

Product datasheet (en)

Version: 1404_08.08.2016

Photo:



Name:

leXsolar-Wind Large

Item number:

1404

Youtube link:

Area of application:

Physics

Dimensions (cm x cm x cm)

42x35x15

Weight (kg):

3,1

User group:

Highschool / Secondary School

Key facts:

Wind energy experiments for high schools
Understanding wind energy: from physics to application
Contains the innovative leXsolar-wind rotor set

List of components:

1 x 1100-19 leXsolar-Base unit Large
1 x 1100-22 Resistor module

1 x 1100-23 Potentiometer module
1 x 1400-01 leXsolar-Savonius rotor modulw
1 x 1400-07 Capacitor module 220 mF, 2.5V
1 x 1400-08 LED-module 2mA, red
1 x 1400-12 leXsolar-Wind rotor set
1 x 1400-19 Wind machine
1 x 1400-22 Wind turbine module
1 x 1404-02 Box 1404
1 x 1100-25 Buzzer module
1 x 1100-26 Light bulb module
1 x 1100-27 Motor module without gear
1 x 1100-28 Color discs - Set 1
1 x L3-01-013 Lid for tray
1 x L3-01-023 Insert Wind Large 1404
1 x L3-03-132 Layout diagram 1404 Wind Large
1 x L3-03-258 Info sheet initial startup

Extras needed:

1 x 9100-03 AV-Module
1 x 9100-05 PowerModule
2 x L2-06-012 Test lead black 25 cm
2 x L2-06-013 Test lead red 25 cm

Extras available:

1400-02 Anemometer with mount
L3-03-124 Lehrerheft leXsolar-Wind Large
L3-03-070 Schülerheft leXsolar-Wind Large
L3-03-072 Student's manual leXsolar-Wind Large
L3-03-126 Teacher's manual leXsolar-Wind Large

Description:

This system provides you with all the answers you need concerning the basics of using wind energy. With the help of curriculum-based trials, it discusses different topics which are necessary for understanding the functions of wind power plants. The study of how wind speed, wind direction or rotor type influences the power output are only some examples of possible experiments. Both qualitative experiments for students from age of 11 to 13, and complete quantitative trials for physics lessons until the age of 19 are described in detail.

Experiments:

Influence of the wind speed on a wind turbine
Start-up wind speed at a wind turbine
Comparison of the start-up wind speed of a Savonius and a three-blade rotor

Change the turbine voltage by connecting a consumer
Examine the wind speed behind the rotor
Energy balance sheet at a wind turbine
Calculating the efficiency of a wind turbine
Storing electric energy
Energy conversion in a wind turbine
Examine color wheels using a wind turbine
Comparison of a Savonius rotor and a three-blade rotor
Comparison of two, three and four-blade rotors
Characteristic curves of a wind turbine
Influence of the wind direction
Influence of the rotor blade pitch
Influence of the rotor blade pitch on the start up speed of a wind turbine
Influence of the blade shape

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

1100-22 Resistor module:

Plug-in module with 33 Ohm resistor
Tolerance: 5 %
Maximum power: 2 W
Layout: plug-in module with 4 mm jacks
Grid-dimension of the jacks: 70 mm
Module size: 85 mm x 85 mm

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

1400-01 leXsolar-Savonius rotor module:

Savonius wind turbine
Starting wind speed: ca. 3.3 m/s
Nominal voltage (at a wind speed of 5 m/s): 0.4 V
Dimensions of the rotor: h=60 mm, d=80 mm
Layout: plug-in module with 4 mm jacks
Grid-dimension of the jacks: 70 mm
Module size: 85 mm x 85 mm

1400-07 Capacitor module 220 mF, 2.5V:
Capacitor plug-in module

Capacity: 220 mF
Voltage: 2.5 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

1400-08 LED-module 2mA, red:
LED plug-in module
Red LED (maximum emission at 697 nm)
Minimum voltage: 1.7 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

1400-12 leXsolar-Wind rotor set:
Set of rotor blades and hubs to set up different wind turbines
4 rotor blades with optimized profile
4 rotor blades with flat rectangular profile
5 hubs for setting up 3-blade rotors with pitches 20°, 25°, 30°, 50° and 90°
1 hub for setting up 4-blade rotor with pitch of 25°
1 Cap for 3-blade rotor and 1 cap for 4-blade rotor
Allows setting up 24 different wind turbines
Easy assembling and disassembling without tools

1400-19 Wind machine:

1400-22 Wind turbine module:
Wind turbine module for attaching different types of rotors
Generator: maximum 6 V DC
Layout: plug-in module with 4 mm jacks
Grid-dimension of the jacks: 70 mm
Module size: 85 mm x 85 mm
including safeguard to prevent touching running blades

1100-25 Buzzer module:
Plug-in Module with piezo buzzer
Pulse tone buzzer
Initial voltage: 0.7 V
Initial current: 0.2 mA
Layout: plug-in module with 4 mm jacks
Grid-dimension of the jacks: 70 mm
Module size: 85 mm x 85 mm

1100-26 Light bulb module:
Plug-in module with micro bulb
Initial voltage: 0.9 V
Initial current: 25 mA
Maximum voltage: 6 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

1100-27 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

1100-28 Color discs - Set 1:

Color discs for demonstration of color mixture and optical illusions

Contains a mount with 2 clips for attaching the discs

Mount fits axles of 2mm diameter

Included color discs:

Red-green-blue

Red-blue

Red-green

blue-green

Hue disc

Optical illusion: relief

Optical illusion: color formation

Stroboscope disc

L3-01-013 Lid for tray:

L3-01-023 Insert Wind Large 1404:

L3-03-132 Layout diagram 1404 Wind Large:

L3-03-258 Info sheet initial startup:

Specifications extras needed:

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:

- compatibel 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

9100-05 PowerModule:

The PowerModule is a compact, robust and easy-to-use power supply for experiments. The voltage can be varied incrementally in 0.5V steps from 0 to 12V. It supplies up to 24W output power!

With the acoustic feedback during operation and the voltage indicator by LEDs it is simple and intuitive for the user. With only 70g it is the most lightweight power supply of its power class. Due to the design as leXsolar plug-in module it is fully compatible with all leXsolar experiments. However, it can also be used in other setups with standard 4mm-connectors.

With software control* continuous variable voltages - even time-dependent - can be realized.

Technical data:

Output voltage 0-12V DC

Maximum current 2A

Maximum output power 24W

Automatic overcurrent detection

Voltage variation in 0.5V steps (manually) or continuous (with software* via USB-Connect* or Wireless-Connect*)

Accuracy: +/-0.15V

Contacts: 4mm standard connectors and compatible to leXsolar main board

Input voltage 110-230V AC 50-60Hz

Adaptors for all common sockets included

Weight: 70g (+180g included wall power supply)

RiSU conform

*Please ask for availability

Specifications extras available:**1400-02 Anemometer with mount:**

Anemometer for use with the leXsolar-Wind Large. Also usable with mount for plugging onto main board or onto wind turbine module

Measurement range of wind speed: 0.2 m/s - 30 m/s

Tolerance: 5%

Measurement units: mph, km/h, m/s or knots

Maximum wind speed memory

LCD backlight display

Auto power off

Waterproof

Incl. battery (CR 2032)

Battery lifetime: 12 Month (depending on power-on time)

Dimensions: 39 x 17 x 98 mm

L3-03-124 Lehrerheft leXsolar-Wind Large:**L3-03-070 Schülerheft leXsolar-Wind Large:****L3-03-072 Student's manual leXsolar-Wind Large:**

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.

L3-03-126 Teacher's manual leXsolar-Wind Large:

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.