

Product datasheet (en)

Version: 1222_30.11.2021

Photo:



Name:

leXsolar-H2 Professional 2.0

Item number:

1222

Youtube link:

Area of application:

Chemical and Environmental Engineering
Renewable Energies

Dimensions (cm x cm x cm):

Weight (kg):

User group:

Basic Training
Industrial Customers

Key facts:

Experimenting with a Solar Module
Hydrogen production with the Electrolyser
Efficiency of the Electrolyser
Production of green hydrogen
Operating a Fuel Cell Stack
Characteristic Diagram of the Operation Fuel Cell
Hydrogen usage of the FC Stack

List of components:

1 x 1118-02 Motor module Pro
1 x 1100-04 Solar module 5.33 V, 370 mA
1 x 1100-62 Potentiometer module 110 Ohm Pro
1 x 1118-17 Base for solar panel
1 x 1200-18 H2 Storage
1 x 1222-01 Aluminium case 1222
1 x 1222-02 manometer set-up 1 bar
1 x 1400-13 leXsolar-base unit Professional
1 x 1400-19 Wind machine
1 x 9100-03 AV-Module
1 x 9100-05 PowerModule
1 x 1800-17 Distilled water (100 ml)
1 x L2-01-126 FC Mount
1 x L2-02-017 Propeller
0,25 x L2-02-088 Silicone tube inside 4mm outside 6mm
0,15 x L2-02-048 Silicone tube 2 mm
1 x L2-02-083 Y-connector 4mm
2 x L2-04-059 Safety test lead, 50cm, red
1 x L2-04-060 Safety test lead, 50cm, black
1 x L2-04-080 Lamp housing
1 x L2-04-200 Illuminant infrared 230V
3 x L2-05-068 Safety short-circuit plug, with mid socket
1 x L2-06-087 Syringe 2ml
1 x L2-06-132 Valve for H2 Storage
1 x L2-06-205 Fuel Cell Stack 1W
1 x L2-06-206 Double Cell Electrolyser
1 x L2-06-207 FCEV Car Model
2 x L2-06-210 Adapter 2mm/4mm red
2 x L2-06-211 Adapter 2mm/4mm black
1 x L3-01-222 Inlay H2 Professional 1222
1 x L3-03-258 Info sheet initial startup
1 x L3-03-307 Layout diagram 1222 H2 Professional 2.1
1 x L2-06-213 Hose Clamp 1-5 mm
1 x L2-04-066 Safety test lead, 25cm, red
1 x L2-04-067 Safety test lead, 25cm, black

Extras needed:

1 x 1200-17 H2 Charger

Extras available:

No extras available.

Description:

The H2 Professional 2.0 is a great experimenting kit for all students to investigate the technology of

hydrogen production and usage. The H2 Professional can be used for basic training and for advanced studies.

The electrolysis process operates either with the solar module for green hydrogen production, or with main current for gray hydrogen.

We provide a new version of a fuel cell stack, which can be dismantled completely into single cells. Experiments are therefore possible with the stack and the single cells. The fuel cell stack has a maximum power of 1 W.

Running the fuel cell is possible with the electrolyser or with the already known H2 Storage Module.

Furthermore we integrated the Wind Machine to analyse the stack-effect and the oxygen influence on the fuel cell.

Last we added a new car chassis for a fuel cell electrical vehicle demonstration.

Experiments:

Producing hydrogen via electrolysis.

U-I chart of the electrolysis.

Putting the fuel cell into service.

Performance characteristics of the fuel cell.

Investigate the stack-effect of a fuel cell.

Hydrogen consumption of a fuel cell.

Specifications of components:

1118-02 Motor module Pro:

1100-04 Solar module 5.33 V, 370 mA:

solar module with high efficiency polycrystalline solar cells

5.33 V open circuit voltage

370 mA short circuit current

1.5 W peak power

Optimized low light behaviour

Contacting via 4mm jacks

1100-62 Potentiometer module 110 Ohm Pro:

1118-17 Base for solar panel:

1200-18 H2 Storage:

The H2 Storage allows for the simple and safe storage of hydrogen as metal hydride. The storage module is easily filled with the H2 Charger or from a gas cylinder. The adjustable valve releases the hydrogen again.

Technical data:

Capacity: 10 l (approx. 0.9 g hydrogen)
Max. pressure: 3 MPa (20°C)
Release pressure: 0...3.0 MPa (25°C)
Connection: M6-winding

1222-01 Aluminium case 1222:

1222-02 manometer set-up 1 bar:

With the analog manometer the customer is able to check the hydrogen pressure during the experiments with the H-Tec Fuel Cell Stack
The manometer works from 0 to 1 bar.
There is already a copper attachment installed to connect the manometer with a 4 mm silicone hose to the fuel cell.

1400-13 leXsolar-Base unit Professional:

Main board for up to 4 plug-in modules
Grid-dimension of the plugs: 70 mm
Enables series and parallel connection of the modules
Changing between series and parallel connection by turning the Modules
Equipped with 12 additional 4mm security jacks for connecting security measuring lines
Each single plug-in module can be contacted externally
Enables current measurement between each module

1400-19 Wind machine:

9100-03 AV-Module:

The IV-Module is able to measure current and voltage and therefore replaces conventional multimeters completely. With touch buttons three measurement modes can be selected: current, voltage and combined current- / voltage-measurement.

leXsolar AV-Module is intuitive and easy to use but yet allows precise and professional measurements. A high resolution graphics display shows the measurement values as well as visualizes the measurement modes.

