

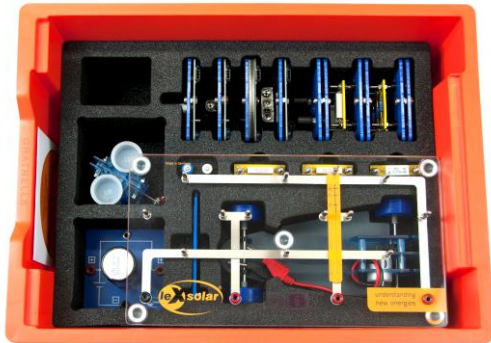
Product datasheet (en)

Version: 1802_06.05.2015

Photo:

Name:

leXsolar-Emobility Large



Item number:

1802

Youtube link:

Area of application:

Dimensions (cm x cm x cm):

Physics
Technology Training

42x35x15

Weight (kg):

User group:

Highschool / Secondary School

Key facts:

Battery technology for educational purposes
Various battery types like NiZn, LiFePo, capacitor
Includes fuel cell
E-Mobility with electric model car

List of components:

1 x 1100-62 Potentiometermodul 110 Ohm Pro
1 x 1118-09 Battery module NiMH 3xAAA Pro
1 x 1118-11 Capacitor module Pro
1 x 1801-07 leXsolar-Base unit EMobility
1 x 1800-01 Resistor module (triple) Pro
1 x 1800-03 Resistor plug element 1 Ohm
2 x 1800-05 Resistor plug element 10 Ohm
1 x 1800-08 Battery module holder 1xAAA Pro
1 x 1801-02 Electric model car
1 x 1801-06 LiFePo-battery AAA
1 x 1802-02 Box 1802
1 x 1800-15 Distilled water (100 ml)
1 x 1800-04 Resistor plug element 100 Ohm
1 x L2-04-102 NiZn-battery AAA
1 x L2-06-067 Reversible Fuel cell
1 x L3-03-016 leXsolar-CD
1 x L3-01-013 Lid for tray
1 x L3-01-070 Insert 4E Energiespeicherbox 5002
1 x L3-03-166 Einräumplan 1802 EMobility Large
1 x L2-04-021 NiMH battery AAA

Extras needed:

1 x 9100-03 AV-Modul
1 x L2-06-012 Test lead black 25 cm
1 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 9100-13 ChargerModule
1 x L2-06-011 Digital multimeter

Extras available:

1800-07 Lithium-polymer (LiPo)-battery module
1800-13 Lead (Pb) -battery module Pro
1800-09 Battery adapter cable
9102 leXsolar-SmartControl Large

Description:

This product teaches students the physical and technical foundations and applications of different battery technologies. The highly-topical issue of electric mobility is explored with an electric model car. Dimensioning and application of different battery types are just as much a topic as life expectancy or charging methods. The characteristics of various battery types are analyzed with qualitative and quantitative experiments. The product is expandable with a Lithium-Polymer and a lead battery module. Considering the storage problems with renewable

energies, these topical issues should find their way into the curriculum.

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

1801-07 leXsolar-Base unit EMobility:

1800-01 Resistor module (triple) Pro:

1800-03 Resistor plug element 1 Ohm:

1800-05 Resistor plug element 10 Ohm:

1800-08 Battery module holder 1xAAA Pro:

1801-02 Electric model car:

1801-06 LiFePo-battery AAA:

1800-15 Distilled water (100 ml):

1800-04 Resistor plug element 100 Ohm:

L2-04-102 NiZn-battery AAA:

L2-06-067 Reversible Fuel cell:

L3-03-016 leXsolar-CD:

The leXsolar-CD covers all student and teacher manuals's as pdf- and word-file. If you need manual's as printed version, you can order them separately.

L3-01-013 Lid for tray:

L3-01-070 Insert 4E Energiespeicherbox 5002:

L2-04-021 NiMH battery AAA:

Specifications extras needed:

9100-03 AV-Modul:

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: 0.1 mA (0...199mA) and 1 mA (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

*available 2015

9100-13 ChargerModule:

The ChargerModule is a universal battery charger for all batteries included in leXsolar-EStore. 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 minus-delta-U method for NiMH batteries 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

Specifications extras available:

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

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

1800-09 Battery adapter cable:

9102 leXsolar-SmartControl Large:

SmartControl Large provides a convenient collection of SmartControl modules for every product of the leXsolar-Large series. There is no

need for additional measuring instruments, power supplies or cables.

Additionally, a SmartGrid can be built through the combination of the included SmartMeter modules and multiple leXsolar products.

The package also contains three leXsolar-WirelessConnect which allow wireless control over the experiments using a Windows-PC.

If mobile devices or other platforms are used, an extra SmartControl Server is needed.