FUELCELL Store

Operating Instructions

F111 Methanol Fuel Cell

J103 Junior DMFC

Email: sales@fuelcellstore.com

Toll Free: +1 855 251-0016

International: +1 979 703-1925

Website: fuelcellstore.com

Introduction and Intended Use

In the future, many areas of the power generation industry will exploit the chemical transformation of energy in fuel cells in order to generate electricity from hydrogen. The success of this technology will be based upon the universal availability of hydrogen and its ecological and economic benefits.

Methanol, a liquid carrier of hydrogen, is a fuel employed in fuel cells which can be compared in its use to petrol or diesel fuels for internal-combustion engines. It is being examined closely by the automotive industry for its potential for use in drive concepts.

The Methanol Fuel Cell Junior provides a vivid demonstration of this technology.

The equipment has been developed for teaching and demonstration purposes only.

Any other use is prohibited.

Caution!
The Methanol Fuel Cell Junior employs an approximately 3 % methanol-in-water solution. Methanol is toxic and highly flammable. The General Safety Precautions contained in these Operating Instructions must be observed.

h-tec
Hydrogen Energy Systems

wishes you many enjoyable hours learning about this technology with the Methanol fuel cell Junior.

- The system is intended for teaching and demonstration purposes in schools, universities, institutions and companies only.
- It may only be set up and operated by a competent person.
- Read the Operating Instructions before setting up the Methanol Fuel Cell Junior. Follow them during use and keep them readily available for reference.
- The system is not a toy. Operate the Methanol Fuel Cell Junior and keep it and the methanol solutions out of the reach of small children.
- Remove inflammable gases, vapours and fluids from the vicinity of fuel cells and electrolyzers. The catalysts contained in the system can trigger spontaneous combustion.
- Methanol and its vapours are toxic. The equipment may therefore be used only in well-ventilated areas.

- The system may only be operated in a display case, which is sufficiently ventilated at all times. The operator is obliged to prove this by means of appropriate measurements.
- Methanol is flammable. Remove from the vicinity of the system anything that could ignite the methanol (naked flame, materials that can become charged with static electricity, substances with a catalytic action).

- Do not smoke.

- Use the cell only on a level surface.
- Only operate the system at room temperature and ambient pressure.
- Tell your students about any potential dangers and carefully supervise experimentation.

h-tec will not accept any responsibility for injuries or damage sustained in the event of these Safety Precautions not being followed.

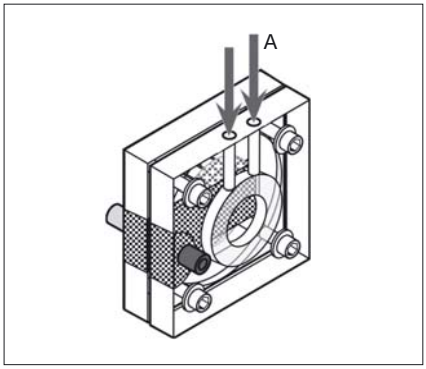
General Safety Precautions

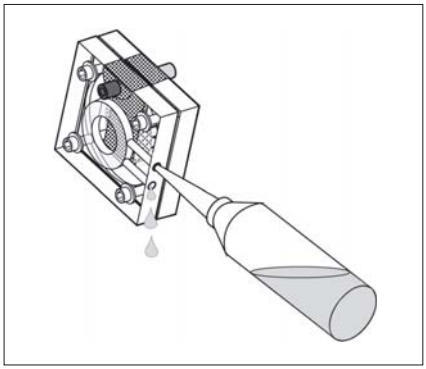
Safety precautions for the handling of methanol

- Observe the warning information on the bottle, and the associated safety data sheet.
- Use only approximately 3 % (by weight) methanol-in-water solution. Other concentrations are not allowed.
- Do not allow the methanol solution to come into contact with the skin or eyes.
- Do not allow the methanol solution to be swallowed or its fumes inhaled.

First-aid measures in the event of contact with methanol

- In the event of contact with the skin, wash immediately with large quantities of water.
- In the event of contact with the eyes, wash immediately with large quantities of water, and consult an eye specialist.
- Should methanol fumes be inhaled, open windows or take affected persons into the open air.
- Should the solution be swallowed, give the affected person large quantities of water to drink, and consult a doctor.
- In the event of an accident or nausea, consult a doctor immediately. Show the doctor the methanol bottle and label.





1. Read the General Safety Precautions.
2. Before setting up the cell, remove the labels from the top holes **(A)**.

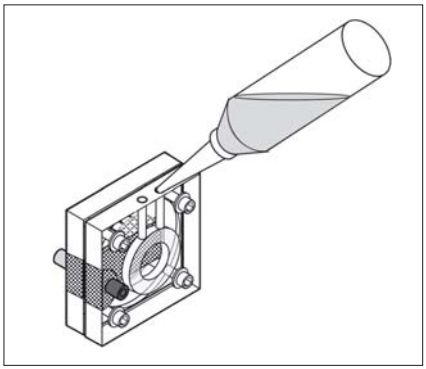
   The two holes on the top **(A)** are used for charging and venting the cell.

Should the cell have dried out, continue from Step 5.

3. To drain water from the cell, hold the cell with one hole above the other.
4. Squeeze the pipette to force air into the top hole. The water flows out of the bottom hole.

   Use an absorbent disposable cloth. Observe the safety instructions.

5. Pour approximately 3 % methanol solution into the cell through one of the top holes (see diagram on page 7). The air escapes through the other hole.



- The cell begins delivering electrical power after approximately five minutes and will continue to do so for around three hours. Should the cell have dried out, the start-up time may last up to an hour.
- Should the cell no longer deliver power, the methanol has been exhausted. Drain the remaining water in this case and fill the cell with fresh methanol solution as described in Steps 3 to 5 of the instructions.

Maintenance

If the cell is not to be used for a longer period, flush it out with distilled water. Use the labels provided to seal the top holes and the air vents, in order to prevent the cell from drying out.

The cell's ability to function as a direct methanol fuel cell may deteriorate after longer periods without use. Should the desired performance not be reached following repeated recharging with a methanol solution of approximately 3 %, we recommend charging the fuel cell for 48 hours with 1 % sulphuric acid, and then charging once more with a solution of approximately 3 % methanol. Note that sulphuric acid is highly aggressive. Wear goggles and protective gloves, and observe the warning information on the bottle and the associated safety data sheet.

	Methanol Fuel Cell	**Junior DMFC**
Item No.	F111	J103
Height	50 mm (60mm)	140 mm
Width	50 mm (120mm)	100 mm
Depth	40 mm (90mm)	40 mm
Weight	60g (100g)	115g
Electrode area	4cm^2	
Generated Power	10 mW	10 mW
Generated Voltage	300-500m V DC	300-500mV DC
Fuel	approx. 3% methanol solution (by weight)	approx. 3% methanol solution (by weight)