

SECTION 03 - TECHNIQUE AND ENERGY

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Teaching guide in digital format



Minimum invoiced order: € 130,00 + VAT



Power House - Green Essentials 5394

Sustainable development is a form of socio-economic development able to protect and enhance the resources of the Earth, where man is committed to safeguarding environment and common resources for future generations. With this kit you can learn about alternative and sustainable forms of energy, by following some simple experiments related to the use and transformation of energy. To perform all the experiments with the power house, you will have to refer to the simple and intuitive original guide in English. Ages 10 and up.

Topics

- RESEARCH FOR THE FUTURE
- CONSTRUCTION MATERIAL
- COLD, WARMER, HOT
- PROJECT POWER HOUSE
- HEAT — FAMILIAR YET MYSTERIOUS
- THE SUN AS HEAT DISPENSER
- THERE'S SOMETHING IN THE AIR
- WATER, SALT, AND RAIN
- GREAT CLIMATE
- LIGHT AND HEAT FROM THE SUN
- ELECTRICITY FROM SOLAR ENERGY
- ENERGY FROM THE WIND
- TRICKS THAT PLANTS USE



5394

INTRODUCTION

In this section we present several equipments, easy to use and highly effective, related to the issue of renewable energies. How to get energy from the sun through solar cells or from hydrogen thanks to PEM cells, or simply from the wind. These energy resources are destined to replace the traditional ones such as coal and oil. These devices can easily be assembled and allow to understand the physical and chemical principles upon which the production of renewable energy is based.



H2Go Delux HZ11

Hydrogen cars with fuel station powered by solar panel and remotely controlled.



HZ11

H-Racer HZ03

Hydrogen cars with fuel station powered by solar panel.



HZ03

Hydrocar**HZ04**

Car kit with reversible cell and autonomous motion, displacement sensor and flashing LEDs.

**HZ04****Solar Hydrogen Education Kit****HZ02**

The ideal set for demonstrations and to begin to approach, having fun, the world of hydrogen and clean energy.

**HZ02****Bio Energy Discovery Kit****HZ05**

Energy from ethanol. The more compact demonstration kit on the market. It generates electricity using ethanol without noise and combustion. It can work for days, showing the power of the new generation of fuel cells.

**HZ05****Hydro-Wind Kit****HZ08**

Capture wind power!

With this kit you can use the energy produced by a wind generator to power a fuel and hydrogen cell.

**HZ08**

Renewable Energy Monitor

HZ07

Monitoring device with LCD display, designed to detect via PC the performances of all fuel cells and demonstration kits. Possibility to evaluate real-time voltage, current, power, resistance and even kit rotation speed with miniature wind turbines. The tool also works with battery power, can be used with or without a PC and away from electric energy sources.



HZ07

Wind device

5423

Blowing on the blades, a LED turns on to show that wind power has transformed into electric energy.



5423

WindPitch Education Kit

HZ10

Miniature wind turbine designed to assess how different quantities, sizes and blade angles influence the amount of energy produced. This kit contains 4 different models of blades, a special 3-phase AC alternator and a small device equipped with a LED voltmeter and a module for the reproduction of musical sounds.



HZ10

MECHANICAL ↔ ELECTRICAL

Hydraulic turbine

5314

This model of hydraulic turbine permits to demonstrate the conversion of potential hydraulic power in electrical power, without using water sources.

It is fitted with an immersion pump which takes the water from the small basin and throws it against the turbine blades generating a continuous cycle. A voltmeter measures the voltage at the clamps of the dynamo and the electrical power produced can switch on a LED or make a small electric motor fitted with blade rotate.

The pump needs a continuous 12 V voltage.

The use of power supply cod. 5011 (not supplied with the instrument) is suggested.



5314

Air generator

5316

Thanks to this generator it is possible to make work the wind turbine even in the absence of wind.



5316

Wind turbine model

5315

Used to demonstrate the conversion of wind kinetic energy into electrical power. Exposing the turbine to the wind, the movement power is transmitted to a small generator that transforms it in to electric power.

Size: 25 x 25 x 30 cm.



5315

Small electrical motor**5276**

Supplied in an assembly kit. Working with 3-6 V dc voltage. Suitable to develop practical capacities of students and make them understand how an electrical motor works.



5276

AC/DC motor generator, demonstration model**5803**

It is an excellent demonstration model for studying electric current generation. The generator produces AC/DC current when the hand wheel is turned. The presence of AC/DC voltage is visualized by lighting of bulbs. Cables included.



5803

THERMAL ↔ MECHANICAL**Two-stroke engine****2071**

Operating section of a two-stroke engine with carburettor. Turn the crank handle, the spark of the candle coincides with the switch on of a light bulb powered by a 4,5 volt battery.



2071

Four-stroke engine**2101**

This model shows the internal structure and the principle of operation of a diesel four-stroke engine water cooled.

Acting on the crank handle, the moving engine parts are visible. A light bulb simulates the spark of the spark plug (requires as a power supply 2 AA batteries not included).



2101

Diesel engine**2102**

This model shows the internal structure and the principle of operation of a diesel four-stroke engine water cooled.

Acting on the crank handle, the moving engine parts are visible. A light bulb simulates the spark of the spark plug (requires as a power supply 2 AA batteries not included).



