

Product datasheet (en)

Version: 1217_17.05.2017

Photo:



Name:

leXsolar-H2 Professional

Item number:

1217

Youtube link:

Area of application:

**Chemical and Environmental Engineering
Renewable Energies**

Dimensions (cm x cm x cm)

Weight (kg):

8,5

User group:

**Basic Training
Industrial Customers**

Key facts:

Comprehensive experimentation system on fuel cell technology
Two different fuel cell technologies: PEM-, ethanol fuel cells
Buildable fuel cell stacks with three PEM-fuel cells
Easy hydrogen generation and storage with H2 Charger and H2 Storage
Includes all ancillary equipment

List of components:

- 1 x 1100-19 leXsolar-Base unit Large
- 1 x 1100-23 Potentiometer module
- 1 x 1100-27 Motor module without gear
- 1 x 1100-31 Solar module 2.5 V, 420 mA
- 1 x 1200-17 H2 Charger
- 1 x 1200-18 H2 Storage
- 1 x 1213-01 Gas storage module
- 1 x 1217-01 Aluminium case 1217
- 3 x 1218-02 PEM-Fuel cell module
- 1 x 1218-03 Electrolyzer module 2.0
- 1 x 1700-01 leXsolar ethanol fuel cell module
- 1 x L2-02-017 Propeller
- 0,15 x L2-02-048 Silicone tube 2 mm
- 1 x L2-04-022 Lamp with table clamp
- 1 x L2-04-059 Safety test lead, 50cm, red
- 1 x L2-04-060 Safety test lead, 50cm, black
- 2 x L2-04-066 Safety test lead, 25cm, red
- 2 x L2-04-067 Safety test lead, 25cm, black
- 2 x L2-05-035 safety socket adapter SA 4000 red
- 4 x L2-05-036 safety socket adapter SA 4000 black
- 2 x L2-06-011 Digital multimeter
- 1 x L2-06-132 Valve for H2 Storage
- 1 x L3-01-103 Insert H2 Ready-to-go
- 1 x L3-03-258 Info sheet initial startup
- 1 x L3-03-195 Layout diagram 1217 H2 Professional

Extras needed:

No extras needed, all included.

Extras available:

- L3-03-196 Anleitungsheft leXsolar-H2 Professional
- L3-03-198 Instruction manual leXsolar-H2 Professional
- L3-03-197 Experimentierhandbuch leXsolar-H2 Professional
- L3-03-199 Experiment handbook leXsolar-H2 Professional
- L2-04-044 electric grid adapter set
- 1100-63 DC converter 120V - 240V

Description:

leXsolar-H2 Professional offers the entire spectrum of current fuel cell technology for the technical education. Solar module, electrolyzer, and fuel cell permit

the assembling and examination of a solar-hydrogen cycle. Working principles, efficiency and characteristics curves of electrolyzer and fuel cell are just some of the topics covered. Beside the PEM-fuel cell, it also contains an

ethanol-fuel cell in order to compare the different technologies.
H2 Charger and H2 Storage allow for the easy generation and storage of hydrogen.
True to the traditions of the Professional series all ancillary equipment is already included in the robust aluminum suitcase.

Experiments:

What does an electrolyzer do?
Characteristics of an electrolyzer
Hydrogen production with the H2 Charger
Hydrogen storage with the H2 Storage technology
Characteristics of a PEM-Fuel cell
Characteristics of an Ethanol-Fuel cell
Faraday and energy efficiency of the electrolyzer
Faraday and energy efficiency of the PEM-fuel cell
Parallel- and series connection of PEM-fuel cells

Specifications of components

1100-19 leXsolar-Base unit Large:

Main board for the leXsolar plug-in system with 3 slots
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 4 additional 4 mm jacks for connecting measuring lines

1100-23 Potentiometer module:

Plug-in module with adjustable resistance
Resistance continuously adjustable: 0 - 1.1 kOhm
Maximum current: 1A
Module contains two potentiometers connected in series (1 x 100 Ohm and 1 x 1 kOhm)
Allows an exact adjustment of the resistance while having a large resistance range
Layout: plug-in module with 4mm jacks
Grid-dimension of the jacks: 70mm
Module size: 85mmx85mm

1100-27 Motor module without gear:

Plug-in module with DC-motor
Initial current: 20 mA
Initial voltage: 0.35 V
Equipped with automatic fuse protecting from overvoltage
Layout: plug-in module with 4 mm jacks
Grid-dimension of the jacks: 70 mm
Module size: 85 mm x 85 mm

1100-31 Solar module 2.5 V, 420 mA:

Solar module with 5 high efficiency polycrystalline solar cells
2.5 V open circuit voltage
420 mA short circuit current
1 Wp peak power
Optimized low light behaviour
Solar cell size 5 pcs. 26 mm x 52 mm

Contacting via 4mm jacks

With connecting 4mm banana plugs the module can be set up with an angle of ca. 80°

Grid-dimension of the jacks: 70 mm

Module size: 85 mm x 151 mm

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

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

1213-01 Gas storage module:**1217-01 Aluminium case 1217:****1218-02 PEM-Fuel cell module:****1218-03 Electrolyzer module 2.0:****1700-01 leXsolar ethanol fuel cell module:**

Ethanol fuel cell for conversion of chemical energy into electrical energy

Stack of two fuel cells with separately contactable single fuel cells

For ethanol solution with concentration up to 20%

Recommended ethanol concentration for continuous operation 10%

Open circuit voltage $V_{oc} = 1 \text{ V}$ (double cell)

Maximum short circuit current $I_{sc} = 40 \text{ mA}$

Maximum peak power $P = 10 \text{ mW}$

Approx. continuous power $P = 2 \text{ mW}$ (at least 2 min.)

L2-02-017 Propeller:

L2-02-048 Silicone tube 2 mm:

L2-04-022 Lamp with table clamp:

Lamp with table clamp for attachment to the edge of a table. Optimal for providing lighting for the solar panels during indoor experiments.

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

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

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

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

L2-05-035 safety socket adapter SA 4000 red:

L2-05-036 safety socket adapter SA 4000 black:

L2-06-011 Digital multimeter:

TÜV/GS-approved Pocket size mini Multimeter.

L2-06-132 Valve for H2 Storage:

L3-01-103 Insert H2 Ready-to-go:

L3-03-258 Info sheet initial startup:

L3-03-195 Layout diagram 1217 H2 Professional:

Specifications extras needed:

No extras needed, all inclusive.

Specifications extras available:

L3-03-196 Anleitungsheft leXsolar-H2 Professional:

L3-03-198 Instruction manual leXsolar-H2 Professional:

The instruction manuals are available as PDF and Word versions in the online portal. A description of how to download the booklets is attached to every experiment set.

L3-03-197 Experimentierhandbuch leXsolar-H2 Professional:

L3-03-199 Experiment handbook leXsolar-H2 Professional:

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L2-04-044 electric grid adapter set:

1100-63 DC converter 120V - 240V: