

Product datasheet (en)

Version: 1803_25.05.2016

Photo:



Name:

leXsolar-Emobility Ready-to-go

Item number:

1803

Youtube link:

<https://www.youtube.com/watch?v=d4qzp7cAkvg&index=14&list=PLKckcQZwZt5yMah9cp2va>

Area of application:

Physics
Technology Training

Dimensions (cm x cm x cm)

Weight (kg):

5,6

User group:

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

Key facts:

Extensive experimentation system for battery technology
Eight different storage types
Various experiments for E-mobility possible
Including ChargerModule
No additional equipment needed

List of components:

1 x 1118-09 Battery module NiMH 3xAAA Pro
1 x 1118-11 Capacitor module Pro
1 x 1800-01 Resistor module (triple) Pro
1 x 1800-03 Resistor plug element 1 Ohm
1 x 1800-04 Resistor plug element 100 Ohm
2 x 1800-05 Resistor plug element 10 Ohm
1 x 1800-07 Lithium-polymer (LiPo)-battery module
1 x 1800-08 Battery module holder 1xAAA Pro
1 x 1800-13 Lead (Pb) -battery module Pro
1 x 1801-02 Electric model car
1 x 1801-06 LiFePo-battery AAA
1 x 1801-07 leXsolar-Base unit EMobility
1 x 1803-01 Koffer 1803
1 x 1100-62 Potentiometer module 110 Ohm Pro
1 x 1800-15 Distilled water (100 ml)
1 x 9100-13 ChargerModule
1 x 9100-03 AV-Module
1 x L3-01-130 Insert EMobility Rtg 1803
1 x L3-03-258 Info sheet initial startup
1 x L2-04-102 NiZn-battery AAA
2 x L2-06-012 Test lead black 25 cm
2 x L2-06-013 Test lead red 25 cm
1 x L2-06-067 Reversible Fuel cell
1 x L3-03-167 Einräumplan 1803 EMobility Ready-to-go
1 x L2-04-021 NiMH battery AAA
1 x L3-01-200 Deckelschaum mit Noppen

Extras needed:

No extras needed, all included.

Extras available:

1800-09 Battery adapter cable

Description:

This product teaches the physical and technical foundations and applications of different battery technologies. Eight different battery types like lithium-polymer battery, capacitor or fuel cell allow for the study of characteristics like lifespan and charging methods. Qualitative and quantitative experiments are used to explore the properties of various battery types. The electric car can be run with all included storage types. With the integrated ChargerModule batteries are always ready to use and battery charging methods can be addressed in experiments.

Like the other products of the Ready-to-go line, the leXsolar-EMobility Ready-to-go amazes with its flexible and location-independent usability that doesn't require any

additional equipment.

Experiments:

Ohm`s law

- Series connection of ohmic resistances
- Parallel connection of ohmic resistances
- Nominal voltage and capacity of voltage sources
- Four-terminal sensing
- Internal resistance of voltage sources
- Series connection of voltage sources
- The capacitance of a battery module
- The energy density of battery modules
- The Ri efficiency of a battery module
- The total efficiency of a battery module
- Temperature-dependent behavior of the lithium-polymer cell
- The charging process of a capacitor
- The discharge process of a capacitor
- I-V characteristics of the single NiMH battery module
- I-V characteristics of the NiZn battery module
- I-V characteristics of the LiFePo battery module
- I-V characteristics of the lead battery module
- I-V characteristics of the lithium-polymer battery module
- I-V characteristics of the triple NiMH battery module
- The charging process of the NiMH battery
- The charging process of the NiZn battery
- The charging process of the LiFePo battery
- The charging process of the lead battery
- The charging process of the lithium-polymer battery
- The discharging process of a battery module
- Hydrogen production in the reversible hydrogen fuel cell
- Characteristic curve of the electrolyzer
- Hydrogen consumption of a fuel cell
- Characteristic curve of the fuel cell
- The efficiency of the hydrogen fuel cell
- Operation of the electric car with several battery modules
- Operation of the electric car with the reversible fuel cell

Specifications of components

1118-09 Battery module NiMH 3xAAA Pro:

- Battery module for experiments concerning charge regulation
- 3 x NiMH-battery (AAA) 600 mAh
- Equipped with automatic fuse protecting against short circuit
- Layout: plug-in module with 4 mm jacks
- 3-terminal plug-in module for use in circuits with common ground
- Grid-dimension of the jacks: 70 mm
- Module size: 85 mm x 85 mm

1118-11 Capacitor module Pro:

- Capacitor module for simulating batteries in experiments

Extremely high capacity: 5 F

Voltage: 5,4 V

Equipped with automatic fuse protecting against short circuit

Layout: plug-in module with 4 mm jacks

3-terminal plug-in module for use in circuits with common ground

Grid-dimension of the jacks: 70 mm

Module size: 85 mm x 85 mm

1800-01 Resistor module (triple) Pro:

1800-03 Resistor plug element 1 Ohm:

1800-04 Resistor plug element 100 Ohm:

1800-05 Resistor plug element 10 Ohm:

1800-07 Lithium-polymer (LiPo)-battery module:

1800-08 Battery module holder 1xAAA Pro:

1800-13 Lead (Pb) -battery module Pro:

1801-02 Electric model car:

1801-06 LiFePo-battery AAA:

1801-07 leXsolar-Base unit EMobility:

1100-62 Potentiometer module 110 Ohm Pro:

1800-15 Distilled water (100 ml):

9100-13 ChargerModule:

The ChargerModule is a universal battery charger for all batteries included in leXsolar-EMobility. It ensures that all batteries are always ready to use and that no deep discharge occurs. As a consequence, the batteries will have a longer lifetime.

The ChargerModule enables a lot of experiments concerning battery charging methods. Charging methods such as the CC-CV method or fixed-voltage respectively fixed-current charging methods can be investigated in detail.

Charging programs for:

- NiMH-battery

- Electrolyzer
- NiZn-battery
- Pb-battery
- LiFePo4-battery
- LiPo-battery
- NiMH-battery 3-pack
- Capacitor (super cap)
- Additional fixed voltage outputs 3V and 6V

RiSU konform

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

L2-04-102 NiZn-battery AAA:

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.

L2-06-067 Reversible Fuel cell:

The reversible fuel cell consists of an electrolyzer and a fuel cell.

For rapid generation of hydrogen, the fuel cell can be connected to the ChargerModule (charging program Electrolyzer).

To charge the reversible fuel cell the applied voltage should not exceed 1.5V. Otherwise the resulting current could exceed 1A, which would damage the fuel cell.

L3-01-130 Insert EMobility Rtg 1803:

L3-03-258 Info sheet initial startup:

L2-04-021 NiMH battery AAA:

Specifications extras needed:

No extras needed, all inclusive.

Specifications extras available:

1800-09 Battery adapter cable: