Advanced Green Hydrogen Fuel Cell Workstation

Nvis 6007B

Climate change and air pollution are two crucial global issues. Green Hydrogen can be used to overcome these issues because it is a clean and versatile energy source. Its potential as a clean energy solution makes hydrogen a crucial component in sustainable and environmentally friendly systems. Recently developed Fuel cell electric vehicles (FCEVs) are powered by hydrogen. They are more efficient than conventional internal combustion engine vehicles as it produce no harmful tailpipe emissions and emit water vapor only.

Nvis 6007B Advanced Green Hydrogen Fuel Cell Workstation is a versatile system to understand the fundamentals of Green Hydrogen generation technology and give as opportunity about how fuel cell works. All components of the fuel cell system are displayed individually.

It includes green hydrogen generator which splits water (H_2O) into its constituent elements as hydrogen (H_2) and oxygen (O_2) by passing an electric current through an electrolyte solution. A Proton Exchange Membrane (PEM) fuel cell produces electricity through a chemical reaction using hydrogen and oxygen. Hydrogen Pressure Regulator is used to set a particular pressure of hydrogen gas that is required for the proper operation of a fuel cell stack.

Hydrogen Supply Valve that supplies hydrogen from the green hydrogen generator to the fuel cell stack. Hydrogen Purge Valve removes water and purges out redundant air gas from the fuel cells, Controller controls the stack temperature, blowers, hydrogen input, purging and performance of the stack.

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Features

- Complete understanding of Green Hydrogen Generator and PEM fuel cell.
- Fuel cell stack is PEM type and consists of 20 cells connected in series.
- Provided with all necessary Connections/Tubing.
- Setup with adequate current, voltage and temperature protection.
- Diagrammatic representation for the ease of connections.
- Safe and easy to be operated.

Scope of Learning

- Study of generation of hydrogen by using hydrogen generator.
- Study of fuel cell output voltage at different pressure and flow conditions.
- Test the fuel cell at different load condition.
- Study of VI characteristics of fuel cell.
- Study of the Measurement of Fuel Cell Efficiency

Optional

- Study of DC output voltage of Solar Power Plant.
- Study of Battery Charging Current from PV and observe the Inverter AC output.

Technical Specifications

Mains Supply	:	Single Phase, 230V ±10%, 50Hz
SMPS power supply	:	13V (±1V), 5A
Hydrogen pressure value	:	1no.
Hydrogen pressure regulator	:	1no.
Type of fuel cell	:	PEM
Flow rate at max output	:	840ml/min
Number of cells	:	20
Rated power	:	60W
Max stack temperature	:	65°C(149°F)
External temperature	:	5 to 30°C (41-86°F)
Reactants	:	Hydrogen and Air
Over Temperature shut down	:	65°C
Over Current shut down	:	12A
Low Voltage shut down	:	12V
Performance	:	12V @ 5A
H2 pressure	:	0.45-0.55Bar
Hydrogen purity	:	≥ 99.995% (Fuel Cell)
Output volume	:	0-1010 ml/min
Hydrogen purity	:	99.999% (Hydrogen Generator)
Output pressure	:	0-4 Bar (0-60psig)
Input power	:	450W (approx.)
Input Mains	:	220V±10%, 50Hz
Over pressure protective value	:	0.46 MPa
KOH weight	:	500g

Fuel Cell

Green Hydrogen Generator

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Electrical Vehicle (EV) Load Consists of

Electrical Vehicle Load

Head Lamp

Operating Voltage	:	12V
Rated Current	:	3.28A (approximately)

AC Blower

Operating Voltage	:	12V
Rated Current	:	1.85A (approximately)

Wiper

Operating Voltage	:	12V
Rated Current	:	0.64A (approximately)

Horn

Operating Voltage	:	12V
Rated Current	:	0.2A (approximately)
MS pipes	:	38mm x 38mm x 1.5 mm, 1.5mm
MS drawers with handle	:	3nos.
Dimensions of drawer	:	W = 275 mm; D = 375 mm; H = 100 mm
Thickness of drawer	:	1.2mm
Wooden Top	:	19 mm thick plywood
Overall dimensions of setup	:	W = 1200 mm; D = 900 mm; H = 1500 mm

Optional

- Solar power plant of 1kW capacity with inverter, battery and structure.
- Rheostat 110Ω, 5A

Subject to change - Version 2.0

Designed & Manufactured in India by

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