Advanced Battery Emulation for Development and Validation of HV, PHV and Extended Range EV

Solution for Development of HV/EV Powertrain

HORIBA’s Virtual Battery provides the most accurate and convenient battery pack emulation solution available for developing, calibrating, validating, and optimizing the hybrid testing. Interfacing to most programmable DC power sources, as well as most automation or HIL systems, Virtual Battery makes possible:

- Parallel development of engine, transmission, electronics, auxiliaries, and battery packs
- Verification of “what-if scenarios” on the test stand without actual battery specimen
- Emulation of stress and extreme environmental conditions without damaging or destroying batteries
- Battery pack development

HORIBA Virtual Battery Closely Replicates Actual In-Vehicle Lithium-Ion Battery Performance

Variations of Integration

Add HORIBA Virtual Battery on Top of Existing DC Power Supplies for HV/EV and Upgrade to Advanced Battery Emulation

HORIBA’s Battery Emulator is engineered for quick, easy integration with nearly any programmable DC power supply for HV/EV. HORIBA DC power supplies are also available as well as any necessary electronics or accessories to upgrade existing systems.

Choose a Complete, Turn-Key HORIBA Test Stand with Virtual Battery Emulation Included

Add Virtual Battery into any HORIBA E-motor, powertrain or vehicle turn-key test stand and benefit from the optimal combination of hardware and software for your testing needs. Choose the dynamometer, DC power supply, DC interface, control system and accessories that best fit your application.

Vehicle-Specific Battery Models

Virtual Battery includes a standard set of battery pack models, each built up from cell level and calibrated specifically for vehicle-based applications. The calibrated models not only assure exceptional fidelity to in-vehicle battery performance but also eliminate the need for time-consuming parameterization work. Simply choose one of the batteries and start testing.

Safety and Convenience

Virtual Battery includes a Hybrid DC Power Interface Panel that safely organizes electrical connections in one convenient location. The Interface Panel allows quick and safe switch-overs from emulation to battery specimen. Unplug the emulation power source, plug in the actual battery pack, throw a switch, and go. All other connections remain in tact as well as the many safety features provided by the Interface Panel.
Comprehensive and Flexible Battery Emulation Solution

Simulation Performance

HORIBA Battery Emulation Solution provides high-accuracy modeling with the ability to truly replicate battery behavior, performance, and road load events for more reliable and accurate results. It differs from common solutions based on simulation alone only offer battery and hybrid developer tools that mimic simple charge and discharge events.

Battery Pack Models

- Lithium Ion, LiFePO4, NiMH and Pb-acid battery pack models specifically calibrated for vehicle applications.
- Ultra Capacitor modeling is provided with all Virtual Battery programming. Three time sequence phases are offered to reflect short, medium, and long term effects.
- Model parameters and battery controls can be changed and optimized even while a test is in progress.
- Flexibility to create new battery models by identifying parameter values:
  - Open Circuit Voltage
  - Battery Cell Capacity
  - Ohmic Resistance
  - Resistance and Conductance of Short/Long Time Effect

Control Parameters

- High-speed access and control of: Power Limits (Amp / V / W), State of Charge (SOC), Depth of Discharge (DOD), Thermal Control, Slew Rate and Cell Numbers

Test Conditions

- Driving cycles from automation system via CANbus, Ethernet and Analog, Environmental conditions, Stress (maximum performance), Battery age, Battery pack thermal management

External Influences

- Real-time (1 kHz) interface to external simulators and automation system for simulation of: Accessory Power demand, Current or Power demand from E-motor, Ambient Temperature, Cabin Temperature and SOC Windows

Hardware Options

Hybrid DC Interface

- Interface panel offers convenient, safe hook-up for two E-motors with access to signals for measurement devices
- Easy switch-back between battery pack and DC power supply without E-motor disconnection
- Wall mounted junction box with circuit breaker
- Voltage indicators for power on/off indication
- Insulation monitoring device to detect ground fault
- E-Stop tie-in for safe removal of power and PLC communication to TAS for proper shut down

DC Power Supply

- Low ripple and fast response assures accuracy during transient modes
- True voltage symmetry protects electronics from unrealistic voltage to reference ground
- Voltage matching start up prevents damaging current rush
- Power circuit health and safety monitoring

Please read the operation manual before using this product to assure safe and proper handling of the product.

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