

IIT Madras proposes to procure an eight channel high current and high voltage battery cycler for their research on metal-air batteries. The following technical specifications should be complied with completely to qualify the technical bid. A detailed technical compliance statement should be provided and manufacturer's (OEM) product brochure should support it. Information provided in vendor/supplier/redistributor/reseller's website cannot be considered as a supporting document.

Technical Specifications

1. Number of channels required – 8
2. All channels should be capable operating in-parallel and should be able to control with a single software and computer.
3. Voltage specifications
 - a. Voltage range: 0 V to 20 V or better.
 - b. Measurement resolution should be 16 bit or better to attain 1 mV or higher resolution
 - c. Measurement precision should be 100 ppm or better.
 - d. Voltage control accuracy at 0.02% FSR should be 10 mV or better.
 - e. Input impedance should be at least $3M\Omega$ for better voltage measurement accuracy
4. Current specifications
 - a. Should operate at least with current ranges between 10A and 10 mA.
 - b. At least three current ranges should be available between 10A and 10 mA.
 - c. Measurement resolution should be 16 bit or better.
 - d. Current control accuracy should be 0.02% FSR with at least $\pm 5mA$ at 10 A and $\pm 5\mu A$ at 10 mA.
 - e. Minimum voltage that can be measured at maximum current should be 0V. This specification is very important as we may discharge our batteries down to 0V.
 - f. Current rise should happen within 1ms or better.
 - g. Continuous power output should be 200W or better.
5. Time
 - a. Minimum step time should be 5 ms or better to log at least 1500 points per second per channel.
 - b. Measurement resolution time should be 100 μs or better.
6. The entire system should be air cooled with fans inside the cycler.
7. Paralleling option with all eight channels should be possible to operate the battery at high currents.
8. The instrument should have provision to upgrade for Electrochemical Impedance measurements that can operate at least between 1 MHz and 1 mHz. All the battery channels should share a single EIS system to operate in multiplexing mode for all the frequency ranges given above. Valid contour plots supporting the resolution of the EIS resolution have to be produced by the vendor.
9. The instrument should have a provision to add/integrate more channels, in future, to the existing battery cyclers.
10. USB interface or ethernet should be provided to communicate with PC.
11. A data acquisition system with all the computing facilities for controlling and collecting data from the battery cycler should be provided.
12. Software
 - a. All eight channels should be controlled independently using a single software
 - b. All eight channels should be able to operate in parallel and any of channels should be able to operate at any current/voltage ranges simultaneously.

- c. Should be able to operate in constant current, constant voltage, constant power and at any given C-rate.
 - d. Should be able to use user defined power profiles or current profiles to test batteries in real time conditions.
13. Minimum two years onsite warranty from the date of installation of the products.
 14. Optional components: Accessories including auxiliary voltage measurement, auxiliary temperature measurements, auto calibration options, EIS module and any additional accessories available for the quoted product shall be quoted under the optional category.
 15. The vendor should have supplied at least one similar instrument in India in the past two years. List of their customers and their contact details should be provided. IIT-Madras shall inquire the bidders' customers about the quality of product/service. If the testimonial from their customers is not satisfactory, IIT-Madras reserves the right to reject the bid based on technical grounds.
 16. Installation and Training on Site is required.