

PEM FUEL CELL TESTER

FCT-150S / FCT-50S



New compact Fuel Cell Testers for PEM...
... imagined by users, made by professionals



Bio-Logic and Paxitech have combined their expertise to design new compact fuel cell test stations. The **FCT-150S** and **FCT-50S** are complete instruments for PEMFC testing. Based on feedback from our customers, they are designed to be the most flexible test stations on the market.

The FCT-150S and FCT-50S are directly interfaced to a PC by an Ethernet connection. This type of connection also allows the unit to be placed on a Local Area Network for remote access. An alternative USB connection is also available.

The compact chassis integrates a programmable electronic load (250 W), gas control (flow, pressure and temperature) and data acquisition circuitry. The electronic load uses state-of-the-art technology and is capable of reaching very low voltage levels (virtually 0 V) at 150 A (for FCT-150S) and 50 A (for FCT-50S).

A number of safety features have been incorporated in the hardware and also in the software. In the event of an unanticipated overload or loss of control, the FCT-150S and FCT-50S will automatically perform a safe shutdown procedure and turn in purge mode.

FC-Lab® is the operating software used to control and analyze data from the instrument. With an ease-to-use interface, it offers all controls and functions for fuel cell testing with individual tabbed menus. The graphic functions offer a **real-time display** of performances with respect to each of the measured or controlled variables.



GENERAL SPECIFICATIONS:

- Electronic Load: 250 W
- Max current: 150 A / 50 A
for FCT-150S and FCT-50S respectively
- 5 V Reference voltage
- Resolution: 76 μ V
- Electrochemical Impedance Spectroscopy (EIS)
measurement option (10 kHz to 10 μ Hz).

FC-LAB® MONITORING SOFTWARE

With an ease-to-use interface, this software enables control of the fuel gas supply and of the electronic load on separate tabs.

The temperature, pressure and flow rates of the fuel gases are monitored and controlled in the software on a specific "Cell & Gas" window while electrochemical techniques are set in separate "Load" tab. FC-Lab software contains many techniques and has the ability to sequence up to 100 experiments to create unique test programs. FC-Lab software has evolved into an easy-to-use package with unique features and advanced functions.

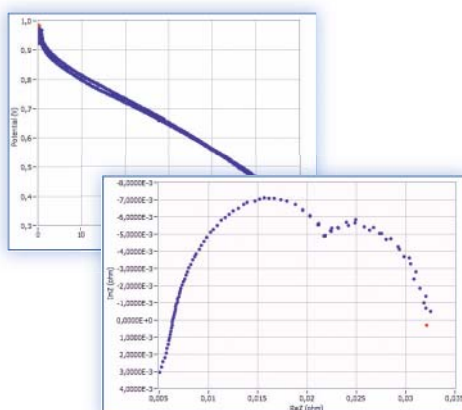


The software provides a very simple interface. On the load tab, linked technique experiments can be created quickly. Using the selector on the left side of the screen, the user can switch quickly from one technique to the other. For each technique the user access settings and graph by a simple mouse click in the selector.

Data are continuously downloaded from the instrument to the computer. As a result, the number of data points recorded is not limited by the buffers in the instrument (on-board buffers can hold 50000 data points).

When the experiment is launched, the instrument is also a complete autonomous station thanks to its operating system. If the computer suffers a disconnection with the instrument, data continues to be collected to the on-board buffers. Data is then forwarded when the connection is re-established.

FC-Lab file format is compatible with EC-Lab® software offering the possibility to analyze data with the powerful tools of EC-Lab software (linear fit, integral, EIS data fitting...).



Safety features:

Both hardware security in the FCT testers and software security in FC-Lab software are implemented for safe experiments. In the instrument an automatic shutdown with switch to N₂ purge is done in case of under voltage, over current, over temperature, loss of pressure supplied. An external alarm can be connected and an emergency stop button is available on the front panel. Software securities can be configured for each controlled variable (flow, temperature, pressure and load) both on the anodic and cathodic sides.

DESCRIPTION

Gas control and display

- Temperatures, Pressures, Flows
- Independent for each cell and each gas

Facilities

- Current Density Display
- On the fly Parameter Modification
- Multi Variable Graphic Display

Load control

- Galvanostatic / Galvanodynamic
- Potentiostatic / Potentiodynamic
- Power / Load

Techniques

- Open Circuit Voltage
- Voltage Pulse
- Current Pulse
- Voltage Scan
- Current Scan
- Potentio EIS
- Galvano EIS
- Constant Load Discharge
- Constant Power Discharge
- Loop

SPECIFICATIONS

Electronic load	FCT-150S	FCT-50S
Maximum load current	150 A	50 A
Maximum load power	250 W	250 W
Minimum load resistance	0,7 mΩ (0,1 V at 150 A)	0,7 mΩ (0,035 V at 50 A)
Current measurement accuracy	0,5% FSR*	0,5% FSR*
Current resolution	11 mA	4 mA

Potential measurement

Maximum voltage	5 V
Potential measurement accuracy	< 0,1% FSR*
Potential resolution	76 μV

Impedance

	FCT-150S	FCT-50S
Frequency range	10 μHz to 10 kHz (accuracy 1%, 1°)	10 μHz to 10 kHz (accuracy 1%, 1°)
Amplitude (programmable)	Potenti: 1 mV to 1 V Galvano: 150 mA to 75 A	1 mV to 1 V 150 mA to 25 A

Data acquisition

10 000 samples/s

Communication

Ethernet 10/100 baseT

Temperature controllers

5 Heater PID controllers	One for the cell 2 for humidifiers 2 for heaters
Probe	PT 100 (software limit: 120°C)

Reactant gas control system	FCT-150S	FCT-50S
Humidifiers	PaxiTech design with bypass Temperature: ambient to 120°C 100% saturation at 87°C from ambient to 4 bars for Input Gas Flow of: 5 L/min 1,7 L/min 1,8 L water bottles/max. fill capacity 0,6 L	
Heated reactant delivery line	870 W	
Mass flow control (automatic)	H ₂ : 0-120 l/h O ₂ : 0-300 l/h Double calibration for O ₂ and Air	0-40 l/h O ₂ : 0-100 l/h Double calibration for O ₂ and Air
Back pressure control	0-5 bars manual	
Internal alarms on temperatures and pressures		
External alarm input		

Option

Transfer gas line heaters Max temperature 120°C

General

Dimensions	495 x 430 x 470 mm
Weight	50 kg
Power	85-264 V, 47-440 Hz
PC configuration	Pentium IV, Windows 2000, XP or Vista

* FSR: Full Scale Range
Specifications subject to change

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