Power Testing Systems

Power Testing for Electric Vehicles

Decarbonization is key across the various industries moving towards green energy initiatives. The hybrid electric vehicle (HEV) and battery electric vehicle (BEV) technologies rely on the core battery power to fuel the power train of the vehicle. Various challenges remain in the process of designing and performance testing on the rechargeable batteries and the sub-system components (e.g. charging station, on-board chargers, power converters, battery management systems, electric power control unit, safety systems) for electric vehicles, which includes:

- Battery voltage towards higher voltage ranges (e.g. 900V, 400A)
- Faster charging times
- Dynamic temperature profiles testing to simulate actual vehicle operating conditions (e.g. -40 °C to 40 °C)
- Power conversion efficiency in power converters (e.g. AC-DC, DC-DC, DC-AC)
- Reliability performance of the on-board charging and power electronics components for the automotive system

Keysight offers products targeted to address these test challenges, while simultaneously providing a safe and energy efficient test approach.

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RIGHT Instrument. FLEXIBLE Terms.
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Addressing Test Challenges of EV Power Systems

High accuracy power systems, analyzers and intelligent software analysis that fits your needs now, and in the future.

EV power test setup commonly includes:

- Regenerative power system: simulate charging cycle performance of an EV battery in the drivetrain environment
- Advance battery test software: create test profiles for battery testing and emulation
- Power analyzer: capture and analyze voltage, current, and power characteristics across a wide dynamic range for power electronics and converters

These instruments are available in various configurations to fit your test application needs.

RP7900 Series Regenerative Power System

PA2200A Series IntegraVision AC Power Analyzer

BV9200B Pathwave BenchVue Advanced Power Control and Analysis Software

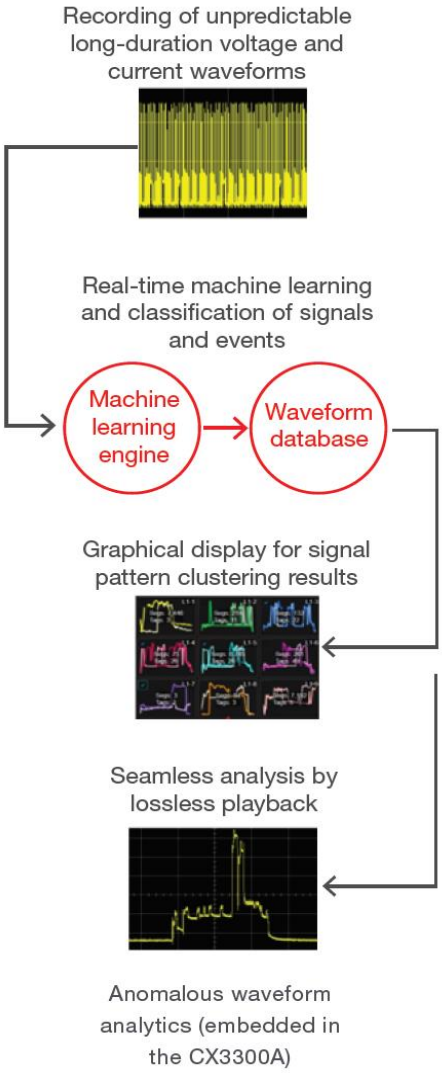
BV9210B Pathwave BenchVue Advanced Battery Test and Emulation Software

Validation Power at Device Levels

Automotive power electronic devices consist of diodes, insulated-gate bipolar transistors (IGBTs), MOSFETs, Micro Controller Unit (MCUs) and field-programmable gate array (FPGA) units. Any malfunction could lead to potential fatalities and detrimental business impacts, such as mass product recalls.

The Keysight CX3300A device current waveform analyzer and anomalous waveform analytics software enables rapid detection and analyzes anomalous signals in these MCUs and FPGAs, resulting in fast rectification of hardware, firmware and software detects.

CX3300A Device Current Waveform Analyzer



Renewable Energy: Simulation of Photovoltaic Arrays

Technology development of photovoltaic (PV) array modules are geared towards higher sun power conversion efficiency; however, there are challenges coming from multiple aspects simultaneously, not limited to the PV fabrication process but also the degradation issues and reliability of the installed PV modules. Solar inverters operating under changing environments and climate conditions adds another important characteristic to gauge the successfulness of moving towards green energy. These are the challenges PV manufacturers are facing today:

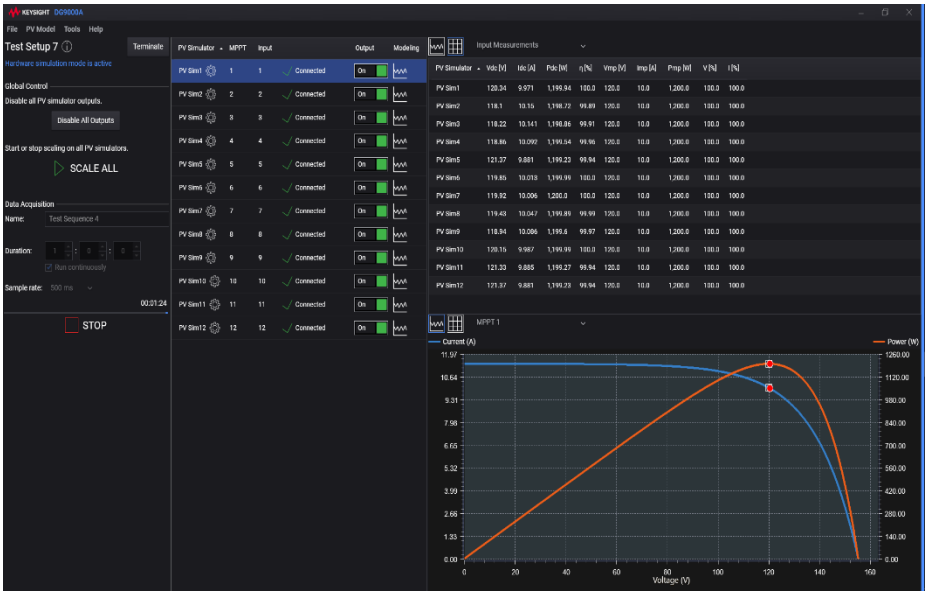
- Achieving higher energy conversion efficiency but more competitively priced
- Simulation of varying climate conditions for characterization of PV modules performance (current, voltage, insulation resistance)
- Development and performance verification for solar inverters maximum power point tracking (MPPT) algorithms and circuits
- Rising voltages creating increasing levels of heat in the test facility
- More parameters needed to be tested in less time
- Meeting the test standard requirements, qualifications, and certification compliance test

Keysight's solar array simulator products are targeted to address these test challenges. The PV8900 Series and E4360A Modular Solar Array Simulators offer multi-mode environment simulation with 20kW high power supply and a 600W module solution to suit every testing need. The PV8900 can be easily expanded to higher power output (up to 200kW) by paralleling multiple units (up to 10 units). The DG9000A advanced PV inverter test software provides an intelligent user interface with a single point of control, configuration, management, and I-V generation for up to 12 separate PV8900 channels.

PV8900 Series PV Array Simulator

E4360A Modular Solar Array Simulator

E4360A Modules



DG9000A advance PV inverter test software

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To Learn More About Power Supply, Power Analyzers, and Solar Array Simulator Instruments:

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