BALANCE-OF-PLANT

- Anode and cathode fuel cell system component testing
- Dynamic and static applications
- Usage of approved engineering hardware from stack test stations
- Performance and quality control
- Customized test system design
- Automated test programs with sequences and scripts
- CAN Bus interface for simulation and hardware-in-the-loop option
- Fully automated for safe, reliable and unattended operation

HORIBA FuelCon

Evaluator BOP

ANODE BALANCE-OF-PLANT

Tank simulation	Inlet pressure regulation, control of test item valves
Stack simulation	Pressure, flow, temperature, humidity of anode exhaust, pressure drop via fuel cell
Dead-end	Recirculation fan control, control of purge valves

ENVIRONMENT SIMULATION

Ultra-low temperature	Conditioning (Gas, intercooler) Temperature: -40 up to 120 °C
Environment simulation	Thermal or climate chamber

GENERAL FEATURES

Onboard power simulation	Electronic load, performance on customer‘s request
CAN interface	Residual bus simulation (RBS) Hardware-in-the-Loop (HiL) Port for external devices Communication with FCMS
Stack simulation	Flow, pressure, temperature and humidity of fuel cell stack or other BoP componentns inside anode or cathode fuel cell system
Vehicle cooling system	Cooling circuit for vehicle electronics, intercooler, test item, system components
Automation system	Unattended 24/7 operation Scripts and sequences Sampling rates up to 1 ms
Data logging	Electrical and process engineering data up to 1 ms
System perphery	Valve control, throttle etc.

CATHODE BALANCE-OF-PLANT

Test of air system components	Compressor Intercooler Membrane humidifier
Power Supply	Highly dynamic for electric turbo chargers or compressors up to 50 kW Frequency converter optional Vehicle energy system simulation
Stack simulation	Pressure, flow, temperature, humidity of cathode exhaust, pressure drop via fuel cell

PERFORMANCE RANGE

Flow	Anode: up to 4,000 Nl/min Cathode: up to 10,000 Nl/min
Humidity	Up to 90 °C dew point
Pressure (Standard)	Fuel cell system: 0 up to 6 bar(a) Periphery: customized
Temperature	Environment up to 200 °C, optional ultra-low temperature

SAFETY

CE conformity marking (according to)
- EMC directive 2014/30/EC
- Low voltage directive 2014/35/EC
- ATEX directive 2014/34/EC
- General product safety directive 2001/95/EC
- Machinery directive 2006/42/EC
- Pressure equipment directive 2014/68/EC

Risk assessment
- DIN EN ISO 13849
- DIN EN ISO 12100

The development of powerful, efficient fuel cell systems for propulsion applications is a major issue of todays R&D. Besides the test of entire stacks and systems, the validation and qualification of single components is getting more important. HORIBA FuelCon‘s Evaluator BOP is tailored peferfectly to those needs and enables complex testing of balance of plant components for anode and cathode applications with high dynamic operation.

The test station therefore acts as sophisticated system that allows the validation for complete, partial or single components with a total system output higher than 200 kW. Especially recirculation fans, intercoolers, humidifiers, compressors, throttles or vehicle cooling systems can be qualified under „fuel cell conditions“ that simulate real operating scenarios.

Furthermore the Evaluator BOP comes along with an extended equipment of safety features for a reliable test operation and can also be combined with additional components like climate chambers or shakers.

Please feel free to download the latest information available at www.horiba-fuelcon.com. If you have any questions, please do not hesitate to contact us. We will be happy to support you and discuss your testing requirements!

BZM260_01_04 2019/02

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