

FLEXIBLE PEM FUEL CELL TEST STANDS

FLEXIBLE SYSTEMS FOR TESTING PROTOTYPE FUEL CELLS

Client

Major automotive manufacturer (Fuel Testing Labs).

Problem Scope

The company needed a flexible system to test prototype fuel cells. There are eight test stands that control the flowing and humidifying of gasses. The function of the test stands is to control heating and cooling, the temperature of gasses, humidity of gasses, performance and electronic load of the fuel cells. The fuel testing lab required a system that would perform various tests on the fuel cells to control the hardware, datalogging, and user interface. As prototype units, new tests are required on a frequent basis. The main challenge was to design a system with flexible architecture that would allow frequent test and hardware changes and new software features with minimal software modifications.

Viewpoint's Solution

In order to achieve maximum flexibility in the test stands, Viewpoint used NI's Fieldpoint, NI data acquisition cards, GPIB interface, and RS-485 serial boards. LabVIEW was chosen as the software that would integrate the various types of hardware together and operate the test stands.

Technical Highlights

The main elements of the software include user interface, controlling algorithms, input, output, calibration, datalogging and test automation. To achieve maximum flexibility, the software was written so that modifications, upgrades and replacements can be made to each segment without affecting the other segments. This factor is key in the ease of use and continual operation of the prototype fuel cells.

The test stands are required to perform tests for long periods of time, which called for a system that would maintain their stability. Protection of the fuel cell from damage and safety of the operators was also taken into consideration when designing the system.

Results

The test stands have been in operation for six months and the company is pleased with the flexibility and reliability of the system. The prior system did not meet the needs of the testing lab as it was too inflexible and required considerable time to reprogram each test.

