

Containing all the parts needed for studying the main alternative energies:

PHOTO-VOLTAIC SOLAR ENERGY: Transformation of solar radiation (halogen lamp-simulation) right into electrical power. A photo-voltaic module made up of two 2,5 V / 300 mA -panels, series or parallel connection being able to be carried out. The energy generated is measured by the multimeter and is to be applied to the lamp, electric-motor and rechargeable batteries for these to be recharged or discharged.

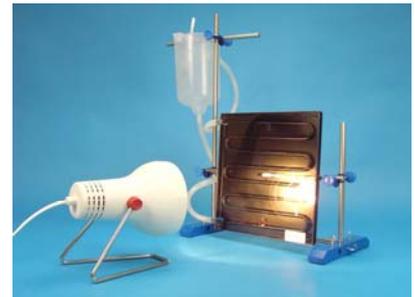
THERMAL SOLAR ENERGY (Flat surface collector): Transformation of the solar radiation (halogen lamp-simulation) into heat absorbed by a metal flat surface collector with inner coil and accumulator container. Temperatures are measured by means of thermometers placed inside the collector and inside the accumulator container.

THERMAL SOLAR ENERGY (Parabolic collector): Transformation of the solar radiation (halogen lamp-simulation) into heat absorbed in a container placed at the focal point of a parabolic collector. The temperature in the container is measured until it boils.

WIND ENERGY: The energy of the wind (hair drier-simulation) drives the blades of a propeller which is joined onto an electrical generator. The energy generated is measured by a multimeter and it is to be applied to the electrical motor.

HYDROGEN FUEL CELL: It is the energy that will power our cars in the future. The electrical energy generated by the photovoltaic module is to be applied to the fuel cell for the latter to work first as an electrolyser thus producing hydrogen and oxygen. Once the gases have been stored, then they are used for carrying out the inverse reaction and therefore generating electricity as a fuel cell. The electricity generated is measured by means of a multimeter and applied to an electrical motor.

GEOTHERMAL ENERGY: The thermal energy inside the Earth (simulated by a gas burner which is not included in the kit) makes water boil in a container. The steam produced at high pressure is ejected at a turbine coupled to an electric generator. The energy generated is measured by the multimeter and is to be applied to the electrical motor.



COMPONENTS:

Photo-voltaic module

Two independent panels with 4mm-connectors. Each panel generates 2.5V/300mA, series connections (5V/300mA) or parallel connections (2.5V/600mA) are available. Mounted on a 165 x 175 mm- metal plate with boss head on the back for fixing onto a 10mmØ-rod, the slanting angle being adjustable.



Flat surface thermal collector

Metal framework with inner black coloured-copper coil. Thermometer fixed in the inside. Heat-proof polycarbonate cover. Two 8mmØ-taps for water intake and outflow. It has a boss head for fixing onto a rod, the slanting angle being adjustable. Dim. 250 x 260 mm.



Parabolic thermal collector

Plastic-material made with 230mmØ reflecting parabolic mirror surface. Ø30x22mm-Metal container for water to flow in, the container being coloured in black for enhancing the radiation absorption, it can be driven on its support for reaching an optimal placement at the focal point thus the water being able to boil. It has a boss head available for fixing onto a horizontal or vertical 10mmØ-rod, the slanting angle being adjustable.



Wind energy / geothermal module

Motor-Generator mounted on metal framework with 4 mm-connectors. It has a boss head available for fixing onto a 10mmØ-vertical rod. Dim.: 80x80x27mm



Three bladed-Propeller



Turbine

Reversible Fuel cell

With 4 mm-connectors. Dim. 72x80x80 mm.
Working as an electrolyser
Power consumption: 1,8 W
Necessary voltage: 1,4 – 1,8 VCC
Max. current: 500 mA
Hydrogen and oxygen volume: 15 ml each.
Working as a fuel cell:
Power output: 0,4 W
Voltage output: 0,3 – 0,95 VCC



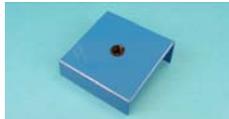
Module with motor

Low inertia-electrical motor with propeller most suitable for low power use. Voltage range, 0.7 to 5.0V (standard, 2.0 V). Starting current, 10 mA. Painted metal sheet support with 4 mm-connectors. Dim. 80x80mm.



Lamps module (2x)

E10 lampholder for lamps. Painted metal sheet support with 4mm-connectors Dim. 80x80mm.



E10 Lamp 2,5V/200mA (4x)



Batteries module

For two rechargeable batteries LR6-size. Painted metal sheet support with 4mm-connectors. Dim. 80x80mm.



Ni-MH R6-type Rechargeable battery (2x)

120W Halogene lamp

Lamp with steerable support and connecting wire at 220V. Halogen lamp with reflector included, power 120 W, only 12°-aperture so as to get maximum luminosity condensation. High luminosity and thermal emission.



Air generator

Hair drier with feeding wire.
Voltage 220V.



Steam generator

500ml-Flask with a plug with bent pipe for steam outflow.



Digital multimeter

LCD Display.CC Voltage: 200mV to 500V.
CA Voltage: 200/500V. CC current:
200µA/200mA/10A, etc...



Water container

1 litre-Accumulator container with level indicator and taps on side and bottom.



Silicone hoses (2x)

Length: 450mm, inner diameter: 7mm.

Clamp for thermometer

Connection wires set

4x 30cm-red, 3x 30cm-black, 1x 60cm-red and 1x 60 cm-black.



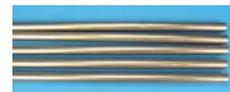
Rectangular support base (2x)

Metal -made with 3 holes for rod with fixing screws. Dim.: 200x20x30mm.



10mm Ø-Rods set

2x 350mm rod and 2x 250mm rod



10mm Ø-detachable rod

Total length, 500mm



Double boss head (3x)

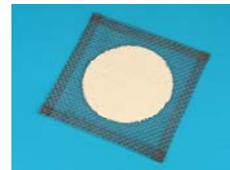


100mmØ-Ring with rod



Metal screen with ceramic fiber

Dim.: 125x125mm. Fiber 80mm Ø



Distilled water 50ml



Thermometer, -10 +110°



Storage Cases

A 312x427x75mm case with tray (with holes) in the inside.
A 312x427x225mm case



Experiments manual