Hydrogen Fuel Cell Controller

Flexible Hydrogen Fuel Cell Control System

At MAHLE Powertrain, we have developed a control system tailored for hydrogen fuel cell systems. Building on our extensive expertise in ICE, hybrid and battery electric vehicle control, our fuel cell controller is fully flexible and configurable and can accommodate any layout of fuel cell stack, balance of plant, fuel supply and thermal management system.

Additionally, the controller interface with the vehicle (or building, or other device) systems can be readily re-configured to accommodate any application. CAN ID's can be fully configured and system IO can be adapted to suit the specific sensor and actuator requirements for the application. Bespoke wiring harnesses can be produced for each application.

The underlying software has been developed and demonstrated in real applications, enabling full control over the complete fuel cell system, including balance of plant, stack operation and performance. Systems may utilise a recirculating anode supply as well as complex Cathode-side operating strategies for enhanced start up and shut down performance. Individual cell voltages can be monitored, and system behaviour adapted to maintain optimal operation.

- Fully adaptable software
- Easy to configure I/O structure

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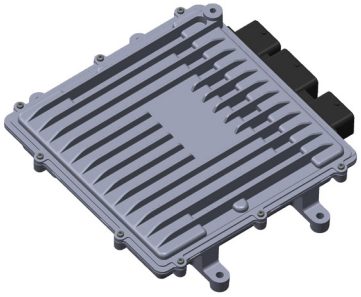
Fuel Cell Control System

We have also developed a complimentary and fully configurable HMI system which can display measured, and calculated, data from the system. Remote data access is also possible, enabling systems to be monitored in remote, or difficult to access, installations and locations.

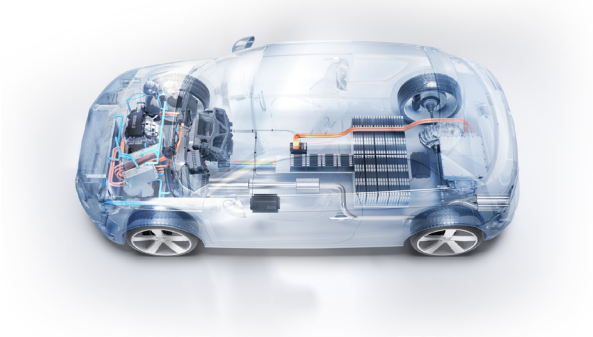
MAHLE Powertrain's fuel cell control system perfectly compliments our system integration, design and development expertise and enables us to offer full turn key solutions for your fuel cell system needs.



MAHLE Flexible ECU (MFE)

Benefits

- Our fuel cell control system is fully flexible & benefits from the following features
  - › Fast and fully customisable control software
  - › Broad range of hardware options for different I/O and processing requirements
  - › Core logic for fuel cell stack control
  - › Fully configurable CAN interface
  - › Complete flexibility of system component selection
  - › Cell voltage measurement & control algorithms



Powetrain and whole vehicle control systems

Bramble energy FCEV demonstrator vehicle

Applications

- Prototype system control
- Testbench & vehicle applications
- User-calibratable parameters for in-use optimisation
- Bespoke wiring harness solutions
- Remote data logging

Fuel Cell Controller Features

- Cathode airpath control including humidity & bypass
- Anode pressure balancing & recirculation
- Anode purge with adaptive control
- Cell voltage measurement & health monitoring
- Hydrogen leakage detection & safety system activation
- Cell & stack performance monitoring & control
- Thermal management system control
- Vehicle system integration, data logging & HMI

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