

**BALLARD™**

**FCmove™-HD+**

# Fuel Cell Power Module for Heavy Duty Motive

Ballard's FCmove™-HD+ is the 100kW product of our 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 40% 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

Available either in a low-profile or small footprint form factor to enable greater flexibility in commercial truck and bus vehicle designs.

### 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 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

IP6K9K-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 (WiFi or cellular) connection allows customers to monitor performance data remotely, and anticipate required maintenance.

### Safety Features

Integrated safety system with ventilation fans, and hydrogen sensor built into the module to ensure highest safety and ease of installation.

## Product Specifications\*

Performance	Engine Bay	Rooftop
Net system power	100 kW	100 kW
Operating system current	20 – 360 A	20 – 360 A
Operating system voltage	280 – 560 V	280 – 560 V
Idle power	9 kW	9 kW
Physical		
Dimensions (L x w x h) mm, excluding air filter	1056 x 630 x 650	1705 x 714 x 360
Dimensions (L x w x h) mm, including air filter	N/A	1996 x 802 x 440
Weight	260 kg	260 kg
Environmental protection	IP6K9K	
Operating temperature	-30°C – +50°C	
Minimum start-up temperature	-25°C	
Short-term storage temp	-40°C – +80°C	
Reactants and Coolant		
Fuel type	Gaseous hydrogen	
Fuel purity	As per SAE J2719 or ISO 14687:2019 grade D	
Fuel supply pressure	8 barg nominal	
Peak fuel efficiency	57%	
Oxidant	Air	
Coolant	Ethylene glycol min 0% to a max 60% by volume, balance DI water	
Radiator coolant outlet temperature	70°C nominal	
Safety Compliance		
Certifications	ISO 6469-2:2009 <sup>1</sup> ISO 6469-3:2011 <sup>1</sup> ISO 23273:2013 <sup>1</sup>	
Monitoring		
Control interface	CANbus	
Emissions		
Exhaust	Zero emissions (no PM, NO <sub>x</sub> , SO <sub>x</sub> , CO or CO <sub>2</sub> )	

<sup>1</sup> Specific clauses within each standard

\* Specifications are subject to change without notice