Technical specifications:

Voltage measurement:

- Range: 0...12 V
- Accuracy: 1mV
- Overvoltage protection >12V

Current measurement

- Range: 0...2 A
- Accuracy: 0.1mA (0...199mA) and 1mA (200mA...1A)
- Automatic fuse protection >2A (reactivation with touch button)
- Internal resistance <0.5 Ohm (0...200mA); <0.2 Ohm (200mA...2A)

Electrical connection:

- compatible to leXsolar-basic unit
- 4mm-banana plugs

Display: Graphics display resolution 192x192

Power supply: 2 x AA battery or rechargeable

Interfaces:

- Display to read the measurement values
- leXsolar USB-Connect* for direct PC-connection
- leXsolar Wireless-Connect* for wireless data acquisition

*Please ask for availability

9100-05 PowerModule:

The PowerModule is a compact, robust and easy-to-use power supply for experiments. The voltage can be varied incrementally in 0.5V steps from 0 to 12V. It supplies up to 24W output power!

With the acoustic feedback during operation and the voltage indicator by LEDs it is simple and intuitive for the user. With only 70g it is the most lightweight power supply of its power class. Due to the design as leXsolar plug-in module it is fully compatible with all leXsolar experiments. However, it can also be used in other setups with standard 4mm-connectors.

With software control* continuous variable voltages - even time-dependent - can be realized.

Technical data:

Output voltage 0-12V DC

Maximum current 2A

Maximum output power 24W

Automatic overcurrent detection

Voltage variation in 0.5V steps (manually) or continuous (with software* via USB-Connect* or Wireless-Connect*)

Accuracy: $\pm 0.15V$

Contacts: 4mm standard connectors and compatible to leXsolar main board

Input voltage 110-230V AC 50-60Hz

Adaptors for all common sockets included

Weight: 70g (+180g included wall power supply)

RiSU conform

*Please ask for availability

1800-17 Distilled water (100 ml):

L2-01-126 FC Mount:

L2-02-017 Propeller:

L2-02-088 Silicone tube inside 4mm outside 6mm:

L2-02-048 Silicone tube 2 mm:

L2-02-083 Y-connector 4mm:

The Y-connector allows branching from one to two tubes.

L2-04-059 Safety test lead, 50cm, red:

L2-04-060 Safety test lead, 50cm, black:

L2-04-080 Lamp housing:

L2-04-200 Illuminant infrared 230V:

L2-05-068 Safety short-circuit plug, with mid socket:

L2-06-087 Syringe 2ml:

L2-06-132 Valve for H₂ Storage:

L2-06-205 Fuel Cell Stack 1W:

The fuel cell system is modular and consists of five PEM single cells. Current and voltage are measured over the whole stack or for each cell. The stack runs also on less than five cells. The fuel cell stack operates with the electrolyser as well as with the H₂ Storage module. The leak tightness can be checked via Manometer.

Power per cell: 200 mW

Power total: 1000mW

Dimensions: 60 x 120 x 70 mm (2.4" x 4.7" x 2.8")

L2-06-206 Double Cell Electrolyser:

The double cell electrolysing modul is a combination of: one double cell electrolyser, two water reservoirs for distilled water and two balancing reservoirs to collect the hydrogen and oxygen.

Maximum hydrogen production rate: 40 ml/min

Maximum oxygen production rate: 20 ml/min

Water reservoir volume: 80 ml

Working operating current: 2 A

Maximum current: 3 A

Dimensions: 90 x 170 x 135 mm (3.5" x 6.7" x 5.3")

L2-06-207 FCEV Car Model:

The principle of a fuel cell electric vehicle (FCEV) can be demonstrated via the car model. We recommend to combine the fuel cell with the H₂ Storage module and the base for the fuel cell stack and run the car on a plain and smooth underground.

L2-06-210 Adapter 2mm/4mm red:

L2-06-211 Adapter 2mm/4mm black:

L3-01-222 Inlay H2 Professional 1222:

L3-03-258 Info sheet initial startup:

L3-03-307 Layout diagram 1222 H2 Professional 2.1:

L2-06-213 Hose Clamp 1-5 mm:

L2-04-066 Safety test lead, 25cm, red:

L2-04-067 Safety test lead, 25cm, black:

Specifications extras needed:

1200-17 H2 Charger:

The H2 Charger is an independent and easy solution for the production of hydrogen. The system is compatible with all PEM-fuel cell systems of the leXsolar experimentation kits. Components like gas cylinders are not needed as the hydrogen is stored directly as metal hydride in the H2 Storage.

Technical data:

Weight: 1.8kg

Usable water: de-ionized or distilled water (10 ... 40°C)

Water usage: approx. 20ml/h

Release pressure: 0-3.0 MPa

Gas generation: up to 3 l/h

Purity of produced hydrogen: 99.99%

Charging time for one H2-Storage: approx. 4 hours

Specifications extras available:

No extras available.