Product datasheet (en)

Version:	1801_27.06.2019

Photo:

Name:

leXsolar-Emobility Professional

Item number:

1801

Youtube link:

Area of application:

Electrical Engineering
Automotive Engineering
Renewable Energies

Dimensions (cm x cm x cm)

64x37x16,5

Weight (kg):

6,1

User group:

Basic Training
Industrial Customers

Key facts:

Battery trainer for the technical training
Battery types: NiMH, NiZn, Pb, LiFePo, LiPo, capacitor (supercap) and fuel cell
All components are prepared for four terminal sensing
Including ChargerModule

List of components:

1 x 1118-02 Motor module Pro

1 x 1118-09 Battery module NiMH 3xAAA Pro
1 x 1118-11 Capacitor module Pro
1 x 1400-13 leXsolar-base unit Professional
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
3 x 1800-05 Resistor plug element 10 Ohm
1 x 1800-06 Resistor plug element 33 Ohm
1 x 1800-07 Lithium-polymer (LiPo)-battery module
1 x 1800-08 Battery module holder 1xAAA Pro
1 x 1800-09 Battery adapter cable
1 x 1800-12 Fuel cell holder 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 9100-13 ChargerModule
1 x 9100-03 AV-Module
1 x 1100-62 Potentiometer module 110 Ohm Pro
1 x 1800-15 Distilled water (100 ml)
1 x L2-02-017 Propeller
1 x L2-04-059 Safety test lead, 50cm, red
1 x L2-04-060 Safety test lead, 50cm, black
1 x L2-04-066 Safety test lead, 25cm, red
1 x L2-04-067 Safety test lead, 25cm, black
1 x L2-04-102 NiZn-battery AAA
3 x L2-05-068 Safety short-circuit plug, with mid socket
1 x L2-06-011 Digital multimeter
1 x L2-06-067 Reversible Fuel cell
1 x L3-01-072 Aluminium case Emobility-Professional
1 x L3-01-092 Insert EMobility Professional 1801
1 x L2-04-021 NiMH battery AAA
1 x L3-03-165 Layout diagram 1801 leXsolar-EMobility Professional
1 x L3-03-258 Info sheet initial startup

Extras needed:

No extras needed, all included.

Extras available:

L3-03-105 Anleitungsheft leXsolar-Emobility Professional
L3-03-106 Experimentierhandbuch leXsolar-EMobility Professional
L3-03-107 Instructions manual leXsolar-EMobility Professional
L3-03-108 Experiment guide leXsolar-EMobility Professional
L2-04-044 electric grid adapter set

Description:

For storing electrical energy many different battery technologies are already on the market. But what application needs which battery type, what capacity does the battery

need to have and what loading performance is the best to guarantee a long durability? Due to the problem of storing renewable energy, these are questions which need to be worked on in technical training.
With leXsolar-EMobility Professional, the characteristics of different battery types can be analyzed. In addition, the kit helps students to find out more about the different fields of application. The kit comes with different battery technologies such as lead, NiMH or Lithium-Polymer(LiPo) as well as a PEM-fuel cell. For the correct determination of the internal resistance four-terminal sensing is possible.
With the integrated ChargerModule batteries are always ready to use and battery charging methods can be addressed in experiments.

Experiments:

Setup of a simple circuit
Ohm`s law
Series connection of ohmic resistances
Parallel connection of ohmic resistances
Start-up and idling behavior of a motor
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 charachteristics 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

1118-02 Motor module Pro:

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

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 connectsion 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

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:

1800-06 Resistor plug element 33 Ohm:

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

1800-08 Battery module holder 1xAAA Pro:

1800-09 Battery adapter cable:

1800-12 Fuel cell holder Pro:

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

1801-02 Electric model car:

1801-06 LiFePo-battery AAA:

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 precice 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:
- compatibel to leXsolar-basic unit
- 4mm-banana plugs

Display: Graphics display resolution192x192

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**

1100-62 Potentiometer module 110 Ohm Pro:

1800-15 Distilled water (100 ml):

L2-02-017 Propeller:

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:

L2-04-102 NiZn-battery AAA:

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

L2-06-011 Digital multimeter:
TÜV/GS-approved Pocket size mini Multimeter.

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.

L3-01-072 Aluminium case Emobility-Professional:

L3-01-092 Insert EMobility Professional 1801:

L2-04-021 NiMH battery AAA:

L3-03-165 Layout diagram 1801 leXsolar-EMobility Professional:

L3-03-258 Info sheet initial startup:

Specifications extras needed:

No extras needed, all inclusive.

Specifications extras available:

L3-03-105 Anleitungsheft leXsolar-Emobility Professional:

L3-03-106 Experimentierhandbuch leXsolar-EMobility Professional:

L3-03-107 Instructions manual leXsolar-EMobility 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.

L3-03-108 Experiment guide leXsolar-EMobility Professional:
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.

L2-04-044 electric grid adapter set: