

TECHNICAL BID PROFORMA**Item Name: Multichannel Modular Large Current Electrochemical Workstation Specifications****1.0 Bidder Eligibility Criteria:**

| I | Bidder Eligibility Criteria-I (Public Procurement – Preference to Make in India) | Class I / Class II | Local Content value | Reference, Page No. |
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| I | Only 'Class-I local suppliers' and 'Class-II local suppliers', as defined under DIPP, MoCI Order No. P-45021/2/2017-PP (BE II) dated 16 th September 2020 and other subsequent orders issued therein. | | | |
| 2.0 | Bidder Eligibility Criteria-II | Compliance (Yes/No) | Reference Page No. | Remarks, If any |
| 1 | The bidder/OEM should have supplied at least 3 similar items to IITs, NITs, IISERs, CSIR Labs or other Govt. R&D organizations in the last 3 years, PO copies or installation certificates along with contact details of end user need to be submitted as the proof of supply. IIT Madras reserves its right to verify the claims submitted by the bidder and the feedback from the previous customers will be part of technical evaluation. | | | |

3.0 Technical Compliance:

Multichannel Modular Large Current Electrochemical Workstation Specifications

Multi-channel PC controlled Electrochemical Workstation with a minimum of 2(two) channels or more in a single chassis for Testing, Characterizing and Evaluating Battery, Supercapacitors, Fuel Cells, Solar Cells & Electrochemistry research. At least two of these channels must have 2 A capability, without booster.

Future Upgradation: The Instrument should be capable for upgradation facility 8 or more channels in the same chassis. The chassis should be able to accommodate a high current booster of 10 A or more, described in options, in a single slot. The chassis should be able to simultaneously use boards of different specifications, as described in the main specifications and options. The capability to upgrade in future, meeting the above specifications, is essential.

Capable of performing two, three, and four-electrode measurements.

Bi-Potentiostat facility should be available for RRDE experiments.

Both channels should work independently & simultaneously for all the applications

Cell Cable length should be minimum 2m for both the channels.

| Sl. NO | SPECIFICATIONS | Complied / Not Complied | Reference, Page. No. |
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| 1 | No. of channels: Two channels, Option to upgrade 8 or more channels along with 10A booster | | |
| 2 | Electrode configuration : 2, 3, 4, terminals plus ground | | |
| 3 | Potential scan range: $\geq \pm 10$ V | | |
| 4 | Voltage Compliance : $\geq \pm 12$ V | | |
| 5 | Applied potential resolution: ≤ 310 nV (typical for ± 10 mV signal) | | |
| 6 | Maximum Current: ± 2 A or higher without Amplifier | | |
| 7 | Measured current range: 5 nA to 2A with auto ranging (~ 10 ranges) | | |
| 8 | Measured current resolution: ≤ 120 fA, (typical in nA range) | | |
| 9 | Galvanostat applied current range: ≤ 5 nA to ± 2 A (without booster) | | |
| 10 | Applied current resolution: ≤ 7 pA (min.) | | |
| 11 | Input impedance : $\geq 1 \times 10^{12}$ ohm, typical | | |
| 12 | Data acquisition: 4 x 16-bit ADC (typical) | | |
| 13 | Maximum voltage scan rate: ≥ 10000 V/s, typical | | |
| 14 | Rise Time: < 500 ns | | |
| 15 | Electrometer Bandwidth: ≥ 10 MHz or better | | |
| 16 | Minimum time Base: 2micro s or better | | |
| 17 | Minimum Potential Step: 1micro V or better | | |
| 18 | Impedance measurement frequency range: 10 μ Hz to 1 MHz or higher EIS 1 MHz for entire current range of ± 2 A | | |
| 19 | Windows compatible software should be included as an essential part of the item, and it should be capable for the following techniques: Linear Scan Voltammetry, Cyclic Voltammetry, Chronoamperometry ,Chronopotentiometry Chronocoulometry, Square Wave Voltammetry ,Differential Pulse Voltammetry, Staircase Voltammetry, Normal Pulse | | |

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| | <p>Voltammetry , Open Circuit Voltage, ZRA, Cyclic Polarization ,Linear Polarization ,Tafel, Potentiostatic, Potentiodynamic ,Galvanostatic ,Galvanodynamic ,Dynamic iR ,Constant Current ,Constant Potential, Constant Power, Charge-Discharge, CC-CV, GITT ,PITT, Potentiostatic EIS ,Galvanostatic EIS, Mott – Schottky, Auxiliary Signal Measurement option Etc.,</p> <p>Equivalent Fitting analysis software for Impedance Analysis needs to be provided.</p> | | |
| 20 | <p>COMPUTER:</p> <p>Dell or Equivalent Desktop I3, 16GB RAM, 1TB HDD, Win 10, 22.5” Display – 1 No.</p> <p>All the required cables for the above-mentioned measurements should be included in the offer.</p> <ul style="list-style-type: none"> • Communication interface with PC: Via USB or Ethernet • Power Input: 230 VAC and 50Hz as per Indian standard | | |
| | <p>Options:</p> <p>All the below requirements need to be quoted in option, all the hardware/software should be compatible with the Main chassis to handle the measurements individually and simultaneously.</p> | | |
| 21 | <p>Current Booster: 10A - 1No with necessary Interface cables need to be quoted. The Booster should have option to parallel 2 or 3 boosters to get high current of 20A or more</p> | | |
| 22 | <p>Potentiostat/Galvanostat Channel with following Specifications: 1 No</p> <p>a. Compliance & Applied voltage: $\pm 10V$ as Standard, without adding amplifier.</p> <p>b. Measured current range: 4nA to $\pm 1A$</p> <p>c. Minimum Current Resolution: 31fA or better</p> <p>d. EIS Frequency range: 10μHz-7MHz or better</p> | | |
| 23 | <p>Potentiostat/Galvanostat Channel with following Specifications: 1 Nos</p> <p>a. Compliance & Applied voltage: $\pm 10V$ or better.</p> <p>b. Measured current range: 2μA to $\pm 1A$</p> <p>c. Minimum Current Resolution: 240fA or better</p> <p>d. EIS Frequency range: 1mHz-100kHz or better</p> <p>The item should include all necessary hardware for both Potentiostat and Galvanostat measurements.</p> | | |
| Terms and Conditions | | | |
| 1 | Soft and hard copy of the manual should be provided with the instrument. | | |
| 2 | Test report of the instrument should be provided. | | |
| 3 | Installation should be free | | |
| 4 | Training session related to equipment and software related to the system to be done at least two to three per year until warranty expires. | | |
| 5 | Warranty: Minimum 3 years and 1 year AMC, Company must take responsibility to replace the consumables if needed during the three years of warranty Period. | | |

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| 6 | <p>Service facility and down-time call attendance: Supplier should clearly mention about their service set up in India (preferably in South part of India) for prompt service support along with contact details of service engineers specially trained on the offered system. Service should be provided within 24 hrs from the report of technical problem so that machine down time is minimized.</p> | | |
| 7 | <p>Spares: Supplier should confirm the availability of spares for next 10 years from the date of installation. All essential spares for day-to-day operation needs should be provided as standard supply.</p> | | |
| 8 | <p>Pre-Installation Requirement: Necessary pre-installation advice should be sent immediately after the placement of the order.</p> | | |
| 9 | <p>Delivery Condition: The instrument should be delivered within 4 months.</p> | | |

**SIGNATURE OF BIDDER ALONG WITH
SEAL OF THE COMPANY WITH DATE**