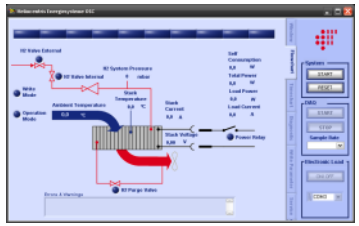
Heliocentris

Nexa® Integration System

1.2 kW Fuel Cell System

The Nexa® Integration System is ideal for demanding application projects. With its 1.2 kW fuel cell module, matching DC/DC converter and a software facilitating overall system control, training and research projects can be implemented easily.

Its fully integrated power module offers performance data that is top in its class and a form factor that allows for facilitated integration into different applications.



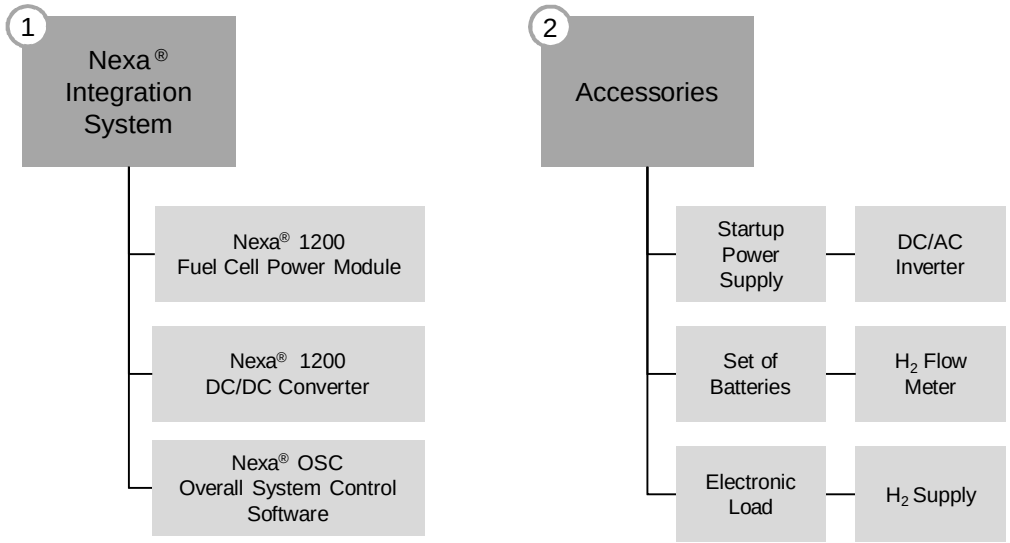
Education & Research

System Overview

Nexa® Integration System

The Nexa® Integration System includes the 1.2 kW Nexa® 1200 Fuel Cell Power Module including a startup kit, the Nexa® DC 1200 DC/DC Converter (24 V or 48 V) and the Nexa® OSC Overall System Control Software to easily set up and run the system in laboratory environments.

For more complex laboratory setups and integration projects a range of accessories is available.



1. Nexa® Integration System for operation in laboratory environments.

2. Accessory program for more complex laboratory setups or integration projects and research projects.

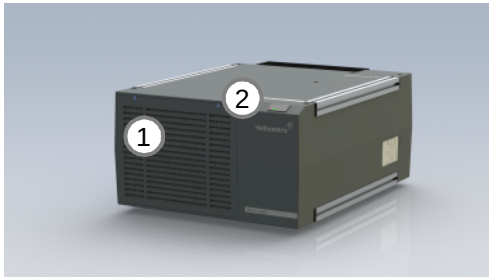
System Overview

Nexa® Integration System

The Nexa® 1200 Fuel Cell Module is the core of the Nexa® Integration System.

The fully integrated fuel cell power module is based on the FCgen™ 1020 ACS stack from Ballard, offering superior fuel efficiency and a long service life. Its enclosed, robust housing with integrated profile rails allows for comfortable integration of the module and protects the inner life of the system.

