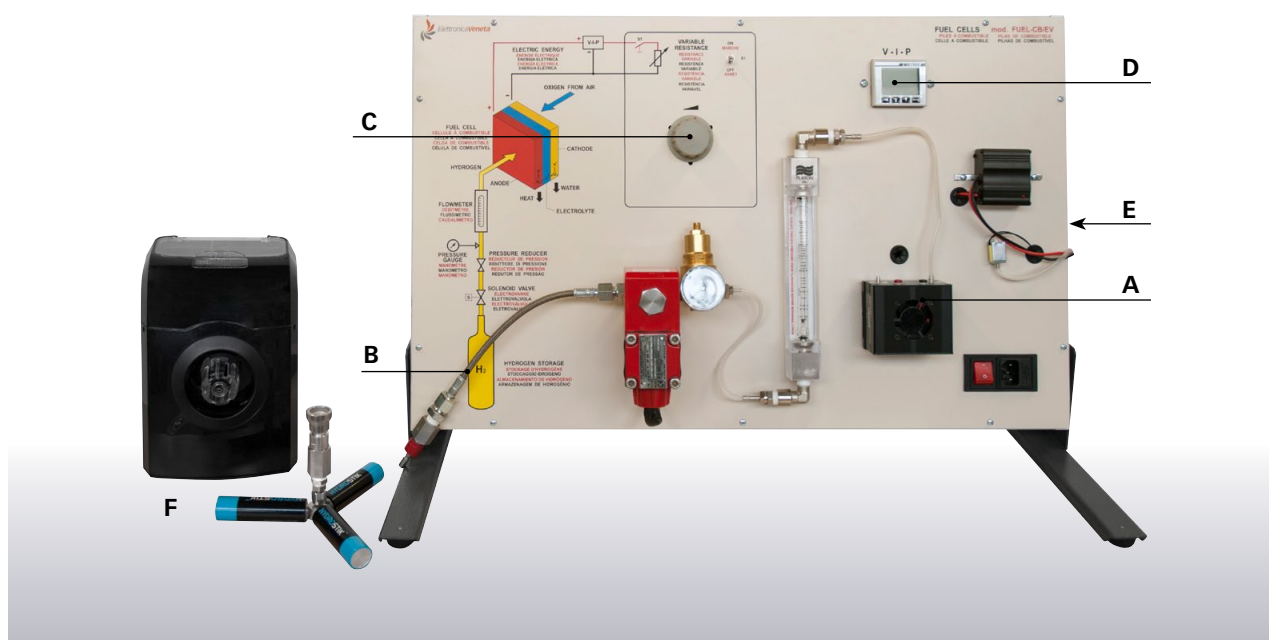


FUEL CELL TESTING PANEL

Mod. FUEL-C.../EV

Mod. FUEL-C...C/EV (computerized version)



INTRODUCTION

Energy saving and environmental pollution reduction are crucial global issues. Using Hydrogen as alternative source to fossil fuels can address both issues, especially if it is produced with the help of renewable energies.

Considering the above, this system enables experimental investigation of the electrochemical energy conversion taking place in a fuel cell stack fed by hydrogen and oxygen (present in atmospheric air). The equipment is manufactured using real components available on the market.

DESCRIPTION

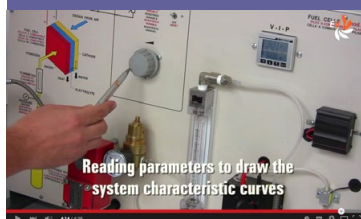
The system consists of:

- A) Fuel cell stack
- B) Hydrogen feeding line
- C) Variable electric load
- D) Instrumentation
- E) Data acquisition board with USB interface for PC connection (computerized versions only)
- F) Mini Electrolyzer with a set of metal hydride cartridges (models FUEL-CE/EV and FUEL-CEC/EV only)

Relevant features:

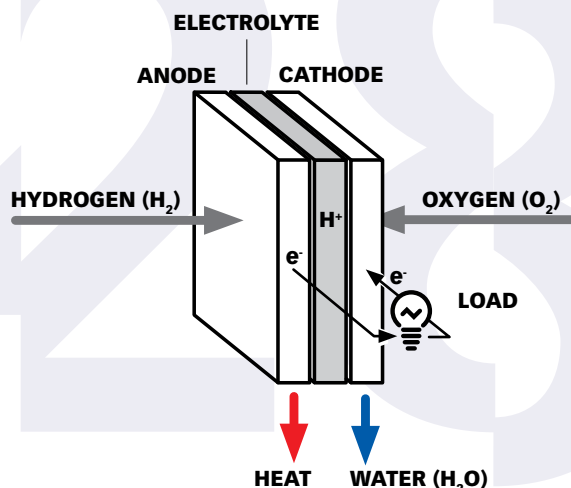
- The fuel cell stack is PEM type and consists of cells connected in series.
- The room air feeding the stack carries the oxygen and cools the stack at the same time.
- To operate, the fuel cell stack must be supplied with hydrogen produced by the PEM Electrolyser mod. HG-300 and stocked by the H2-300 storage tank (not included, refer to the end of this data sheet). For models FUEL-CE/EV and FUEL-CEC/EV only, a mini electrolyzer with its set of metal hydride cartridges is already included.

