

HIGH POWER FUEL CELL MODULE FOR EXTREME DUTY APPLICATIONS

The HyCmax fuel cell system, developed by VDot Cleantech, defines a new category for zero-emissions high power mobility. Developed specifically around marine requirements, HyCmax offers a robust and efficient solution for extreme duty applications such as coastal shipping or rail.

PRODUCT FEATURES

BESPOKE INTEGRATION: HyCmax is comprised of two major subsystems: the stack array and the balance of plant. The two subsystems may be close-coupled or remote from each other depending on installation requirements.

LOW TEMPERATURE OPERATION: HyCmax has been optimized for lower temperature operation, extending fuel cell life and simplifying system processes.

ROBUSTNESS: A large fuel cell stack and low operating temperature enhance the robustness and durability of an already industry-leading fuel cell stack.

LOW PRESSURE: HyCmax has been designed for lower operating pressure in order to simplify the Balance of Plant.

COST EFFECTIVE: HyCmax is based on high power architecture. Fewer units are required to reach megawatt level applications.

INTEGRATABLE: The HyCmax system can be installed in ESD – protected machinery spaces with suitable precautions such as adequate ventilation and H₂ leak sensing.



SAFETY: The stack array is supplied with a safety package in accordance with classification society rules. HyCmax locates all fuel-containing components in a separate, compact, highly ventilated enclosure, simplifying the overall safety concept.

HIGH EFFICIENCY: The large HyCmax fuel cell stack array offers industry-leading overall efficiency and reduced parasitic losses.

HIGH PERFORMANCE: The HyCmax system has been configured for high power, reducing the number of parallel systems required; improving weight, cost, and reliability.

STACK DURABILITY: The HyCmax system utilizes the newest fuel cell stack from Ballard Power Systems, the FCgen-LCS, and further extends durability through extremely fuel cell-friendly operating conditions.

MAINTAINABILITY: The HyCmax platform is developed to be fully maintainable in-situ.

PRODUCT SPECIFICATIONS¹

	STACK ARRAY	BALANCE OF PLANT ²	NET TOTAL
MAXIMUM POWER POINT	663 VDC x 540 Amps 358 kW	663 VDC x -30 Amps -20 kW	663 VDC x 510 Amps 338 kW
NOMINAL POWER POINT	677 VDC x 465 Amps 315 kW	677 VDC x -22 Amps -15 kW	677 VDC x 443 Amps 300 kW
MINIMUM POWER POINT	714 VDC x 90 Amps 64 kW	714 VDC x -8 Amps -6 kW	714 VDC x 82 Amps 58 kW
NOMINAL H₂ FLOW³	17 kg/h	-	-
NOMINAL EFFICIENCY⁴	-	-	52.9%
EXTERNAL COOLING SUPPLY	-	-	330 LPM @ <35°C
WEIGHT	680kg	520kg	1200kg
DIMENSIONS	0.9x0.6x1.6m	0.8x0.8x1.6m	0.9x1.5x1.6m
H₂ COMPOSITION	SAE J2719	-	-
H₂ SUPPLY PRESSURE	10bar	-	-
DIGITAL COMMUNICATION	-	-	PROFINET
PHYSICAL INTERFACES			<ul style="list-style-type: none"> • Amphenol connectors • Hoses (2-4")

SCOPE OF SUPPLY

- Stack array
- Fuel control & recirculation system
- Cathode air system
- Cooling system
- Liquid heat exchanger
- Safety system:
 - Ventilation
 - H₂ detection
 - Fire detection & suppression
- Hybrid-ready control system to integrate to VDot battery installation

1) All values approximate, preliminary and beginning of life
 2) Balance of plant includes process air compression, FC cooling pump; excludes power conversion, ventilation, seawater pump, 24V consumption
 3) Fuel flow includes purge gas
 4) Ratio of net output power to LHV fuel input