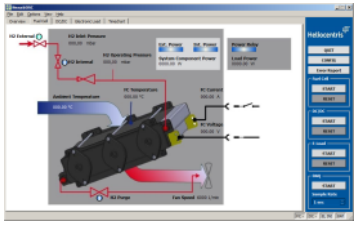
In combination with the Nexa® DC1200 DC/DC Converter and the Nexa® OSC Software facilitating overall system control, the Nexa® Integration System is optimal for implementing stationary applications.



Nexa® 1200

1. Air inlet with intake filter
2. Start/Stop button and status LED
3. Interface unit
4. Exhaust

Nexa® DC 1200



Nexa® OSC

System Features Nexa® 1200

Nexa® Integration System

Improved Overall System Efficiency

Whilst the old Nexa® Power Module required a compressor and a fan for the supply of reaction and cooling air, the Nexa® 1200 uses a single fan on the back of the system, drawing in ambient air for even distribution through the entire system. The parasitic power consumption could be reduced by up to 50%.

Improved Service Life

Heliocentris guarantees a stack service life of 1500 hours, if the system is used according to specifications - three times the service life of the old Nexa® Power Module.

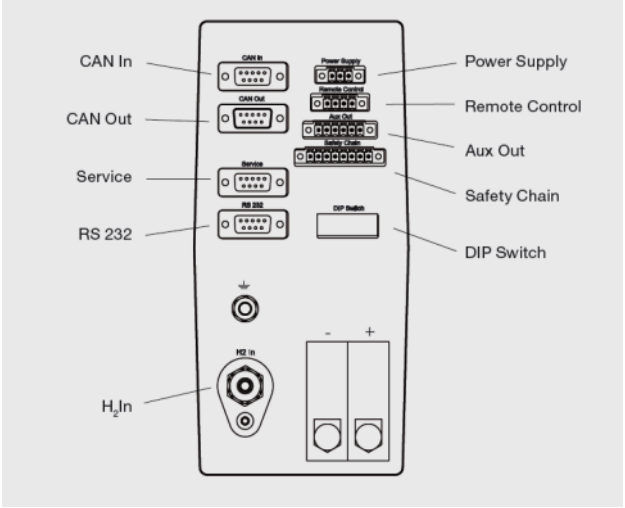
No Draining of Water Required

The open cathode stack facilitates drainage of the water accumulated during the reaction. It is evaporated with the cooling air and is blown out through the air duct at the back of the system. The air outlet is designed for easy attachment of an exhaust air duct.

Central Interface Unit and Mounting Rails

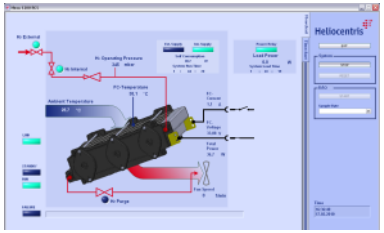
The Nexa® 1200 has a central, easy to reach interface unit on its back, housing peripheral, electrical and hydrogen connectors. Integrated mounting rails further facilitate the integration.

Interface Unit



Scope of Delivery

Nexa® 1200 - Item 1911



Nexa® 1200 Fuel Cell Power Module

Fully integrated 1.2 kW fuel cell power module comprising the FCgen™ 1020 ACS stack from Ballard. Integrated profile rails allow for flexible mounting of the system. All interfaces are located in one place on the system's backside facilitating the connection of cables and hydrogen supply.

Remote Control Software

The included Remote Control Software allows to put the Nexa® 1200 into operation and monitor all relevant operating parameters, e. g. stack voltage, stack current, coolant temperature and load state. All data can be saved for further editing.

Startup Kit

The startup kit facilitates operation of the system in the lab. It comprises a load cable, a power relais, a diode with cooling element, a bundle of connectors and all necessary electric lines.

All items: Item No. 1911

Scope of Delivery

Nexa® DC 1200 - Item 1610 / 1611

Nexa® DC1200

The Nexa® DC 1200 DC/DC Converter stabilizes the unregulated fuel cell voltage of the Nexa® 1200 Fuel Cell Module to 24 / 48 Volt direct current. It also protects the system against reverse currents. The Nexa® DC1200 is required to hybridize the Nexa® 1200 with the optionally available Battery Set..

