Application News

Flow Measurement System Handles Large Viscosity Shifts

Industry: Industrial/Power Generation ***Service: Viscosity Correction*** ***Fluid: Mineral Oil***

Overview

Today, fuel cell technology is recognized as an innovative solution delivering economic, social, and environmental benefits in terms of reliable, clean, cost-effective power and, ultimately, sustainability—preserving and protecting the earth's natural resources. A fuel cell is an electrochemical energy conversion device, similar to a battery in that it provides continuous DC power, which converts the chemical energy from a fuel directly into electricity and heat.

Situation

A leading manufacturer of fuel cell power solutions had a demanding process requiring accurate monitoring of mineral oil flow. As part of its operation, the manufacturer wanted to interface flow measurement equipment with its existing data acquisition (DAQ) system. It needed a flow metering device with a large viscosity shift (from approximately 0.8 up to 40 cSt) and a maximum temperature range of 200 degrees C. The DAQ system handles data logging functions, and is used to perform viscosity corrections as well.

Solution

Flow Technology supplied the fuel cell manufacturer with its FT Series turbine flow meter configured for the high temperature limit with a customized CA03 amplifier. This system provides accurate and reliable digital outputs for use in both viscosity and density correction.

Because of its versatility, the FT Series meter can be employed in a wide variety of liquid and gas flow sensing applications. For added robustness in this application, it was equipped with journal bearings and a high temperature pickoff. The CA03 amplifier, when used with an RF pickoff, generates a carrier frequency that is modulated by the rotating blades of a turbine rotor. This eliminates the effects of magnetic drag, greatly extending the range and linearity of turbine meters.

System Description

The FT Series turbine flow meter utilizes a Universal Viscosity Calibration (UVC) defining the change between the meter's output and the viscosity shift, and providing the data needed for the DAQ system to accurately correct for viscosity shift. The meter output is sent into the customized CA03 with adjustable input gain; this capability allows the user to minimize the effects of temperature shift on the performance of the electronics (such as changes in inductance). The CA03 provides a clean 0 to 10 V pulse that is sent directly to the DAQ system.

Technical Information

Flow Meter: FT4-6
Flow Rate: 0.25 to 2.5 GPM
Fluid: Mineral Oil

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