Fuel Cell Systems & Solutions

Nexa® Power Module

with Integration Kit

Heliocentris presents the Nexa® Power Module by Ballard Power Systems, the world's first volume produced proton exchange membrane fuel cell module.

1200 W | Air Cooled

The Nexa® Power Module comprises an air cooled fuel cell stack using Ballard's approved PEM technology. Consuming hydrogen and oxygen (from ambient air)it generates up to 1200 W of unregulated DC electrical power.

To achieve a complete power module with easy to use interfaces, all necessary auxiliary components are built in: air compressor, cooling fan, humidity exchanger, valves, pressure regulator and microprocessor controller.

The Nexa® Power Module is well-suited for a variety of engineering purposes. The system design enables the integration into a wide range of applications such as

- Stationary power supply systems
- Back-up power generators
- Recreational and portable products.

The Nexa® Power Module comes with a set of start-up components facilitating convenient set-up and integration.

A variety of accessories like hydrogen supply options and power electronics are also available. Please inquire for a customized solution that meets your needs.

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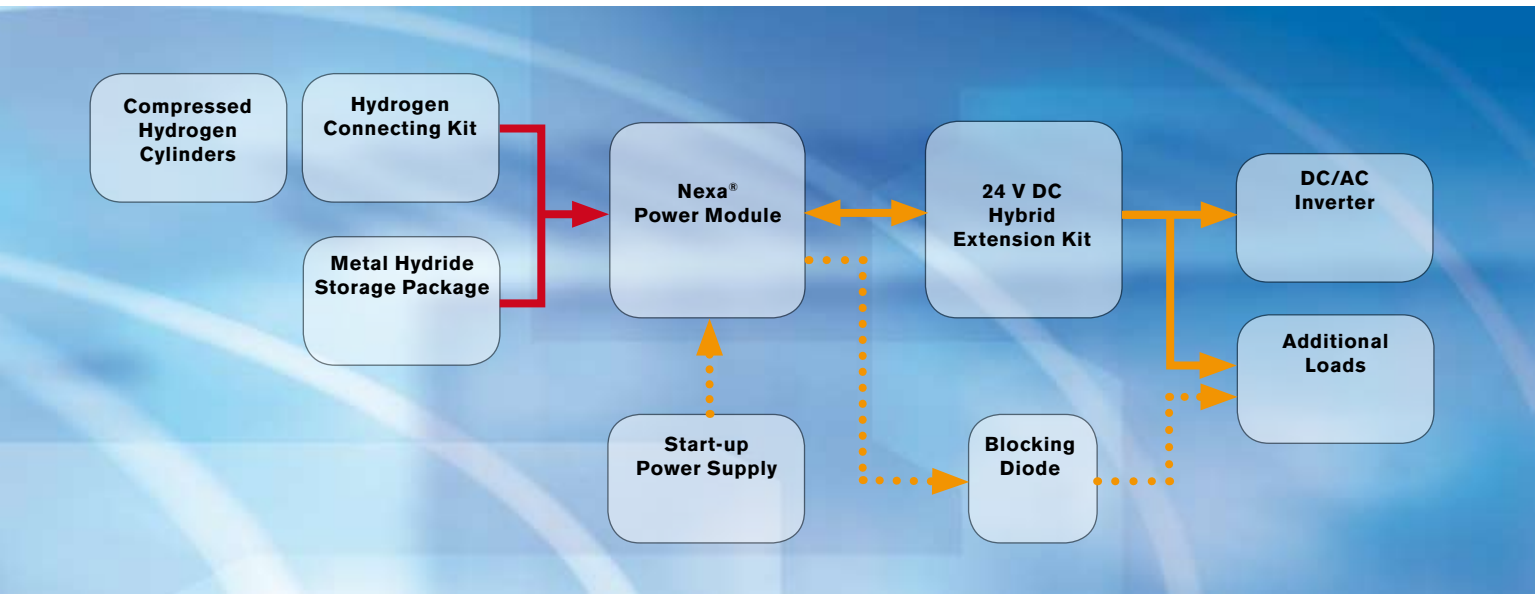
The Integration Concept



Hybrid Extension Kit

As with all PEM fuel cell systems, the Nexa® Power Module requires an external power source for start-up. Since the fuel cell output voltage varies depending on the current drawn, an additional voltage regulation is necessary.

Our Hybrid Extension Kit is a solution for both requirements. It comprises a DC/DC converter, a rechargeable battery, system control software and all necessary cables.

Custom designed for the Nexa®, the DC/DC converter includes a battery charger for hybrid operation as well as back current protection.

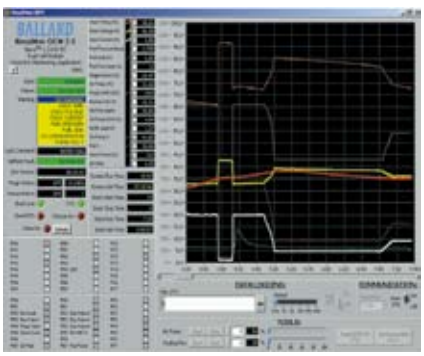
Hydrogen Supply Options

Heliocentris offers various solutions for supplying hydrogen to the system.

The most cost effective solution is our Hydrogen Connection Set. Everything is included to take you from the compressed hydrogen cylinder to the Nexa®.

The most comfortable solution is our Metal Hydride Storage Package. It comprises a set of 3 HS 900 storage canisters and all necessary tubes and connectors.