Hybridization Kit

The included Hybridization Kit ensures that the DC/DC Converter, the Nexa® Fuel Cell Module and the Set of Batteries work together safely as a fuel cell/battery hybrid system. The device is responsible for load control, battery control, battery charging and deep charge protection.

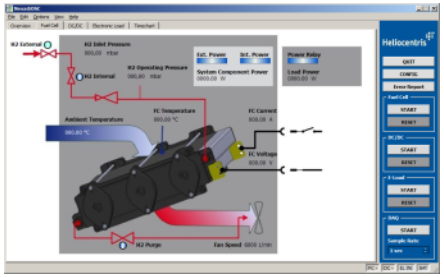
Software

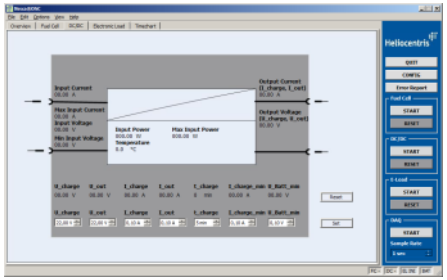
The included software of the Nexa® DC1200 enables the central parameterization of the device and the visualization of its operation parameters via a MS Windows PC. Data logging for further analysis is possible.

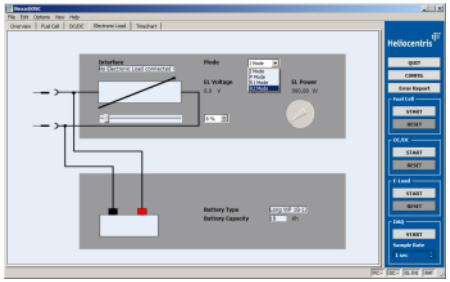
All items: Item No. 1610/1611

OSC Software

Nexa® Integration System







Nexa® OSC Software

The Overall System Control Software enables the central operation and configuration of the main components included in the Nexa® Integration System via a regular MS Windows PC:

» Nexa® 1200 Fuel Cell Module
» Nexa® DC1200
» EL 2400 Electronic Load
» Flow Meter

Component parameters are visualized in the software and can be logged and exported for further editing.

Item No. 1870

Accessories

Nexa® Integration System

Startup Power Supply

The Startup Power Supply provides the power required to start-up the Nexa® 1200 when used without Nexa® DC 1200 and Battery Set.

Item No. 1660

Set of Batteries

The Set of Batteries (24 / 48 V) includes two/four Lead-Gel-Batteries as well as a cable connection set and a short circuit protection for the connection to the Nexa® DC1200. It also enables the startup of the Nexa® 1200 without a power supply.

Item No. 1650 / 1651

EL 2400 Electronic Load

The Electronic Load enables the controllable loading of the Nexa® 1200 Fuel Cell System and features the operating modes: constant current, constant power, constant voltage or constant resistance. The load settings can be made manually or via the included software or the optionally available Nexa® OSC Software.

Item No. 1600

Accessories

Nexa® Integration System

DC/AC Inverter

The DC/AC Inverter converts the power from the Nexa® DC1200 to 230V/110V. Only compatible with Nexa® DC1200 24V Version.

Item No. 1620

H_2 Flow Meter

The Hydrogen Flow Meter enables the exact measurement of the current hydrogen consumption.

Item No. 1730

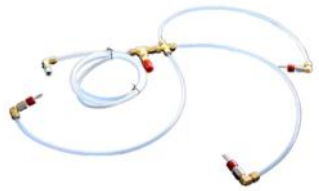
H2 Detector

A portable hydrogen warning device for monitoring the workplace together with a leak test fluid ensure safety during use the system.

Item No. 731

Hydrogen Supply

Nexa® Integration System



Metal Hydride Canister

The low-pressure metal hydride canister allows for safe and easy intermediate storage of 760 sl of hydrogen in a compact form. An integrated quick coupling ensures safe connecting and disconnecting of the canister.

Item No. 647

H_2 Connection Kit 200 bar

For direct operation of the Nexa® 1200 Fuel Cell Module or refilling of Metal Hydride Canisters from compressed gas cylinders. The pressure reducer ensures that the cylinder pressure is reduced to the suitable inlet pressure of the Nexa® 1200 or Metal Hydrid Canister.

Item No. 631

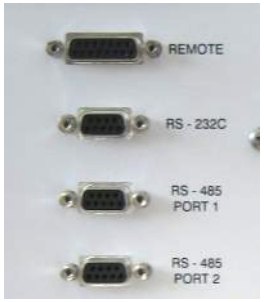
H_2 Connection Kit 15 bar

For connecting three Metal Hydride Canisters to the Nexa® 1200 Fuel Cell System.

Item No. 1502

Hydrogen Supply

Nexa® Integration System



HG60 Hydrogen Generator

The HG60 produces 60 standard liters of hydrogen per hour through the electrolysis of de-ionized water. No free acids or alkalines are used.

Through an innovative and maintenance-free gas dehydration system the generator achieves a hydrogen purity of 6.0 (99.9999 %). It is suitable for the refilling of low-pressure metal hydride canisters.

Item No. 1302

I/O Board

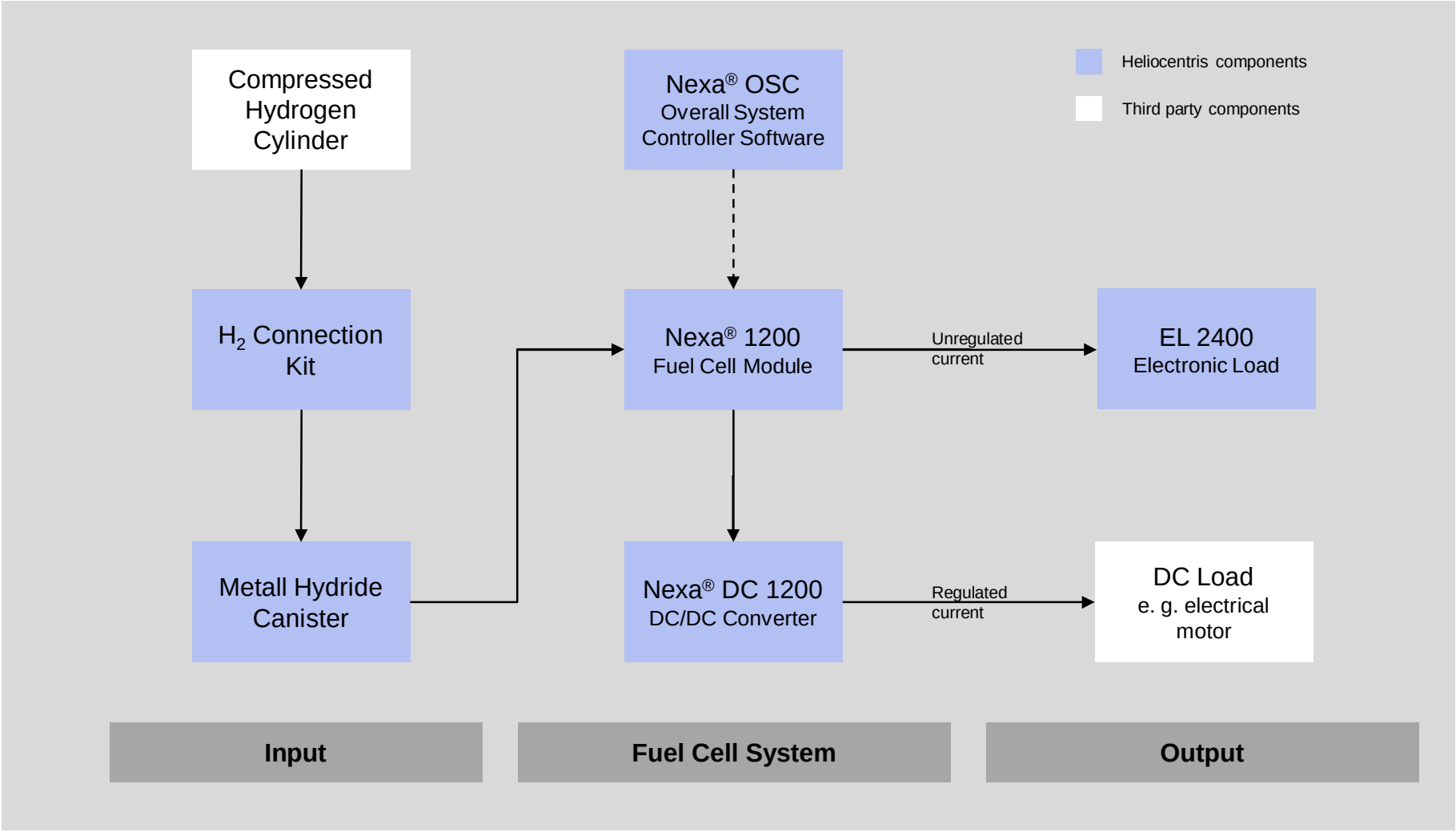
The I/O Board enables remote control of the hydrogen generator via RS232 interface. It allows to check the status of the generator and to control the production of hydrogen with a Windows PC. If equipped with an I/O board up to ten generators can be cascaded via RS485 interfaces.