A video demonstration is available on Elettronica Veneta YouTube channel



Scan code to watch



Operating principle:

The hydrogen coming from the metal hydride cylinder crosses the membranes of the fuel cell stack and combines with the oxygen of the air forming water. This process produces, on the one hand, electricity and, on the other hand, heat. The electricity is used to power an electric load while the heat is released to the environment.

TRAINING PROGRAM:

- Hydrogen storage in metal hydrides
- PEM fuel cells
- System startup
- Evaluation of the system operating parameters
- Calculation of the produced and consumed power
- Calculation of the efficiency of energy conversion
- Drawing the fuel cell stack characteristic curves
- Data acquisition and system supervision via PC (computerized versions only)

TECHNICAL SPECIFICATIONS:

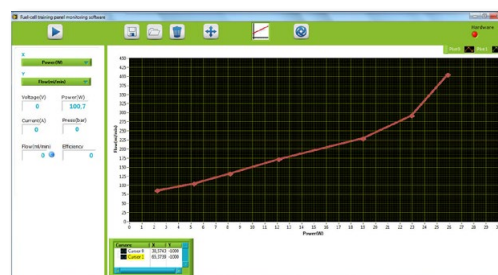
- Painted metallic framework with fore panel of insulating material
- Comprehensive colored diagram of the system
- Stack of PEM fuel cells including air supplying and cooling fan/s and (not for models FUEL-CE/EV and FUEL-CEC/EV) purge solenoid valve:

Model	Nominal power (W)	Regulator	Computerized vers.
FUEL-CE/EV	12		
FUEL-CEC/EV	12		YES
FUEL-CB/EV	20	YES	
FUEL-CBC/EV	20	YES	YES
FUEL-CD/EV	30	YES	
FUEL-CDC/EV	30	YES	YES
FUEL-CG/EV	60	YES	
FUEL-CGC/EV	60	YES	YES
FUEL-CF/EV	100	YES	
FUEL-CFC/EV	100	YES	YES

- Hydrogen feeding line with:
 - solenoid valve
 - pressure regulator
 - pressure gauge
 - pressure transducer (computerized versions only) for measuring and transmitting to the data acquisition board the pressure of hydrogen feeding the fuel cell stack
 - variable area flow meter (non-computerized versions only)
 - thermal mass flow meter (computerized versions only) for measuring and transmitting to the data acquisition board the flow rate of hydrogen feeding the fuel cell stack
- DC multifunction analyzer for the fuel cell stack output electric parameters
- DC electric load: toroidal rheostat with adjustable knob
- Set of three metal hydride cartridge for hydrogen storage (models FUEL-CE/EV and FUEL-CEC/EV only)
- Electrolyzer for cartridges refill (models FUEL-CE/EV and FUEL-CEC/EV only)

PC data acquisition (computerized versions only)

- The unit includes a data acquisition board with USB interface for connection to PC.
- A specific software (developed with LabView) is supplied to monitor the different parameters of the system.
- Parameters displayed:
 - Voltage, current and power generated by the stack and powering the load
 - Flow rate of hydrogen feeding the stack
 - Pressure of hydrogen feeding the stack
- The software enables to:
 - Calculate the energy conversion efficiency



- Draw the fuel cell stack characteristic curves
- Save the exercises data for future analysis or project work

Power supply: 230 Vac 50 Hz single-phase
(Other voltage and frequency on request)

Dimensions: 65 x 40 x 10 cm

Net weight: 10 kg

FUEL CELL FEEDING

To operate, the fuel cell stack must be supplied with hydrogen produced by the PEM Electrolyser mod. HG-300 and stocked by the H2-300 storage tank (see image below).

Mod. FUEL-CE/EV and FUEL-CEC/EV are already supplied with a mini electrolyser and a set of hydride cartridges. In this specific case mod. HG-300 and H2-300 are optionals (not included) and can be used to increase the operating time of the system compared to the supplied accessories.



Feeding the fuel cell with hydrogen from the storage tank H2-300 (image 2), previously fed by the PEM Electrolyzer HG-300 (image 1)

INDISPENSABLE

PERSONAL COMPUTER

- NOT INCLUDED -
(computerized versions only)



PEM ELECTROLYZER

Mod. HG-300 (NOT INCLUDED)

To feed the storage tank; capacity: 300 ml/min
(optional item for mod. FUEL-CE and FUEL-CEC/EV)

METAL HYDRIDE STORAGE TANK

Mod. H2-300 (NOT INCLUDED)

To feed the fuel cell; capacity: 300 l
(optional item for mod. FUEL-CE and FUEL-CEC/EV)



SUPPLIED WITH

THEORETICAL-EXPERIMENTAL HANDBOOK

