



ANALYTIC SYSTEMS

Power Conversion Solutions

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** SPECIAL REPORT **

Fuel Cell Power Controllers

Application Notes

Fuel Cell's are similar to solar panels in that they exhibit a VI curve where the voltage decreases with increasing output current.

Adapting a switch mode DC-DC converter to work with a fuel cell is similar to a solar panel. To prevent the converter from drawing too much current from the fuel cell and 'locking' it down to a un-useable voltage level, Analytic Systems uses a 'discontinuous operating mode' once the output voltage from the fuel cell falls below the optimum operating voltage. Once the load on the converter is reduced so that the fuel cell voltage recovers, the converter resumes a normal continuous mode of operation. As this is a normal mode of operation for the converter, the audible alarm is disabled for the low input voltage condition, although the low input LED will still light to show when the converter is running in discontinuous mode.

If the peak load exceeds the maximum power output of the fuel cell, then a battery should be added to the system to handle the peak currents, and the converter be built as a DC-DC battery charger.

Product Descriptions

The type of converter to be used with the fuel cell varies depending on the voltage required by the load and the range of voltages available from the cell. If the voltage from the cell is always greater than required by the load, then a simpler step-down or 'buck' converter such as the VTC300 or VTC600 can be used. Conversely, if the load voltage is always greater than the output voltage of the cell then a step-up or 'boost' converter such as the VTC305 or VTC605 can be used. All of these converters are 'common negative'.

If the voltage required by the load is both greater and less than the fuel cell output voltage (i.e. The fuel cell voltage ranges from 40 to 60 VDC, and the load is 48 VDC) then we recommend a fully isolated converter such as the VTC315, VTC615 or VTC1015. We also recommend these converters if full electrical isolation is required between the fuel cell and the load.

If the fuel cell is being used to charge a battery, then simply changing the first 3 digits of the part number from VTC to BCD will add the necessary components for battery charging.

We can build converters for load voltages from 1.5 to 48 VDC, fuel cell voltages from 12 to 300 VDC, and power levels from 60 to 1500 watts.

Please contact our Engineering Support team if your application is for operation with a fuel cell. Provide a VI graph if possible to allow us to tailor the converter exactly to your requirements. We will advise on the extra charges (usually minimal) to adapt one of our converters to your exact requirements.