The included software allows for monitoring of all relevant parameters, e. g. H_2 production, pressure, cell voltage and operation time via PC.

Item No. 1801

System Scheme

Nexa® Integration System



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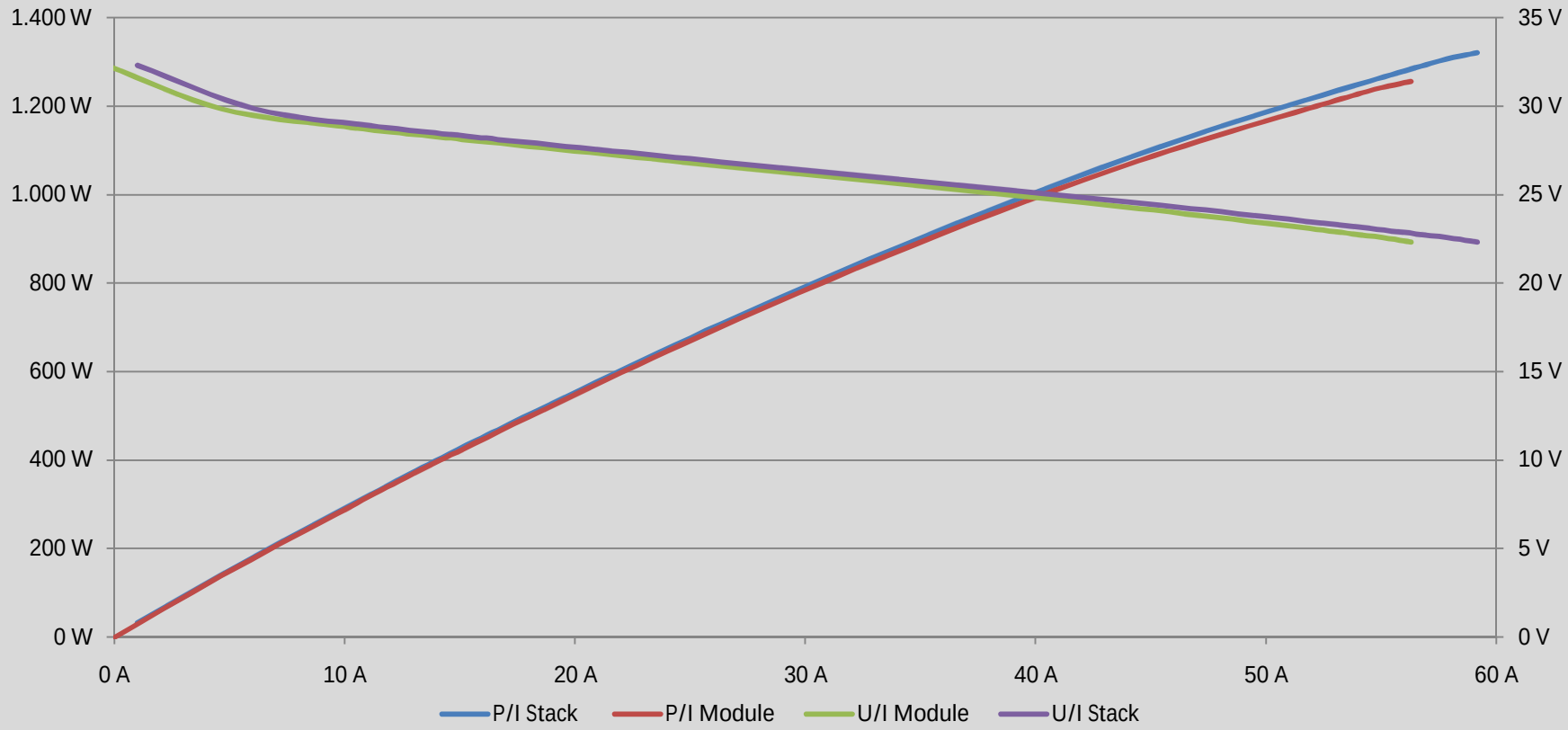
Power Curve – Nexa® 1200 Fuel Cell Module

