

## Fuel Cell Power Module for Heavy Duty Motive Applications

### Description

Ballard's FCveloCity®-HD is the next-generation heavy duty fuel cell power module for use in zero-emission heavy duty motive applications. The hydrogen fuelled power module offers a low risk, versatile and easy installation solution for system integrators, backed by Ballard's unmatched expertise and experience.



### Features

**High Performance** – robust PEM fuel cells deliver the route flexibility, range, gradeability and top speeds demanded by transit operators.

**Flexible Integration** – modular design with separate air and coolant sub-systems enables flexible integration of components into the vehicle drive train and easy access for enhanced serviceability.

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

**Climate Protection** – IP-rated enclosure and freeze protection system to guard 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** – wireless or direct connection provides access to performance data anytime on the road as well as in the service bay, enabling anticipation of required maintenance.

**Proven Reliability & Durability** – demonstrated through exceptional bus availability and fuel cell module lifetime, with >30,000 hours of operation of a fuel cell power module in the field without failure.

**Safety Features** – Integrated safety system with ventilation fans, H2 sensors, and smoke detectors built into the module to ensure highest safety and ease of installation.

**System Integration Flexibility** – collaborating closely with the system integrator, Ballard supports the integration of a variety of drive systems to optimize the transit application.

**Zero-emission** – PEM fuel cell power module to meet the mandates set by policy makers to reduce transportation emissions.

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

**PRODUCT SPECIFICATIONS**

	HD85	HD100
<b>Performance</b>		
Net power	85 kW	100 kW
Operating voltage range	260 - 419 V	357 - 577 V
Operating current range	10 - 284 A	10 - 257 A
Idle power	4 kW	6 kW
<b>Physical</b>		
Fuel cell module		
Dimensions (l x w x h) mm	1130 x 869 x 487	1200 x 869 x 487
Weight	256 kg	280w kg
Coolant Subsystem		
Dimensions (l x w x h) mm	737 x 529 x 379	
Weight	44 kg	
Air Subsystem		
Dimensions (l x w x h) mm	676 x 418 x 352	
Weight	61 kg	
<b>Reactants and Coolant</b>		
Type	Gaseous hydrogen	
Composition	As per SAE specification J2719	
Supply pressure	8 barg nominal	
Oxidant	Air	
Coolant	50/50 pure ethylene glycol and deionized water WEG 60° to 70°C	
<b>Safety Compliance</b>		
Certifications	ISO 6469-2:2009 <sup>1</sup> ISO 6469-3:201 <sup>1</sup> ISO 23273:2013 <sup>1</sup>	
Enclosure	IP55	
<b>Monitoring</b>		
Control interface	CANbus	
<b>Emissions</b>		
Exhaust	Zero-emissions (no PM, NOx, SOx, CO or CO2)	
<sup>1</sup> Specific clauses within each standards		

**Sub-system**

The FCveloCity®-HD includes separate air and coolant systems for simplified and flexible integration into the electric drive system. These two discrete modules have been designed, tested and validated for transit bus and light rail applications.



**Coolant sub-system**

Delivers a water/ethylene glycol (WEG) mixture at a prescribed flow rate to the fuel cell module. Sub-system includes coolant pump, piping, control valve and freeze protection.



**Air sub-system**

Delivers air at a prescribed flow rate to the fuel cell stack to support the electrochemical reaction. Sub-system includes motor, controller, air compressor and a mass flow sensor.