



# 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.



# Advanced Green Hydrogen Fuel Cell Workstation

## Nvis 6007B

### 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

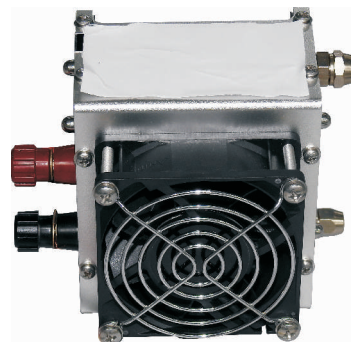
- Study of generation of hydrogen by using hydrogen generator.
- Study of fuel cell output voltage at different pressure and flow conditions.
- Test the fuel cell at different load condition.
- Study of VI characteristics of fuel cell.
- Study of the Measurement of Fuel Cell Efficiency

### 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 $\pm$ 10%, 50Hz |
| SMPS power supply              | : | 13V ( $\pm$ 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                           |
| H <sub>2</sub> pressure        | : | 0.45-0.55Bar                       |
| Hydrogen purity                | : | $\geq$ 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 $\pm$ 10%, 50Hz               |
| Over pressure protective value | : | 0.46 MPa                           |
| KOH weight                     | : | 500g                               |



Fuel Cell



Green Hydrogen Generator



# Advanced Green Hydrogen Fuel Cell Workstation

## Nvis 6007B

### Electrical Vehicle (EV) Load Consists of

#### 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) |

**Stainless steel 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



Electrical Vehicle Load