input the customized program in the software for performing any electrochemical test in a given time frame. • Powerful graphic engine with useful features such as individual Axis scaling, overlays, multiple Y axes, plot addition, zooming and rotation. • It should also include the tutorials to help the user to familiarize with software • Software should be capable of supporting a wide variety of electrochemical techniques as mentioned below. ✓ Fast Cyclic & Linear Sweep Voltammetry ✓ OCP Measurement ✓ Charge-Discharge testing ✓ Cyclic testing of batteries ✓ High speed pulse (Voltage & Current) techniques ✓ ESR ✓ Impedance Measurement ✓ Sweep Type – Linear, Logarithmic, user selectable frequency options ✓ Potentiostatic, Galvanostatic, Potentiodynamic, Cyclic, Voltammogram, Galvanodynamic, Galvanic cycle etc.
25.	Standard Cell	• System should be supplied with one basic standard electrochemical dummy cell
26.	Accessories	• All the channels should be provided with cable set for the testing purpose. Connectors should be alligators.
27.	Power Supply	AC 110 V and AC 230 V
28.	Documentation	• One sets of operating manual for the equipment and control system should be provided in hard copies.

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		• A soft copy of the above manuals should also be provided in a CD/DVD.
29.	Safety Norms	The instrument should be compliant with international norms for safety and environment.
30	Installation, Commissioning and Training	• The delivery of the unit should be considered complete only after successful commissioning of the instrument. • The pre-installation requirements should be communicated to IIT Kanpur well in advance of the installation. • The Installation, commissioning and training should be done only by well-trained factory engineers. • The supplier should provide training to at least two candidates at the installation site to make them familiar with smooth operation of the instrument.
31.	After-sales Service	• The supplier should provide a prompt after-sales service such as regular instrument maintenance, troubleshooting and fixing. • The list of service centers in India should be included.
32.	Spares	• An undertaking that the vendor will supply all the spares and services for the equipment for at least 1 year from the date of commissioning.
33.	Multi-channel Pontetiostat of the same model in India	Provide the list of institutes where the same model in installed.

Optional Items:

1.	Frequency Response analyzer	FRA module that can be connected to multichannel potentiostat
2	Battery holders	Quote the price of each
3.	Extended Warranty	2 years
3	Other spare items such as banana connectors	

Warranty and Maintenance:

1. Must have warranty for at least one year (in base cost)
2. Include the extended warranty and AMC (annual maintenance cost) for the next two years as ‘optional’