ANNEXURE: I

TECHNICAL BID PROFORMA

Item Name: Multichannel Potentiostat Galvanostat

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.**
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 16th 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 2 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 Potentiostat Galvanostat

S. No	Specification	Comply/Not Comply	Reference Page No.
I.	**Electrochemical Workstation Channels:**		
1.	No. of channels : 2 Nos (Should have the facility to add at least 8 more channels, additional channels can be added in the optional category)		
2.	Compliance voltage : ± 20 V or better		
3.	Current : ± 400 mA or better		
4.	Current ranges : ± 10 nA (without gain) to ± 100 mA or better		
5.	Applied potential : ±10V or better		
6.	Input Bias current : < 1 pA or better		

7.	Resolution of measured potential : 3 µV or better		
8.	Resolution at 10 nA range : 30 fA or better		
9.	Potentiostat rise fall time : < 300 nS or better		
10.	D/A converter : Three channel, 16 bit		
11.	IR compensation : Yes		
12.	Electrode connection : 4 (WE, S, CE, and RE)		
II.	**lectrochemical Impedance Requirements** (Number of modules required: 1		
13.	- Hardware and software for EIS measurements in potentiostatic and galvanostatic control, frequency range of 10 µHz - 1 MHz. It should be supplied with fit and simulation software for the analysis of impedance data.		
14.	- Input range ± 10 V, signal types 1 sine, 5 sine, 15 sine,		
15.	- Input channels E and I from the Potentiostat/ Galvanostat or X and Y external signals,		
16.	- AC amplitude 0.25 mV to 0.30 Vrms in potentiostatic mode		
17.	- 0.0002 - 0.3 times the current range in galvanostatic mode.		
18.	- Data presentation: Nyquist, Bode, Admittance, Dielectric, Mott-Schottky,		
19.	- Data analysis: Fit and Simulation, Find circle, Element subtraction		
20.	- A valid contour plot should be available for the EIS module.		
III.	**Bi-potentiostat Configuration:** (Number of modules required: 1)		
21.	- The system must be equipped with an 'internal' dual mode bi-potentiostat option that can be worked in two independent modes explained below.		
22.	- Configurations combining two separate channels will not be allowed: Parallel measurements should be possible on two working electrodes sharing the same counter and reference electrode. In the first mode, a fixed potential is required to be applied to the second working electrode while applying a potential step or a sweep to the first working electrode. In the second mode, a potential offset with respect to the first working		

	electrode is required to be applied to the second working electrode.		
IV.	**A Rotating Ring Disk Electrode and RRDE Cell Set-up**: (Number of module required: 1)		
23.	- A complete set-up for rotating ring disk electrode (Glassy carbon with platinum ring electrode) measurement is required		
24.	- RRDE Cell, 3 mm GC, and Pt RDE (1 no each) should be quoted.		
25.	- The RRDE should have at least two numbers of sealed liquid Hg contacts for very low noise measurements. There must be a provision to easily mount exchangeable electrode tips on the shaft of RRDE that is controlled by a motor control unit.		
26.	- The setup must be suitable for measurements at very low currents (pA) or electrochemical impedance measurements.		
27.	- The rotor should have the capability for remote as well as manual control. A maximum rotating speed of 10,000 rpm or more is required for high speed hydrodynamic EIS, and evaluation of diffusion coefficients for ORR measurements.		
28.	- The RRDE software should have fully automated analysis and plotting option for Levich and Koutecky-Levich analysis.		
29.	- Motor speed range setting 100 - 10,000 RPM in 1 RPM steps		
30.	- Manual speed setting 100 - 10,000 RPM in 1 RPM steps		
31.	- Acceleration/deceleration 4,000 RPM/s		
32.	- A setup with stand and full electrode set up required (Glassy carbon with platinum-working, Ag/AgCl reference, and platinum counter electrodes).		
V.	**Software:**		
33.	- The Software to be provided with the potentiostat/galvanostat should be comprehensive, fully windows based with three dimensional view of graphics and analysis software.		
34.	- The software should record current, voltage, and time for cyclic and linear sweep voltammetric measurements. It should be possible to record current, voltage, and time data in tabular format for each measuring point in voltammogram. Software should be capable of supporting a wide variety of electrochemical techniques as mentioned below.		

35.	- Cyclic and Linear Sweep Voltammetry		
36.	- Linear Polarization		
37.	- Differential Pulse, Sampled DC & Square Wave Voltammetry		
38.	- Chrono amperometry and Chrono potentiometry ($\Delta t >$ 1 ms)		
39.	- Programming of different electrochemical methods and optional accessories		
40.	- Comprehensive database structure & powerful data analysis tool.		
41.	- Inbuilt electrochemical spreadsheet		
42.	- User programmable formulae to new plots.		
43.	- Powerful graphic engine with useful features such as individual axis scaling, overlays, multiple Y axes, plot addition, zooming, and rotation.		
44.	- Each plot can be saved as an image file to use directly in articles or presentation.		
VI.	**Others:**		
45.	- A suitable computer for system control & data acquisition should be offered with the system. It should have the following minimum specs: i7 processor or better, 8 GB SD RAM, 300 GB HDD, 52 x CDD read/write combo drive, 4 USB Ports, 21" TFT Colour Monitor, 101 Keys Keyboard, and Optical mouse.		
46.	- Installation should be done onsite at IIT Madras		
47.	- Warranty: Minimum 12 months from the date of installation and Optional AMC for 1 Year to be quoted separately.		