The Monitoring Software



The Nexamon® OEM control software allows the user to set parameters and monitor operational data of more than 20 system variables of the Nexa® Power Module, e.g.

- Stack voltage, current, temperature
- Hydrogen pressure and consumption
- Ambient Temperature
- Air Mass Flow Rate
- System operating time
- ...

The control software of the Hybrid Extension Kit visualizes all data related to hybridization and battery management. It also allows the user to set different battery types and optimize the charging and discharging parameters.

The Accessories

24 V DC Hybrid Extension Kit

Custom designed for the Nexa® Power Module, the Hybrid Extension Kit provides voltage regulation to 24 V DC, necessary start-up power, back-current surge protection and battery hybrid operation.
This package includes:

- DC/DC converter with Microprocessor
- 24 V battery pack
- Operation panel with LCD and RS232 interface to display and set operation parameters of Nexa® and DC/DC converter
- PC Software for setting and visualizing the battery management

DC/AC Inverter

The DC/AC Inverter converts the DC power from your 24 V DC Hybrid Extension Kit into 110 / 230 AC power. Designed using the latest technology, the inverter delivers efficient pure sine wave AC to run even the toughest equipment and appliances such as power tools, lights, computers and microwaves, just to name a few.

Compressed Hydrogen Cylinder Connection Kit

This kit is required to connect the Nexa® Power Module to a compressed hydrogen cylinder. It contains a single stage pressure regulator, a connecting tube with adaptor for Nexa® and a mounting panel for compressed gas cylinders.
Available with DIN, CGA or BS cylinder connection.

Metal Hydride Storage Package

This package provides a comfortable hydrogen supply solution for the Nexa® Power Module. It comprises 3 metal hydride canisters with a total hydrogen capacity of 2.7 std.qm and all necessary tubes and connectors.

Blocking Diode

The Blocking Diode protects the Nexa® Power Module from back current surges.
(not necessary if using the Hybrid Extension Kit)

Start-up Power Supply

This power supply provides the power required for start-up and shut down procedures of the Nexa® Power Module.
(not necessary if using the Hybrid Extension Kit)

Hydrogen Safety Package

The package comprises an MSTox 9001 Personal Hydrogen Monitor and a non-toxic liquid for leak detection.

The MSTox 9001 continuously displays hydrogen concentration on an easy-to-read LCD and features both acoustical and optical alarms that automatically alert you whenever gas concentrations exceed your pre-set levels. The MSTox 9001 is so small and lightweight that most of the time you won't even realize you are wearing it.

Technical Data

Nexa® Power Module with Start-up Kit

Power	Rated net power	1200 W
	DC voltage range	22…50 V
	Rated voltage	26 V DC
	Rated current	46 A
Fuel		Hydrogen
	Quality	≥ 4.0 (99.99 vol %)
	Pressure	0.7…17 bar g (0…250 psi g)
	Consumption	18.5 sl/min (@ rated power)
Emissions	Water	870 ml/hr (@ rated power)
	Noise	≤ 72 dBA @ 1 m
Physical	L x W x H	56 x 25 x 33 cm (22 x 10 x 13 in)
	Weight	13 kg (29 lbs)
Start-up kit content		Mounting tray, Hydrogen tub Load relay, start switch RS485 to RS232 converter Monitoring software

Hydrogen Cylinder Connection Set

Cylinder pressure	max. 200 bar g (2900 psi g)
Delivery pressure	0…15 bar g, adjustable (0…220 psi g)

Metal Hydride Storage Package

Total hydrogen capacity*	240 g (= 2.7 sqm)
Total discharge rate*	21 sl/min
Refilling pressure	max. 17 bar g (250 psi g)
Refilling time	~ 1 hour in flowing ambient
H2 quality for refilling	air
Safety devices	≥ 5.0 (99.99 vol %) Thermal/pressure relief certified to CGA S-1.1
Diameter x Length **	90 mm x 425 mm
Weight**	7 kg

* Nominal, condition dependent ** Single canister

Hydrogen Sensor

Sensor type	Hydrogen 4 %
Measuring principle	3-electrode sensor
Standard range	0.00…4.00 % vol.
Sensitivity	1.0…2.5 nA/ppm
Operating conditions	-20…+40 °C, 10…95 % r.h.
Life time	4 years

Hybrid Extension Kit

Converter	Nominal output voltage	24 VDC
	Output voltage range	22…30 VDC
	Output current	max. 55 A
	Output power	max. 1200 W
	Input voltage range	26…48 VDC
	Efficiency	96 %
	Protections	Short-circuit proof Back current and thermal protection
Batteries	Nominal voltage	24 V (2 x 12 V)
	Capacity	≥ 15 Ah

DC/AC Inverter

Type	Sine wave (THD < 3 %)
Output voltage	110 / 230 V (60 / 50 Hz)
Continuous output power	1500 W
Short time output power	2000 W
Input voltage	24 V
Efficiency (full load)	87/89 % (110/230 V)

Blocking Diode

Type	Fast recovery diode including heat sink
Forward current IF(AV)	70 A
Reverse blocking voltage	200 V
Max. reverse recovery time	200 ns

Start-up Power Supply

Output voltage	24 V (-10/+20 %)
Output current	5.2 A (+7 %)
Output power	150 W
Input voltage	90…264 V (60/50 Hz)
Efficiency	78 %

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