AW-LAKE
PROCESS FLOW MEASUREMENT

APPLICATION SPOTLIGHT

Coriolis Flow Meters Ensure Accurate Product Transfer in Hydrogen Pumping Stations

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APPLICATION:

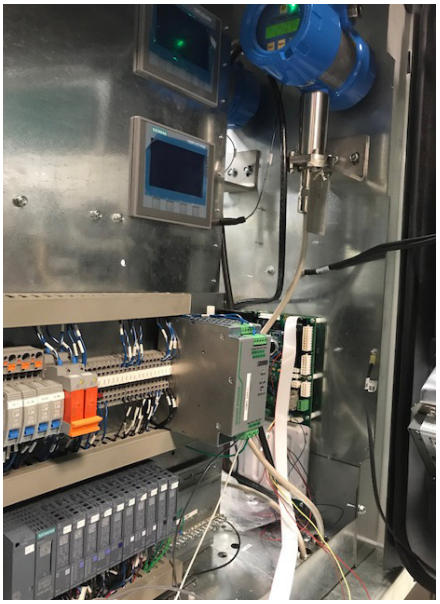
A Western Michigan Fueling Station OEM needed a regulated and more accurate method in measuring hydrogen pumped into vehicles at their hydrogen dispensing stations. The system primarily supports California's fuel cell-powered electric vehicles. Fuel cells convert stored hydrogen into electricity that powers the electric vehicle. This clean technology's only byproduct is water. Alternate technology to the fuel cell is lithium battery-powered electric vehicles, which can take up to 20 minutes to recharge, compared to Fuel Cells, which refill in just 2 minutes.

PRODUCT SUPPLIED:

- TCM-0450 High Pressure Coriolis Mass Meter for Gas
- TCE-8000 Coriolis Transmitter
- SignalFire Wireless Telemetry System featuring a 900mHz Gateway and Ethernet Interface Module

CHALLENGE:

Because the pumping station is a "custody transfer" application, very high accuracy is critical when transferring product for purchase and must be performed according to international gas regulations for hydrogen dispensing. Dispensing and taxing of hydrogen is only permitted with a certified fuel dispenser.



Rear view of control system with IO cards and dispensing controls

Most hydrogen mass flow meters used for dispensing hydrogen into electric vehicles require that flow meters be located on the "warm" side of the heat exchanger, resulting in lower accuracy readings. A higher accuracy flow meter that performs within regulations is needed to support the application.

SOLUTION:

AW-Lake's TRICOR TCM-0450 High Pressure Coriolis Mass Flow Meter is the only certified MI-002/OIML137 Coriolis meter that operates on the "cold" side of the heat exchanger for improved filling accuracy. The flow meter offers mass-based measurement, independent of density and viscosity, at an accuracy of up to 0.1% of reading. Compact, wear-free, and low maintenance, the TCM-0450 is the world's first certified Coriolis flow meter for hydrogen dispensing in accordance with the European CE-Directive, MID.

The transmitter portion of the TCM 0450 sends flow data to a Gateway of a SignalFire Wireless Telemetry System, which delivers output – via Modus – to the customer's PLC. The DIN rail mounted Gateway features a wireless 900mHz network with integrated I/O capability for easy connectivity of multiple sensors.

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The transmitter's integration with the mesh network of the SignalFire Gateway facilitates serial communications with the pump. Using an Ethernet Interface Module to convert the Modbus signal from the TCE-8000 Coriolis Transmitter to an Ethernet TCP, the wireless telemetry system sends flow data to the customer's PLC, where the process is monitored and recorded.

The SignalFire Modbus-to-Ethernet TCP Gateway is used to monitor flow as well as temperature and density. This remote monitoring system has become this OEM's standard package for all hydrogen fueling pumps.

SignalFire DIN Gateway

Rear view of hydrogen pumping station showing TCM-0450 High Pressure MID-002 / OIML certified Coriolis meter.

Front view of low pressure (5000 psi) hydrogen pumping station on skid.