Application News

Big Three Automaker Tests Hybrid Vehicle Designs Using Advanced Flow Measurement Systems

Industry: Automotive ***Service: Flow Rate*** ***Fluid: Coolant/Transmission Fluid***

Overview

Today, the "Big Three" Detroit automobile manufacturers have aggressive R&D programs for hybrid vehicles. These programs, initiated in response to rising fuel costs and increased environmental awareness, support the growing market demand for hybrid autos providing reduced fuel consumption. Key to the development of new hybrid vehicles is research into advanced systems for transmission fluid and engine coolant.

Situation

The customer needed an accurate solution for measurement of coolant and transmission fluid flow rates. Coolant is used to remove heat from the combustion engine. Transmission fluid is used to lubricate both the gears of a vehicle as well as the reduce friction in the moving parts of the electric motor. Measurement of coolant flow rates, pressures and temperatures, in conjunction with the same measurements from the transmission fluid, helps engineers design to maximum efficiency and reliability.

The temperature requirement of the coolant/transmission fluid testing application typically includes testing from cold start through extreme heat.

Solution

After reviewing the customer's specifications, Flow Technology delivered a pair of flow measurement solutions: an FT Series turbine flowmeter and LinearLink Temperature Compensated Interface (TCI) for coolant measurement, and a Decathlon Series Positive Displacement (PD) flowmeter for transmission fluid measurement.

The FT Series turbine meter is a versatile instrument offering high accuracy, compact size, and fast speed of response. The LinearLink TCI is a sophisticated electronics platform for flowmeter linearization and viscosity correction.

Intended for a wide variety of liquid flow applications, the DC-I positive displacement meter has only two moving parts for utmost reliability and low cost-of-ownership.

System Description

The compactness and economy of the FT Series turbine flowmeter made it an ideal choice for measuring coolant flow. Although the viscosity of the water/glycol coolant mixture was very temperature sensitive, the LinearLink TCI with a Universal Viscosity Curve (UVC) kept the accuracy well within specification.

In the case of transmission fluid, viscosities of up to 5,500 cp necessitated the use of a Decathlon Series PD flowmeter. The DC-I meter provided very accurate readings at cold temperatures while ensuring adequate readings at higher temperatures. This meter was also more compact and economical than a mass flow meter. Polyphenylene Sulfide impellers were selected to handle sudden temperature changes.

Technical Information

Flow Meters (Model Number): FT6-8AEU3-LEG-1, DC02I-6115-5102000
Electronics (Model Number): LNT-C2-MAB6, IS-160-01
Flow Rate: Transmission Fluid: 1-8 LPM
Coolant: 0.38-19 LPM
Fluid: Coolant, Transmission Fluid

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