

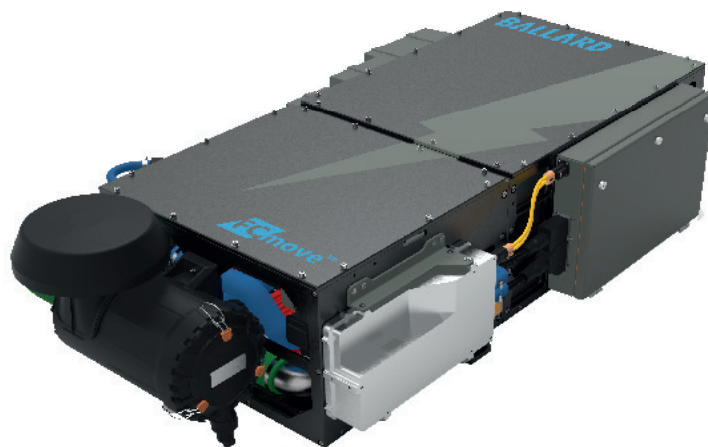


Power to change the world®

## Fuel Cell Power Module for Heavy Duty Motive Applications

### Description

Ballard's FCmove™-HD is the next-generation heavy duty fuel cell power module for use in zero-emission motive applications. The hydrogen fuelled power module offers a durable, compact and easy installation solution for system integrators and vehicle OEMs, backed by Ballard's unmatched fuel cell expertise and experience.



### Features

**Lower Life Cycle Cost** – with better fuel economy and fewer maintenance requirements, total cost of ownership is 35% lower than previous product generations.

**Simplified Integration** – this complete package, with all subsystems fully integrated, has interfaces located on one panel to provide easier access for connections as well as maintenance.

**Robust Components** – designed with a new generation of more robust balance of plant components to improve reliability.

**System Integration Flexibility** – reducing the volume by 40% and weight by 35% has produced a low-profile power module that enables greater flexibility in commercial vehicle design.

**Freeze-Start Capability** – freeze start from -25°C, with no need to plug in the vehicle or use special start procedures.

**Humidification** – integrated humidification system is maintenance free and provides maximum system performance and durability through a wide range of environmental conditions.

**High Performance** – robust PEM fuel cells deliver the power, range, and efficiency demanded by fleet operators.

**Proven Reliability & Durability** – demonstrated through exceptional fuel cell stack lifetime, with >30,000 hours of operation and 97% module availability in service.

**High Temperature Operation** – permits a smaller cooling package for integration flexibility and generates HVAC heating, significantly improving overall vehicle fuel economy.

**Climate Protection** – IP67-rated enclosure system guards against premature deterioration of key module components in extreme climates.

**High Pressure System** – offers better performance, fuel efficiency and durability by preventing degradation of the fuel cell power module.

**Fuel Efficiency** – two to three times more efficient than CNG/diesel engines, fuel cell buses reduce overall fuel consumption.

**Remote Diagnostics** – direct or wireless connection allows customer to monitor performance data remotely, and anticipate preventative maintenance.

**Safety Features** – integrated safety system with ventilation fans, and hydrogen sensor built into the module to ensure highest safety and ease of installation.



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## PRODUCT SPECIFICATIONS

	FCmove™-HD*
<b>Performance</b>	
Net system power	70 kW
Operating system current	20 - 250 A
Operating system voltage	250 - 500 VA
Idle power	8 kW
<b>Physical</b>	
Dimensions (l x w x h) mm, excluding air filter	1495 x 812 x 386
Dimensions (l x w x h) mm, including air filter	1783 x 815 x 415
Weight	250 kg
Environmental protection	IP67
Operating temperature	-30°C – +50°C
Minimum start-up temperature	-25°C
Short-term storage temp	-40°C – +80°C
<b>Reactants and Coolant</b>	
Fuel Type	Gaseous hydrogen
Fuel purity	As per SAE specification J2719
Fuel supply pressure	8 barg nominal
Peak fuel efficiency	57%
Oxidant	Air
Coolant	Ethylene glycol or propylene glycol min 20% to a max 60% by volume, balance DI water
Radiator coolant outlet temperature	60°C nominal
<b>Safety Compliance</b>	
Certifications	ISO 6469-2:2009 <sup>1</sup> ISO 6469-3:2011 <sup>1</sup> ISO 23273:2013 <sup>1</sup>
<b>Monitoring</b>	
Control Interface	CANbus
<b>Emissions</b>	
Exhaust	Zero-emissions (no PM, NOx, SOx, CO or CO <sub>2</sub> )
<sup>1</sup> Specific clauses within each standard * Specifications are subject to change without notice	