

Green Energy Fuel Cell System Relies On Thermal Flow Meters and VIP Flow Conditioner

Ready for Whatever Comes Down the Pipe

San Marcos, CA — Process and plant engineers will find the versatile [ST80 Series](#) thermal mass flow meter from [Fluid Components International](#) (FCI) provides highly accurate, reliable air/gas flow measurement in the latest fuel cell technology projects designed to provide clean electric power while reducing and eliminating harmful emissions such as carbon, NOX and SOX that are detrimental to the environment.



FCI's ST80 flow meters and [Vortab Insertion Panel \(VIP\)](#) flow conditioners have been successfully installed in a new green energy project using fuel cells to produce electricity, hydrogen and hot water. The design and implementation of this project will help the plant owner benefit from the California Bioenergy Market Adjusting Tariff Program (BioMAT) for reselling excess electricity while also allowing them to move closer to zero emissions at the site.

The ST80 flow meter and VIP flow conditioner were installed for monitoring of multiple process applications: (1) fuel gas primary feed; (2) fuel gas pressure relief; (3) deoxidizer relief line flow; (4) cooling tower vent, anode exhaust gas; and (5) fresh air blower discharge flow. VIP flow conditioners were utilized when less than ideal pipe straight-run conditions would have impacted overall measurement accuracy.

Featuring FCI's Adaptive Sensor Technology™ (AST™), the ST80 flow meter is designed with an innovative, patented hybrid sensor drive. This measuring technique combines, for the first time, both of the industry's highly proven constant power (CP) and constant temperature (CT) thermal dispersion sensing technologies in the same instrument.

In addition to this new measurement drive technique, there is a choice of four different flow sensor element designs to ensure best installed performance, including FCI's new wet gas solution. The Wet Gas MASter™ sensor developed for the ST80 Series optimizes the sensor head design and installation to prevent condensation droplets, entrained moisture or rain from contacting the thermowells, which ensures steady, reliable measurement.

Adding to the ST80 flow meters applications versatility, they are suitable for pipe diameters from 1 inch to 99 inches [25 mm to 2500 mm] and air/gas temperatures up to 850 °F [454 °C]. They feature accuracy of $\pm 1\%$ of reading, $\pm 0.5\%$ of full scale and repeatability of $\pm 0.5\%$ of reading with flow rates as low as 0.25 SFPS up to 1000 SFPS [0,07 NMPS to 305 NMPS] and 100:1 turndown.

The outputs and user interface choices for this meter are extensive and interface with virtually any control system and/or set-up or configuration devices. Standard outputs include dual, NAMUR NE43 compliant 4-20 mA analog outputs, HART (version 7), Modbus 485 and a USB port (for interfacing with configuration freeware). FOUNDATION Fieldbus or PROFIBUS PA or DP can be optionally added. The optional backlit LCD display provides digital and bar graph readouts of the flow rate and temperature, totalized flow, alarms, diagnostics feedback and even a user defined label/tag field.

The transmitter enclosure for the ST80 flow meter is NEMA 4X/IP67 rated, selectable for NPT or metric conduit port threading and is available in both aluminum and stainless steel and may be remotely located up to 1000 feet [305 m] apart from the flow element. The instrument also carries global approvals for use in hazardous areas and a 3rd party evaluation that demonstrates compliance to IEC 61508.

The VIP flow conditioner neutralizes flow profile irregularities caused by elbows, valves, blowers, compressors, and other flow disturbances that commonly occur in piping and duct runs. The VIP provides a swirl-free, repeatable flow profile that flow meters require for accurate measurement. The VIP is particularly effective with wide-turndown and/or low flow sensitive flow meter technologies (e.g. thermal dispersion) to provide a highly repeatable flow profile during laminar, transitional and turbulent flow conditions.

Fluid Components International is a global company committed to meeting the needs of its customers through innovative solutions for the most challenging requirements for sensing, and measuring flow, pressure and temperature of gases.