Nexa® Integration System



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Parts List

Nexa® Integration System

Item No.	Name	Description
1911	Nexa® 1200	1.2 kW Fuel Cell Power Module with FCgen™-1020ACS stack, Monitoring and Control Software and Startup Kit allowing to run the system in the lab
1610	Nexa® DC1200-24	DC/DC Converter stabilizing the unregulated fuel cell voltage of the Nexa® 1200 Fuel Cell Module to 24 V DC, incl. Hybridization Kit and Cable Connection Set (battery set recommended for operation)
1611	Nexa® DC1200-48	DC/DC Converter stabilizing the unregulated fuel cell voltage of the Nexa® 1200 Fuel Cell Module to 48 V DC, incl. Hybridization Kit and cable connection set (battery set recommended for operation)
1870	Nexa® OSC	Software package for overall system control with a MS Windows based PC
Hydrogen Supply		
631	H_2 Connection Kit 200 bar	Connection Kit for refilling of Metal Hydride Canisters from compressed gas cylinders
1502	H_2 Connection Kit15 bar	Connection Kit for connecting 3 Metal Hydride Canisters to the Nexa® 1200 Fuel Cell Power Module
Accessories		
1660	Startup Power Supply	AC-Adaptor for powering Nexa® 1200 Fuel Cell Module during startup
1650	Set of Batteries 24 V	Two Lead-Gel-Batteries á 18Ah
1651	Set of Batteries 48 V	Four Lead-Gel-Batteries á 18Ah
1600	EL 2400 Electronic Load	Electronic Load for controllable loading of the Nexa® 1200 Fuel cell Module. Operating modes: constant current, constant power, constant resistance, constant voltage
1620	DC/AC Inverter	Inverter to operate loads requiring DC/AC input (only aplicable with Nexa® DC1200 and Battery Set)
1730	H_2 Flow Meter	Hydrogen Flow Meter for measurement of hydrogen consumption
731	H_2 Detector	Hydrogen Leak Detection Set including a hydrogen sensor with a display and various acoustic and visual alarm levels and a leak test liquid

