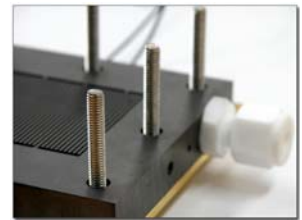
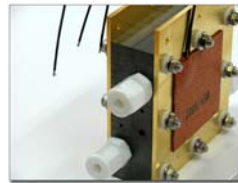


WonATech Fuel Cell Test Station

WFCTS



- Fuel Cell Test Systems
- Fuel Cells, Stacks and Hardware
- Solutions and Membrane Material
- Carbon Cloth and Paper
- And more.....



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WFCTS

Fuel cell Test System



FEATURES

- ▶ Fully Integrated & Automated system
- ▶ Max. 4 channels control & acquisition independently
- ▶ Flexible Operation
- ▶ Safety Designed with various protection
- ▶ Three independent programs for communication, control and analysis
- ▶ Variable Fuel cell supports; PEM, DMFC, PAFC, SOFC, MCFC etc
- ▶ For single cell or stack
- ▶ Reformer simulation
- ▶ Using WFTS Software
- ▶ Powerful GUI (graphical user interface) makes user easy to operate the system.
- ▶ Stand-alone modular type or rack mount type available

DESCRIPTION

The WFCTS Fuel cell testing system provides a complete range of fuel cell performance experiments for the fuel cell scientist and fuel cell engineer.

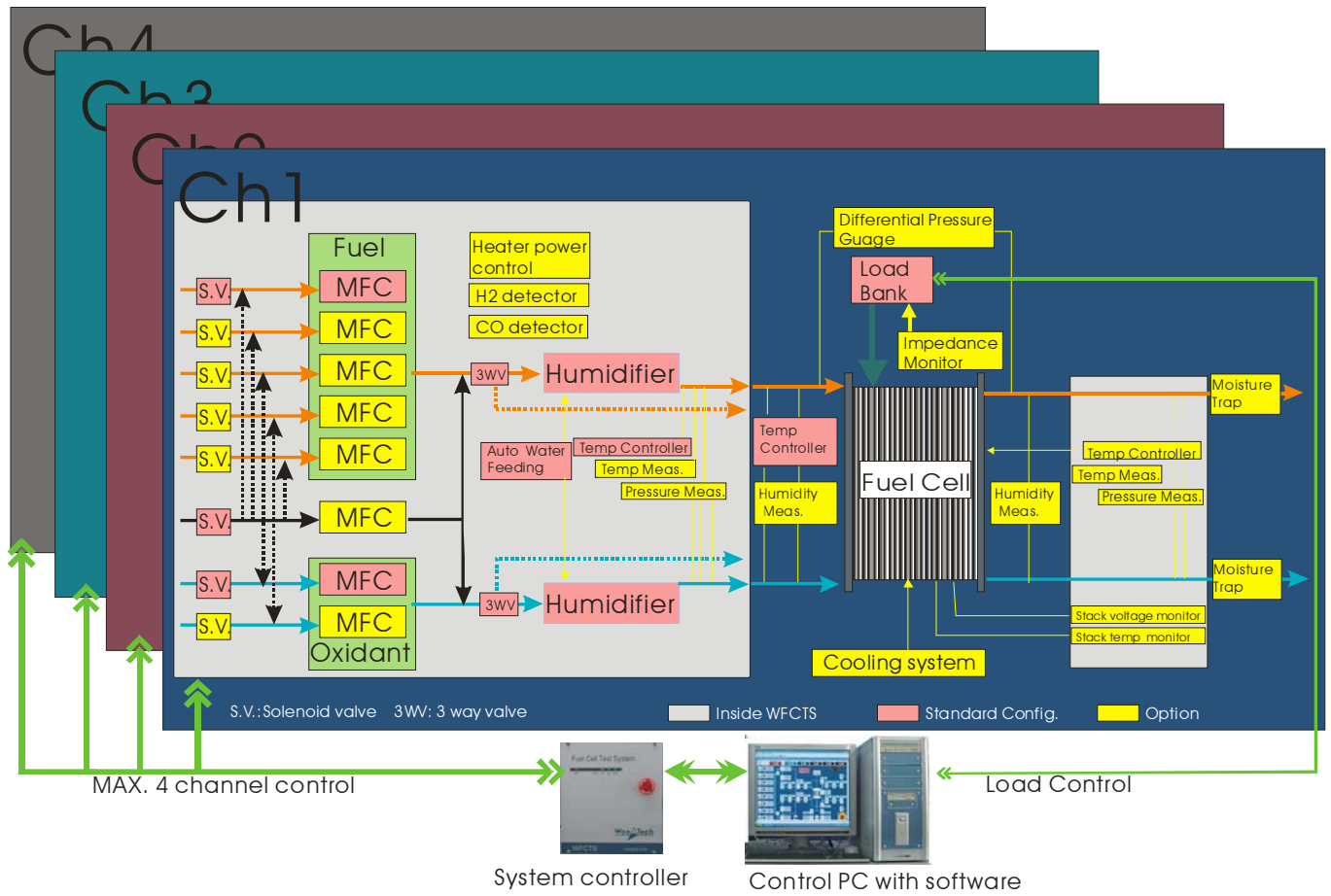
WonATech can manufacture fully customized test station to meet each customer's individual requirements.

