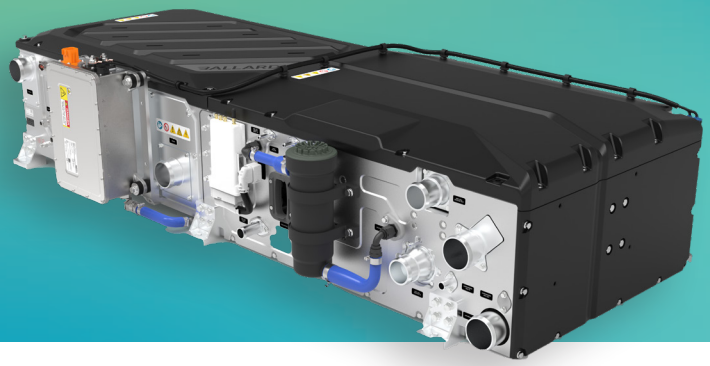
BALLARD™

FCrail™-HD+

Fuel Cell Power for Rail applications



Ballard's FCrail™ -HD+ is specifically designed for rail applications that require zero-emission power. The culmination of our product development and field experience exceeds 50 million kilometers of vehicle operation and FCrail™-HD+ leverages Ballard's proven technology to deliver reliable performance, high power density, and provide economical zero-emission solutions for rail.

Features

Lower Life Cycle Cost

When compared to previous products, our newest generation can provide better fuel economy and fewer maintenance requirements, reducing the total cost of ownership by 35%.

Subsystem Integration

Completely integrated with system controller, hydrogen shutoff, pressure regulation, recirculation pump, purge valve assembly, and water seperator. All interfaces designed on one panel for simplicity and to provide easier access for connections and maintenance.

Robust Components

Designed with a new generation of more robust balance of plant components to improve reliability.

System Integration Flexibility

Rooftop design enables greater flexibility in rail applications from an enhanced low-profile power module.

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 rail 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

IP6K9K - rated enclosure system guards against premature deterioration of key module components in extreme climates.

High Pressure System

Ensures 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, which reduces overall fuel consumption.

Remote Diagnostics

Direct or wireless connections allows customers to monitor performance data remotely, and anticipate preventative maintenance.

Safety Features

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

Product Specifications*

Performance	
Net system power	100 ± 2 kW
Operating system current	60 - 360 A
Operating system voltage	280 - 560 V
Idle power	9 kW
Physical	
Dimensions (l x w x h) mm, excluding air filter	1704 x 808 x 395
Dry Weight, excluding air filter	295 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, ISO 14687:2019 grade D
Fuel supply pressure	8 barg nominal
Peak fuel efficiency	57%
Oxidant	Air
Coolant	Ethylene glycol 50% to 60% by volume, balance DI water
Radiator coolant outlet temperature	60°C nominal
Safety Compliance	
Certifications	IISO23273 2013, ISO6469-3 2011, ISO6469-2 2009, SAE J2578, UN ECE Reg 10, ECE/TRANS/180/Add.13, REACH, EN 50657, DIN 25201, VDI 2230, EN 50126, EN 50155, IEC 60077-1, ISO 3744, EN 50153, EN 50343, EN 61373
Monitoring	
Control Interface	CANbus, Ethernet
Emissions	
Exhaust	Zero-emissions (no PM, NOx, SOx, CO or CO2)

1 Specific clauses within each standard * Specifications are subject to change without notice

Here for life™

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