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Technical Data

Nexa® Integration System

Fuel Cell Power Module	
Dimensions	
Width x depth x height	400 x 550 x 220 mm
Weight	Approx. 22 kg
Stack	
Manufacturer	Ballard
Make	Fcgen™-1020ACS
Type	PEM
Design	Air cooled, open cathode
Electrical	
Rated power	1,200 W
Rated current	52 Adc
Output voltage (unregulated)	20 - 36 Vdc
Operational temperature	5 - 35°C

Media	
Hydrogen quality	4.0 (99.99 % or better)
Hydrogen consumption	15 slpm (at rated output)
Air consumption	335 m^3/h (at rated output, 30 °C ambient temperature)
Connectors	
Electrical connector	Screw terminal, 25 mm recommended
Hydrogen connector	Brass clamping ring screw connection, 6 mm
Periphery connector	Plug-in connector, Phoenix FCM
Communication connector	Plug-in connector, Sub-D

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Technical Data

Nexa® Integration System

DC/DC Converter	
Specifications	
Output power	max. 1,450 W
Nominal voltage	24 / 48 Vdc
Output voltage	0 … 32 Vdc / 0…62 Vdc
Input voltage	16 …45 Vdc
Output current	max. 55 / 27 Adc
Operational temperature	-10…55 °C
Efficiency	> 95 %
Weight	approx. 2.5 kg

Accessories	
H_2 Flow Meter	
Measuring range	25 slpm
Accuracy	± 1.5% of full scale
Temperature	0-50 °C
H_2 Detector	
Sensor type	Hydrogen 4 %
Measuring principle	3-electrode sensor
Standard range	0.00 - 4.00 %

Accessories	
Set of Batteries	
Rated voltage	24 Vdc / 48Vdc
Capacity	36 Ah / 72 Ah
Startup Power Supply	
Output voltage	24 Vdc
Output current	5.2 Adc
Output power	150 W
Input voltage	90 ... 264 V (60/50 Hz)
Electronic Load	
Load voltage	0 ... 160 Vdc
Load current	0 ... 100 Adc
Load power	max. 2400 W
Power supply	115 / 230 V (60/50 Hz)
DC/AC Inverter	
Output voltage	110 / 230 V (60/50 Hz)
Continuous output power	1500 W
Short time output power	3000 W
Input voltage	24 Vdc
Efficiency (full load)	91 / 93 % (110/230 V)

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Technical Data

Nexa® Integration System

Hydrogen Supply	
Hydrogen Generator with I/O Board	
Hydrogen flow rate	60 sl/h
Hydrogen purity	> 6.0 (99.9999 %)
Hydrogen delivery pressure	1.4 - 10.7 bar adjustable
Pressure accuracy	0.1 bar (±0.5 %)
Water quality	Deionized or distilled
Operating temperature	15 °C - 40 °C
Relative humidity	0 - 80 %, non-condensing
Input voltage	120 or 240 V AC / 50 - 60 Hz selectable
Power consumption	480 VA max.
Operation panel	LC Display 128 x 64 pixels
	Set points, status, alarm
I/O board with PC software (option)	1 port RS232
	2 ports RS485
	Potential free relay contacts
	Set points, system status, user parameter
Dimensions (W x D x H)	230 x 355 x 410 mm
Weight (unfilled)	22 kg

Metal Hydride Canister	
Storage capacity (at charge pressure of 17 bar)	760 sl
Output	6 slpm
Weight	6.5 kg
Size (ø x L)	89 x 420 mm
Charge pressure	10 - 17 bar
H_2 Connection Kit 15 bar	
Inlet pressure	15 bar (217.5 psig)
Connections	3 x metal hydride canister to quick coupling
H_2 Connection Kit 200 bar	
Inlet pressure	200 bar (2900 psig)
Outlet pressure	0 - 20 bar (0 – 290 psig)

The power delivered by the fuel cell depends on various parameters and decreases throughout the product life. All technical data correspond to the stack power at time of delivery.

The system works with hydrogen, a highly inflammable gas. Therefore, the respective local norms and safety regulations for transport, storage and operation have to be observed. Before setting up and operating the system, carefully read the instruction manual.

Subject to changes without notice.