

Ultra-High Precision Battery Testing

HPS Series

Key Features

- ✓ **10ppm Precision** with industry-leading 24-bit resolution across six current ranges per test channel
- ✓ **Temperature controlled** sampling circuit reduces measurement variation and noise
- ✓ **Embedded MCU** for real-time calculations of battery capacity, power, energy, IR, and efficiency metrics
- ✓ Optional **integrated MZTC** chamber providing a turn-key benchtop testing solution
- ✓ **Built-in** 2nd voltage input, PT100 input, CAN-Bus, and EIS dedicated per test channel

Beyond Precision

Developed in collaboration with industry leaders Ford Motors and Sandia National Lab, and supported by US DOE funding through DOE ARPA-E, Arbin's next-generation High Precision tester (HPS) is an ultra-high precision, low current battery tester. It is specifically designed to detect minute signatures of battery degradation trends early in the testing lifecycle, significantly reducing the battery development cycle.

The HPS enhances battery development for material researchers by utilizing temperature-controlled electronic components and a dedicated microcontroller unit (MCU) per test channel. This advanced system enables researchers to conduct high-precision coulombic efficiency tests on batteries or capacitors with precision reaching below 10 ppm.

Standard Configurations

Voltage Range	Current Range
-6 to 6V	5A/1A/100mA/10mA/1mA/100μA

System Information

System Characteristics			
Channels per Chassis		2	
Current Ranges per Channel		6 (auto switching)	
Channel Parallel		Up to 10 A	
Current Rise Time		<200 μs	
Built-In Auxiliary Inputs			
Temperature PT100		1 input/channel	
2nd Voltage		1 input/channel	
CAN Bus (CAN 2.0, CANFD)		1 /channel	
EIS		10 mHz to 1 kHz	
Control & Measurement Specifications			
Parameter		Voltage	Current
Measurement	Accuracy	±0.002% FSR	±0.004% FSR
	Precision	±0.001% FSR	±0.002% FSR
	Resolution	24 Bit	
Control	Accuracy	±0.005% FSR	
	Precision	±0.004% FSR	
	Resolution	24 Bit	
Time Resolution		100 μs	
Data Acquisition Rate		Up to 1 kHz	
MZTC Chamber Specifications			
Chamber Zone Qty		2 zones with 2 cell fixtures each	
Temperature Range		[Ambient-10°C] to 60°C	
Temperature Uniformity		±1.5°C	
Temperature Control Stability		±0.5°C	
Chassis Specifications			
Cooling		Air-cooled with built-in variable speed fans	
Input Power		110V1P – 240V1P	
Chassis Size		Width: 16" (407 mm) Depth: 27" (686 mm) Height: 5" (127 mm)	

Application Focus



dQ/dV & High Precision Coulombic Efficiency



Cyclic & Linear Voltammetry
PITT/GITT
Symmetric-Cell Testing



Dynamic data acquisition based on changes in time, voltage, and current to capture more data when it's needed and maintain efficient file sizes.



Simulation of Real World Test Profiles



Data Sampling and Logging: Powerful embedded controllers provide ultra-fast data sampling and logging.



Comprehensive safety features for lithium-ion battery testing.

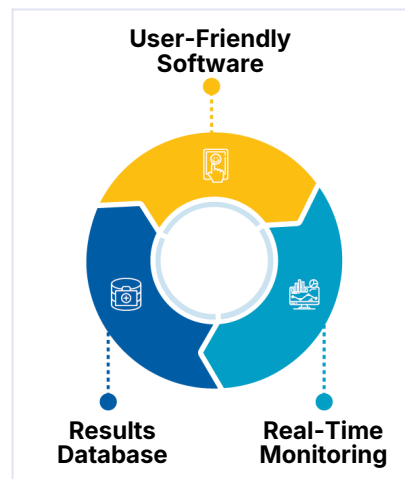


Facility integration to interface with temperature chambers, test facilities, or other third party systems.

Powerful Software Integration

Arbin's HPS system, powered by our latest MITS software, optimizes the battery testing process by simplifying control of the testing process, and integrating the test station into a test facility.

- ✓ Create and manage test schedules, monitor real-time testing, and analyze results.
- ✓ Integration with third-party hardware and automation software.
- ✓ Suitable for both laboratory and production environments.
- ✓ Test data securely stored in a range of robust databased formats including MS SQL, PostgreSQL, or utilize Apache Kafka for additional flexibility.



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