



Power to change the world®

Fuel Cell Power Module for Marine Applications

Description

Ballard's 200 kW system, FCwave™, is specifically designed to provide zero-emission power to marine vessels. The culmination of product development and field experience based on more than 50 million kilometers of heavy-duty vehicle operation, FCwave™ uses proven technology from Ballard's heavy duty module portfolio to deliver reliable performance, high power density and favorable economics.

Ballard's FCwave™ fuel cell system is tested and certified for operation in marine environments. The system is scalable from 200kW to MWs to suit a broad range of marine vessels including ferries, barges and hotel load for cruise ships.

Features

Modular, Scalable Power

Available in 200 kW increments, FCwave™ facilitates scalable power output and flexible integration onto the marine vessel.

Low Lifecycle Cost

Low total-cost-of-ownership, achieved through product performance optimization, common components across product platforms and low maintenance requirements.

Long Lifetime

Powered by Ballard's FCgen®-LCS heavy duty liquid cooled stack and designed to deliver long term performance.

Ease of Integration

The system is integrated into a clean-lined cabinet with easy access doors and all interfaces accessible from the front for service and maintenance.

Safe Operation

Designed hand-in-hand with industry to withstand the rigors of the marine environment and meet the most stringent safety standards.

Remote Diagnostics

Direct connection allows the customer to monitor performance data remotely, and plan for preventative maintenance.

Technology Leadership

The same Ballard fuel cell technology powering FCwave™ is already proving itself in more than 3,000 fuel cell electric trucks and buses deployed in China, Europe and North America.





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PRODUCT SPECIFICATIONS

	FCwave™
Performance	
Rated power	200 kW
Minimum power	30 kW
Peak fuel Efficiency	56 %
Operating voltage	350 - 720 V DC
Rated current ¹	2 x 300 A 1 x 550
System cooling output	Max 65° C
Stack technology	
Heat management	Liquid cooled
H2 Pressure	3,5 - 5 Barg
Physical	
Dimensions (l x w x h) ²	1220 mm x 738 mm x 2200 mm
Weight (estimate) ³	875 kg
Environmental protection	IP44
Engine room (DNV GL CG-0339)	+0° C - +45° C
Minimum start-up temperature	0° C
Short-term storage temp	-40° C - +80° C
Reactants and Coolant	
Type	Gaseous hydrogen
Composition	As per SAE spec. J2719
Oxidant	Air
Composition	Particulate, Chemical and Salt filtered
Coolant ⁴	Water or 50/50 glycol
Safety Compliance	
Certifications	DNV-GL compliant
Enclosure	Hydrogen safe enclosure
Monitoring	
Control interface	Ethernet, Can
Emissions	
Exhaust	Zero-emission

¹ System output is 2 x 300 A (1 x 550A output still under development). ² Target size. ³ Includes: framed skid base, fuel cell stacks, plumbing and wiring, H2 enclosure, cooling system, air system, electrical panel, and miscellaneous (sensors, cable tray, etc.). ⁴ Customer coolant type.