

Multi-station durability test rig for single PEM electrolyzer membranes

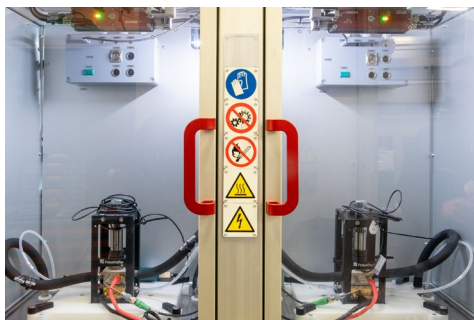
Stand-alone testing solutions



This rig is designed to perform durability tests on individual PEM electrolyzer membrane cells, to characterize cell performance over time. The rig consists of 8 independent test stations. Each station can adjust the flow and temperature of the anode circuit and the pressure of the cathode circuit, control the current or voltage applied to the cell and perform electrical functional tests, including impedance spectroscopy (EIS).

THE SYSTEM

The test bench is designed both for laboratory use and for production-line audits, and can assess the quality of the entire PEM membrane production process. The test bench therefore features a sophisticated automation system that gives full control over all test input conditions. The system is flexible: a fixture-change system allows it to handle different product types.



1. Test Station

MAIN FEATURES

The system can carry out a variety of tests on individual PEM electrolyzer membrane cells, providing a thorough analysis of their performance over time under different input conditions.

- > Anode circuit: adjustable inlet flow and temperature.
- > Cathode circuit: adjustable working pressure.
- > Electrical functional test
- > Impedance spectroscopy (EIS)

TECHNICAL SPECIFICATIONS

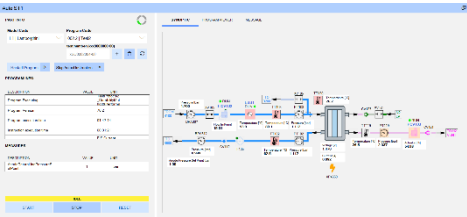
- > Membrane Type: PEM
- > Number of Stations: 8
- > Voltage Range: 0–10 V
- > Current Range: 0–40 A
- > Cathode Pressure Range: 1–10 barG
- > Anode Pressure Range: 1–3 barG
- > Anode Water Flow (per station): 5–50 l/h
- > Anode Water Temp. (per station): 25–90 °C



2. Hydraulic Circuit

THE SOFTWARE

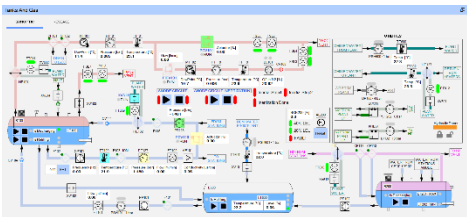
The software is based on Loccioni's Aulos platform, a suite comprising two main systems: **Aulos Automation**, a desktop monitoring application that includes the HMI for controlling the hardware and running routines, and **Aulos Supervisor**, which collects data and results from the systems and creates their programs and configurations.



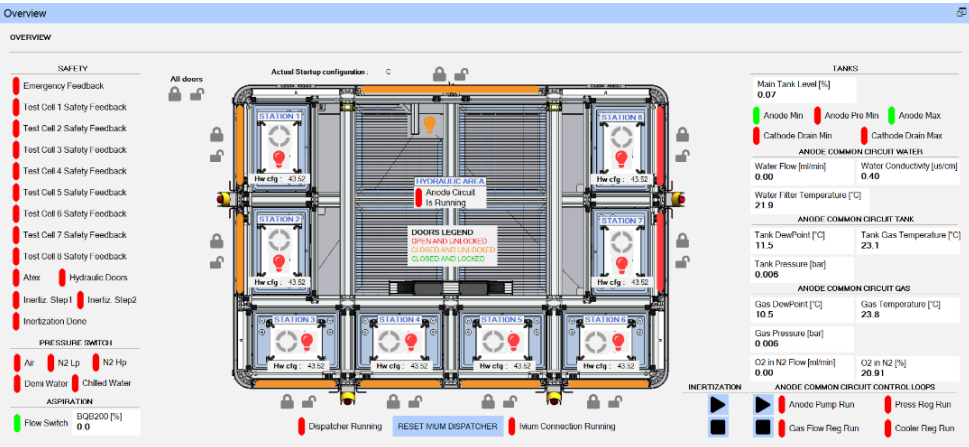
3. Station Automation Panel

Application features include:

- > User Access Configuration
- > Hardware Monitoring and Calibration
- > Manual Debug
- > Dashboard
- > Program Editor
- > Program Execution
- > Automatic Cycling
- > Result Analysis
- > Health Analysis
- > Data Maintenance Tool



4. Synoptic View



5. Main Bench Overview

LOCCIONI