Fuel Cell Electric Vehicle Test Solutions

NH Research (NHR)
Enabling Electrification
Enabling Electrification

NHR enables electrification by accelerating innovation, validation & functional test of today’s & tomorrow’s technologies

Backed by over 50 years of experience

- Best in class performance
- Ease of use
- Modular & scalable solutions
- Reduced testing time
- Improved safety
- Energy savings
Fuel Cell Test Solutions for Today’s & Tomorrow’s Products

Flexible, Modular Hardware
AND Software

Benefits

- Modular & Scalable Power
- Fast Response Time
- Reduced testing time
- Built-in Measurements
- Flexible & Easy Integration
- Multiple Layers of Safety
Fuel Cell Electric Vehicle Test Solutions
High Voltage Fuel Cells

Fuel Cell Testing

Step 2
Fuel Cell Stack

Step 3
Battery

Fuel Cell Load
9200/9300 Regenerative
4700/4760 Air-cooled Load

Fuel Cell Stack
Fuel Cell Emulation

Step 3

Motor

Fuel Cell Stack

Electricity

Inverter

Motor

9200/9300
Fuel Cell Emulator

EV Powertrain
Powertrain Testing with Fuel Cell Emulation

- Historically round-trip efficiency < 50%
- Improve motor / controller & new batteries ➔ efficiency gains
Powertrain Test Approaches

The NHR Approach accepts back EMF and prevents safety hazards. Isolated input and output paths eliminates single points of failure.
Battery Emulation

Step 3

Battery

Electricity

Fuel Cell Stack

9200/9300 Battery Tester

Battery Test

Battery
DC/DC Converter

Emulate Fuel Cells & DC Busses (PV)
FCEV Test Solutions

- **9430 Regen**
  - 4 Quadrant Load
  - up to 96kW

- **4600 AC Load**
  - up to 36kW

- **9410 Grid Sim**
  - up to 96kW

- **9420 AC Source**
  - up to 96kW

- **9200 Series**
  - 12 kW, 21 channels

- **9300 Series**
  - 100 kW to 2.4 MW

- **4300 Chassis**
  - 150W, 300W, 600W

- **4700 & 4760**
  - 1kW to 36kW

**AC Grid Sim**
- 9410
- 9420

**AC Loads**
- 9430
- 4600

**Bi-directional DC Source Fuel Cell Emulators**
- 9200 Series
- 9300 Series

**Fuel Cell Test**
- 9200 Series
- 9300 Series

**DC Loads**
- 4300/4300
- 4700/4760

**DC Regenerative Loads**
- 9200 Series
- 9300 Series
Access Resource Library

- **Download Application Notes**
  - The Fundamentals of Battery Test
  - Electric Powertrain Testing Challenges & Solutions
  - Battery Emulation: Testing without Batteries

- **On-Demand Webinars**

- **Schedule a Consultation**

- **Electric Vehicles Webpage**

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“At NHR, we consider every customer a partner.”

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