

Product datasheet (en)

Version: 1219_17.05.2017

Photo:

Name:



leXsolar-H2 Ready-to-go 2.0

Item number:

1219

Youtube link:

<https://www.youtube.com/watch?v=hwH276YDKKI&index=11&list=PLKckcQZwZt5xmSkC9p1>

Area of application:

Dimensions (cm x cm x cm)

Physics
Chemistry
Chemical and Environmental Engineering
Electrical Engineering
Renewable Energies
Technology Training

Weight (kg):

User group:

7,9

Basic Training
Highschool / Secondary School
Middle School / Junior High School
Industrial Customers

Key facts:

Comprehensive experimentation system on fuel cell technology
Different fuel cell technologies: PEM- and 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
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 1219-01 Koffer 1219
0,15 x L2-02-048 Silicone tube 2 mm
1 x L2-02-017 Propeller
1 x L2-04-022 Lamp with table clamp
2 x L2-06-011 Digital multimeter
2 x L2-06-012 Test lead black 25 cm
2 x L2-06-013 Test lead red 25 cm
1 x L2-06-014 Test lead black 50 cm
1 x L2-06-015 Test lead red 50 cm
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 L3-03-163 Layout diagram 1219 H2 Ready-to-go 2.0

Extras needed:

No extras needed, all included.

Extras available:

L3-03-083 Anleitungsheft leXsolar-H2 Ready-to-go
L3-03-082 Lehrerheft leXsolar-H2 Ready-to-go
L3-03-095 Instructions manual leXsolar-H2 Ready-to-go
L3-03-100 Teacher's manual leXsolar-H2 Ready-to-go
1200-18 H2 Storage
L2-04-044 electric grid adapter set
1100-63 DC converter 120V - 240V

Description:

leXsolar-H2 Ready-to-go offers the entire spectrum of current fuel cell technology for the classroom. This product was completely reworked and now contains the newest fuel cells for educational purposes. 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 Ready-to-go series all ancillary

equipment is already included in the robust aluminum suitcase.

Experiments:

Set up of an electrolyzer and the different fuel cells

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:**1218-02 PEM-Fuel Cell Module:**

high performance PEM fuel cell
converts hydrogen and oxygen into electricity and water

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:

L2-04-022 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.

L2-06-011 Digital multimeter:

TÜV/GS-approved Pocket size mini Multimeter.

L2-06-012 Test lead black 25 cm:

The black test lead is used for the electrical connection of the modules. The cable is directly plugged into the base plate or alternatively directly into the plug connection of the modules. The cables have two different colors to distinguish between the positive and the negative pole. The black cables are plugged into the negative pole.

L2-06-013 Test lead red 25 cm:

The red test lead is used for the electrical connection of the modules. The cable is directly plugged into the base plate or alternatively directly into the plug connection of the modules. The cables have two different colors to distinguish between the positive and the negative pole. The red cables are plugged into the positive pole.

L2-06-014 Test lead black 50 cm:

The black test lead is used for the electrical connection of the modules. The cable is directly plugged into the base plate or alternatively directly into the plug connection of the modules. The cables have two different colors to distinguish between the positive and the negative pole. The black cables are plugged into the negative pole.

L2-06-015 Test lead red 50 cm:

The red test lead is used for the electrical connection of the modules. The cable is directly plugged into the base plate or alternatively directly into the plug connection of the modules. The cables have two different colors to distinguish between the positive and the negative pole. The red cables are plugged into the positive pole.

L2-06-132 Valve for H2 Storage:

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

L3-03-258 Info sheet initial startup:

L2-02-048 Silicone tube 2 mm:

L3-03-163 Layout diagram 1219 H2 Ready-to-go 2.0:

L3-01-075 Aluminium case "H2 Ready-to-go":

Specifications extras needed:

No extras needed, all inclusive.

Specifications extras available:

L3-03-083 Anleitungsheft leXsolar-H2 Ready-to-go:

L3-03-082 Lehrerheft leXsolar-H2 Ready-to-go:

L3-03-095 Instructions manual leXsolar-H2 Ready-to-go:

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.

L3-03-100 Teacher's manual leXsolar-H2 Ready-to-go:

The experiment handbooks 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..

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

L2-04-044 electric grid adapter set:

1100-63 DC converter 120V - 240V: