# ABB Power Conditioning Systems

## DC/AC Converter for PEM Fuel Cell System
## Hydrogenics, Mississauga, Canada

Plant Reference Sheet

**80kW Fuel Cell Converter**

# Overview

For Hydrogenics' new 80kW PEM Fuel Cell Unit, ABB provided a DC/AC Power Conditioning System. The purpose of the project was to demonstrate Hydrogenics' new 80kW fuel cell stack. The PCS convert the dc-power generated by the fuel cell stack to ac-power, injected into the utility grid at 575V.

ABB' PCS was successfully commissioned with Hydrogenics' Fuel Cell stack in Spring 2003.

## Mechanical

The PCS is delivered in a NEMA 1 in-door electric cabinet. The cabinet contains the dc/ac inverter, sinus filters, contactors, protective devices and controls. Power cables and controls wires are easily interconnected to the fuel cell dc-source, the ac-grid and the customer control system respectively. The supplied enclosure is sized 2 m long x 0.6m deep x 2.2 m high.

## Inverters

The DC to AC conversion is performed by an ABB voltage source IGBT inverter unit. This voltage source inverter is capable of controlling power from the fuel cell to the grid while compensating for the fuel cell dc-voltage which varies as a function of power output. The unit also has an additional controls feature allowing system self support with power from the fuel cell if utility power is lost. The inverter modules utilize forced air cooling with a fan.

## Magnetics

Three air-cooled sinus filters assures harmonic currents and voltages within the IEEE 519 standards. A dry type VPI power transformer provides galvanic isolation and voltage matching between the fuel cell/inverter voltage and the 575V grid.

## Control

The complete control of the Power Conditioning System support system is done digitally. Grid and load voltage monitoring, inverter and fuel cell current controls, inverter charging and sequence control, protection and monitoring are all implemented in the digital RMIO controls. A simple keypad with display provides local human machine interface, and a digital serial is used for controls interface with customer control systems.


Picture shows ACS600 inverter module used in the fuel cell PCS enclosure.

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## Main Technical Data

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| Plant: | Hydrogenics, Missassauga, Canada |
| PCS Installation: | Indoor |
| Fuel Cell Installation: | Indoor |
| Enviromental Conditions: | 0°C +40°C |
| Primary Supply: | 575V / 60 Hz |
| Inverter Control: | AMC Controls Cards and AC 800M |
| Inverter Technology: | IGBT Voltage Source Inverters |
| Communication: | Modbus Serial Link |

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