Test station can measure fuel cell parameters such as humidity, temperature and gas flows, voltage and current while controlling all aspects of the testing environment.

WFCTS is controlled by a PC under the Windows 98/XP/2000 environment. The user interface follows the Windows application design guide. If you are familiar with Windows applications, you can use the software even without the operation manual or on-line help. The commands, parameters, and options are in terminology that most researchers are familiar with.

Test data is saved to a binary file that can be exported to an Excel™ program for external data handling. This data set can be analyzed using independent data analysis program DATA MANAGER.

System configuration



- By expanding system controller, one control PC can manage Max. 4channels with full optional equipments.
- Easy to expand system configuration by adding proper optional equipments.
- Each channel's configuration can be different by user's purpose
- The system can be equipped into rack or independent modular chassis.
- For gas reformation, Max. Fuel gas line is 5, Max. oxidant gas line is 2
- Nitrogen gas flowing path thru MFC or without MFC is available
- PC controllable heating power on/off is available.

Standard Configuration List

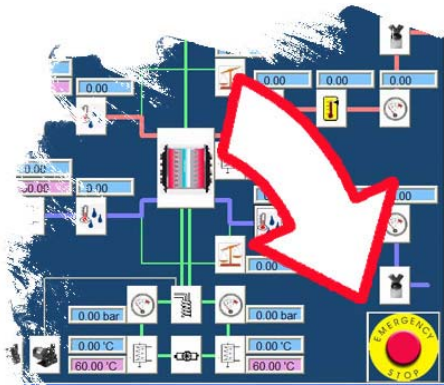
- | | |
|--|---|
| <ul style="list-style-type: none"> - Solenoid valve: 3ea - MFC for Anode and Cathode - Check valve: 4ea - 3 Way valve: 2ea - Humidifier: 2ea - Automatic water feeding for humidifier: 2ea | <ul style="list-style-type: none"> - Temperature controller(line heater): 4ea - Load bank: 1ea - Stack or cell Temperature controller: 1ea - System controller with emergency switch - Control PC with WFTS software - Interface boards with cables |
|--|---|

Optional Equipment List

- | | |
|--|--|
| <ul style="list-style-type: none"> - MFC(s) for Anode and/or Cathode for Reformate - MFC for Nitrogen - Pump for DMFC - Heater Power control - Gas detectors - Temperature controller with measurement (Outlet) - Temperature measurement (Outlet) - Humidity measurement(Inlet, Outlet) | <ul style="list-style-type: none"> - Pressure measurement(Inlet, Outlet) - Impedance Monitor - Stack cooling system - Stack temperature monitor(each cell) - Stack voltage monitor(each cell) - Differential pressure gauge - Moisture trap |
|--|--|



Safety Features



- ▶ Over-limit protection of current, voltage, power, temperature or pressure are included in the software through system configuration and/or each device's limit setting. If monitored value meets one of limit condition then the experiment will be stopped automatically for safety.
- ▶ Watch dog will make the system stop when unexpected communication interruption between PC and system.
- ▶ Uninterrupted Power Supply can be installed to prevent PC & system shutdown in case of power failure.
- ▶ Fail function will stop experiment automatically when the reading value is different from control value due to system component's malfunction.

- ▶ Toxic and/or combustion gas detectors/alarms may be installed to protect against gas leakage. Up to two gas sensors to detect gas leakage are available at various locations throughout the hydrogen gas supply and vent paths. At the moment of detection gases, the system will be shut off automatically.
- ▶ Fail-safe solenoid valves will automatically shut off the Cathode Gas (CG) flow and the Anode Gas (AG) flow and switch to Nitrogen purging, particularly in the event of an over temperature condition within the operating fuel cell.
- ▶ For safe load control, fail function is active. (If reading value is different from control value, system will stop experiment.)
- ▶ Emergency Stop Buttons is provided by hardware and software. The system will be shut down on pressing any of these buttons.
- ▶ If stack or cell voltage's reading value is under standby voltage, Load could not be active.



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