MSTB 500

Test Bench for testing modular S-Design SOFC stacks in the range of 100 to 500 W

This test bench has been developed as analysis tool for the characterisation of 100 to 500 W SOFC stacks operating under ideal condition with realistic fuel. It is equipped to characterise SOFC stacks fuelled with hydrogen and/or desulphurised natural gas. The test assembly includes a Catalytic Partial Oxidation (CPOx) fuel processor and an exhaust gas after-burner. An electric air preheating system is also included to guarantee a minimum inlet stack temperature of 650°C. Components have been selected to maximise the duration of uninterrupted long term tests in a laboratory environment. The appealing packaging of the unit gives it a product like look beyond the style of traditional research stations.

The test bench can be operated with 1 to 6 stack modules containing 6 repeating units each. A control software is implemented under LabView™ environment and is based on an embedded industrial PC for control and data acquisition. PC and critical devices are protected by a proper UPS battery. The test bench has been designed to guarantee safe operation on the basis of hardware limit switches and safe valves.

All components are integrated on a compact trolley. All 4 side-panels can be open to allow an easy access for maintenance and diagnostic operations.

Back and front view of the MSTB 500

Design

- Operating with laboratory components
- Rack on wheels for good mobility
- Doors at front, left & right for easy access to integrated BoP components like mass flow controlers, valves, electronics, etc. for maintenance
- Connections at rear side for
  - Input gases: Natural Gas, Hydrogen, Nitrogen, Air, Forming Gas,
  - Exhaust pipe, condensed water
  - Cooling water circuit
  - Electrical Power & Signals
- Separation in two functional areas to allow safe servicing of the unit also during operation:
  - the hot part on the top including furnace and SOFC stack
  - the cold part with the electronics and Balance of Plant components.

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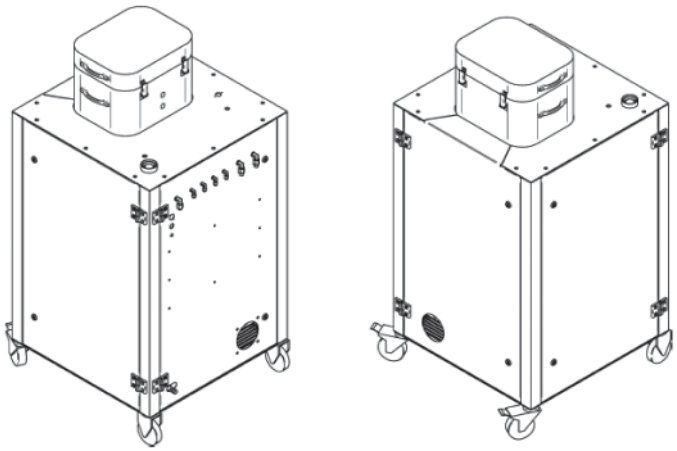
Main Specifications

Main specifications for test bench and laboratory are reported in the table below*

Max Stack power	500 W
Overall weight	ca. 100 kg
Foot print	700 x 700 mm^2
Height	1.5 m
Power supply	AC 400 V 3Ph, 50 Hz, 16 A fuse
Hydrogen supply	3 bar, 12 Nl/min
Nitrogen supply	3 bar, 12 Nl/min
Forming gas supply	3 bar, 30 Nl/min
Natural gas supply	desulphurised @ 150 mbar, 4 Nl/min
Cathode gas supply	clean compressed air @ 3 bar, 200 Nl/min
Coolant supply	soft water @3 bar (2 liter/min, 20°c)
Minimum aspiration flow (exhaust)	150 Nm^3/h
Air preheater	2 kW up to 650°C

The customer has to provide all the necessary infrastructures, e.g. gas supply lines at proper pressure or cooling circuit as specified above to operate properly and safely the equipment.

For Stack integration and connection, the S-Design Stack modules are mounted directly on the Bench



*Specifications are subject to change without notice.

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