

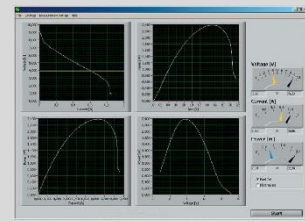


HYDROGEN FUEL CELLS TRAINER



DL HYDROGEN-A

Trainer for the theoretical-practical study of the hydrogen based fuel cells energy.



Complete with connecting cables, experiment manual and **software for data acquisition and display**.

TRAINING OBJECTIVES

- Study of a fuel cell stack up to ten cells
- Producing and storing hydrogen
- Determining characteristic curve of solar panel
- Voltage controlled automatic measurements
- Determining characteristic curve of electrolyser
- Learning about Faraday's laws
- Determining characteristic curves of fuel cell
- Determining fuel cell efficiency
- Determining decomposition voltage of water
- Long-term measurements at your own PC
- Fixing the output at different operating points of the fuel cell stack
- Monitoring single cell stack voltages at your PC
- Power-controlled automatic measurements
- Data acquisition of wave tracing vs time measurement.

Average training hours: 5h

Approx. packing dimensions: 1.0 x 0.40 x 0.68 m.

Net weight: 35 kg.

TECHNICAL SPECIFICATIONS

The trainer includes:

- 2-cell PEM electrolyser stack, composed of two individual cells (electrically connected in series), with relevant power supply to produce hydrogen,
- PEM fuel cell stack, composed of 10 individual cells wired in series, to combine with the ambient producing current, heat and small quantities of water when supplied with hydrogen,
- hydrogen storage tank to connect to the output of the PEM electrolyser stack,
- lamp as a load for the electric energy generated by the fuel cell stack,
- solar panel module to supply the electrolyser stack with relevant output terminals,
- Fan to provide air,
- 2 modules with lamps to irradiate the solar panel for indoors,
- power output to supply the lamps, and protection device on the front panel,
- fuel cell monitor software,



RENEWABLE ENERGIES



- accessories necessities for data acquisition and PC interfacing as well as software for data processing and characteristic curves representation.

Specifications:

- Electrolyser: 15 W @ 4Vdc (voltage range $3 \div 4$ Vdc and current range $0 \div 4$ A), H₂ production 65cm³/min.
- Fuel cell stack with 200mW per cell (2W per ten), generated voltage $0,4 \div 0,9$ V per cell.
- Solar panel module: 6 V/3,3 A.
- Hydrogen storage: 80 cm³.
- Lamp for experiments: 4,0 - 4,5W.

The following accessories are also included: water bottle (with distilled water of 250ml), protective goggles, silicone tubing, funnel, and detailed operation manual.

The supplied software that works with the transformer measuring card, fixed on the front of the system, and connected to the PC via USB cable, has the following features:

- in fuel cell mode: P_{max} 10W, permitted voltage $0 \div 10$ Vdc, permitted current $0 \div 5$ A,
- in electrolysis mode: P_{max} 10W, permitted voltage $0 \div 4$ Vdc, permitted current: $0 \div 3$ A,
- measuring, storing and evaluation of various values and characteristic curves of the fuel cell models
- recording of the measured values and performing automatically, with voltage regulation, with current regulation or manually,
- checking the efficiency of the fuel cells,
- displaying of up to 10 individual voltages of a fuel cell stack in real time,
- recording and displaying of characteristic curves and efficiency of the electrolyzers,
- recording and displaying graphs of voltage/current, power/time, power/current, power/voltage.

To operate with the card, the following are also supplied:

- connections for terminals and power supply,
- monitoring cable and USB cable.