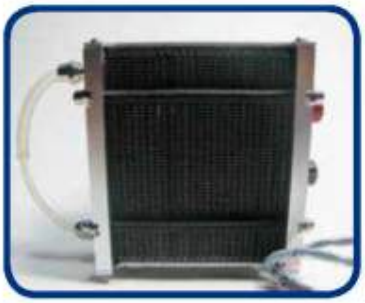
INSTRUMAX

COMPUTER CONTROLLED PEM FUEL CELL TRAINER

STACK AND SYSTEM COMPONENT INFORMATION

Stack

- Is made up of plate-like cells with air channels to allow the flow of air across the membrane. The membrane facilitates the flow of Hydrogen creating the release of electrons. Electrically conductive separator plates between each pair of cells enable the flow of electrons. The stack aspect is that they are all placed on top of each other and held together by epoxy endplate



Blower

- Supply air to the fuel cells and meanwhile decrease the temperature of the stack.

Controller

- Controls the stack temperature, blowers, hydrogen input, purging and short circuiting of the stack

Visit Our Website
www.instrumax.com.au

SPECIFICATIONS

- Type of Fuel Cell: PEM
- Number of Cells: 20
- Rated Power: 100W
- Performance: 12V @ 8.3A
- H2 Supply Valve Voltage: 12V
- Purging Valve Voltage: 12V
- Blower Voltage: 12V
- Reactants: Hydrogen and Air
- External Temperature Range: 5 to 30°C
- Max. Stack Temperature: 65°C
- H2 Pressure: 0.45-0.55 bar
- Hydrogen Purity: ≥ 99.995% dry H2
- Humidification: Self-humidified
- Cooling: Air (integrated cooling fan)
- Flow Rate at Max Output: 1.3 L/min
- Start-up Time: ≤ 30 seconds at ambient temperature
- Efficiency of Stack: 40% @ 12V
- Low Voltage Shut Down: 10V
- Over Current Shut Down: 12A
- Over Temperature Shut Down: 65°C
- External Power Supply: 13V (±1V), 2A
- Variable Load
- Battery 12V

ACCESSORIES TO CONTROL PEM

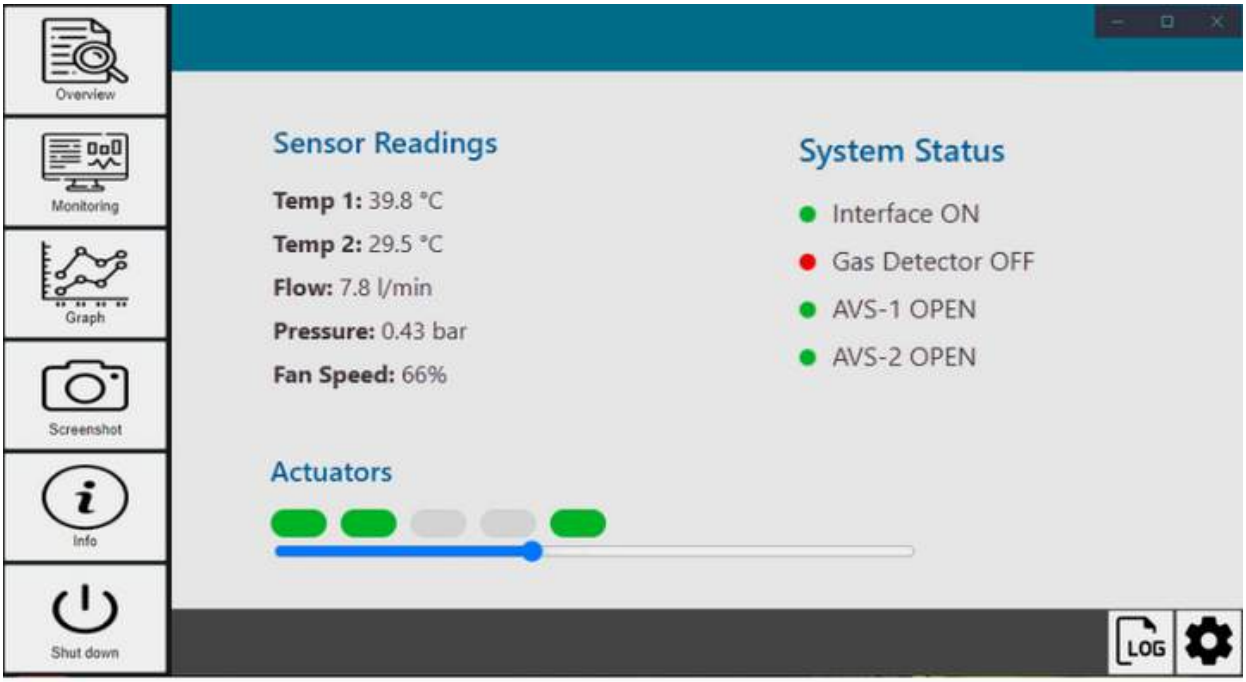
- Pressure regulator for the hydrogen inlet at the PEM fuel cell, range: 0 – 1 bar.
- Solenoid valve to supply H2.
- Purge solenoid valve.
- Load module.
- Hydrogen on demand desktop refueling station

INSTRUMENTATION:

- Flow sensor: for H2 flow to the stack. (optional)
- Pressure sensor: for H2 pressure at the stack inlet.
- Temperature sensor: for temperature of the purge stream, temperature in the stack.
- Current and voltage sensors.

SOFTWARE

- Real-Time Data Acquisition: Captures and displays data from various sensors in real-time for immediate analysis.
- Graphing Tools: Real-time plotting of multiple data sets with customizable axes for visual analysis.
- User-Friendly Interface: Intuitive graphical user interface (GUI) designed for ease of use.
- Data Logging and Export: Allows for data logging and exporting CSV and Excel format for further analysis.
- IoT Integration: Cloud-based connectivity enabling remote monitoring and visualization.



Note: Images are subject to change with product improvements.

Visit Our Website
www.instrumax.com.au

EXERCISES AND PRACTICAL POSSIBILITIES

- Study the basic ideas behind how a proton exchange fuel cell (PEM) function.
- Study on how hydrogen and air consumption affect a fuel cell's efficiency.
- Study on how generated electricity affects a fuel cell's efficiency.
- Analyzing a fuel cell's voltage and current density characteristics.
- Power density comparing variable loads.
- Representation of the polarization curve of a fuel cell.
- Study of the influence of the current flow in the load circuit.

The user can create and complete a number of additional exercises.