2102

ELECTRICAL ↔ THERMAL**Thermoelectric generator****5350**

The sensitive part of this item consists of a Peltier cell. It is in contact on one side with a small aluminium wing to be immersed in hot water, on the other side with a small basin to be filled with ice and cold water. Due to the Seebeck effect, the difference in temperature produces a difference in potential that is noticeable at the terminals, this difference can make a small electric motor work: applying a difference in potential to the terminals (max 12V), due to Peltier effect, a great difference in temperature is set between the two faces of the ceramic block.

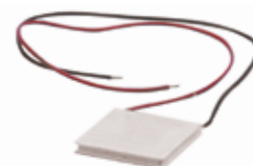


5350

Peltier's cell**5374**

It consists of 144 doped silicon bars, serial connected and close in a ceramic block.

Maximum voltage: 12V.



5374

RADIANT ↔ THERMAL

Solar water heater

2000

It is a model of the domestic use devices. Thanks to this item you can heat water by means of sun radiant power.

An immersion pump, working at 12 Vcc, make the water circulate in the heating coil of the solar panel.

After a few minutes it is possible to notice an increase in temperature.

It is supplied with a transformer.



2000

RADIANT ↔ ELECTRICAL ↔ MECHANICAL**Model of solar vehicle****5319**

This model gets electric power from the solar panel.
When it is exposed to the sun it starts to move autonomously.



5319

Solar energy motor**5317**

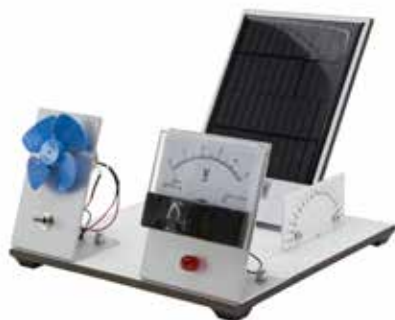
Exposing the item to the sun, the panels convert solar energy into electrical power which can be used to make the disk rotating.
Size: 100x120 mm.



5317

Photovoltaic panel**5318**

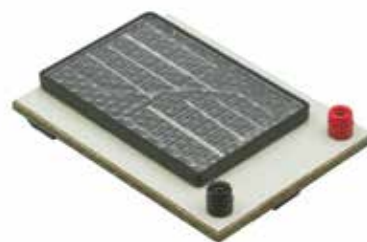
Exposing the panel to the sun you will get the transformation of solar power into electrical power thanks to which the motor starts to rotate, or a light bulb switches on. The panel is tilted and supplied with a protractor so you can easily evaluate its performance according to the angle of the solar rays incidence.



5318

Photovoltaic panel with base**5311**

Suitable for rendering measurements.
Panel size: 10 x 6,5 cm.
 $V_{DC\max} = 1,3\text{ V}$.



5311

Fuel cell with separable devices**5412**

This item permits measurements concerning conversion of light power into electrical energy.

The light energy produced by a 75 W lamp(similar to solar energy) is converted into electrical power by a photovoltaic panel.

This electrical energy is used to separate, thanks to a PEM electrolytic cell, (Proton Exchange Membrane) water molecules in the constituent components (with an increase in chemical potential energy contained in hydrogen and oxygen gases).

The two gases are mixed again through a PEM fuel cell, producing water and electric energy again, which is used to operate a fan (mechanical energy) by a small electric motor. The two PEM cells are identical and are both used as electro-chemical converters, once in a direction and then in the opposite.

The measurement of electrical quantities can be performed by means of two multimeters. it is possible to detect as vary the electrical quantities during the operation, making use of voltage and current sensors.

Equipment supplied

- 1 Base
- 1 Projector
- 1 220 V - 75 W lamps
- 1 Solar panel
- 1 PEM electrolytic cell with tanks
- 1 PEM fuel cell
- 1 Small motor with fan
- 2 Analogical portable multimeter
- 4 Electrical leads
- 1 Syringue
- 2 Taps
- 4 Adaptors
- 1 Distil water bottle
- 2 Tubes
- 2 Plugs



5412

Electricity at home

5628

Feasible circuits

1. Light system driven by a unique switch.
2. Light system with two serial lamps driven by a unique switch.
3. Light system driven by a unique switch and socket.
4. Light system with two parallel lamps driven by a commutator.
5. Light system driven from two switches with diverters.
6. Light system driven by two switches with interruption power relay.
7. Light system driven by three switches.
8. Alarm system with two switches

Equipment supplied

- | | |
|--|---|
| <ul style="list-style-type: none"> • 1 Aluminium panel fitted with clamps for power supply • 2 Metallic supports for panel, fitted with screws and wing nuts • 1 Switch • 2 Diverters • 1 Inverters • 2 Buttons • 1 Socket • 1 Commutator • 2 Bulbs-holder • 2 Bulbs • 1 Power interruption relay • 1 Alarm • 1 Screwdriver | <ul style="list-style-type: none"> • 1 Electrician scissors • 1 Set of devices to fix wires • 6 Screws M3 30 mm • 4 Screws M3 20 mm • 20 m Blue electrical lead Ø 0,75 mm • 20 m Brown electrical lead Ø 0,75 mm • 20 m Black electrical lead Ø 0,75 mm • 20 m Yellow-green electrical lead Ø 0,75 mm • 2 m electrical lead • 10 Wing nuts M3 • 1 Plastic holder • 1 pdf teaching guide |
|--|---|



5628