

Application News

Turbine Flow Meter Solution Optimizes Testing for Off-road Equipment

Industry: Heavy Equipment

Service: Flow Rate/Total

Fluid: Transmission Oil

Overview

Heavy equipment manufacturers must ensure the ruggedness and reliability of every component used onboard tractors, backhoes, bulldozers and other off-road equipment. Engine and drive train components are subjected extreme conditions while in service in the field, including high temperature, high pressure, vibration, etc.

Situation

A leading manufacturer of tractors and other agricultural off-road equipment uses an automated test stand to test torque converters for leakage prior to equipment assembly. Transmission oil is measured before entering the converter and again after exiting. Any difference in the flow rate can be attributed to leakage in the device. The testing is complicated by the fact that fluid volume at cool temperature is not the same as a high temperature.

Solution

To help the customer obtain accurate flow rate measurements, Flow Technology provided a solution comprised of an FT Series turbine flow meter paired with the LinearLink™ Temperature Compensated Interface (TCI). The FT Series meter is an ideal choice when high accuracy, compact size and fast response are critical. The LinearLink TCI is a sophisticated electronics platform for flow meter linearization and viscosity correction. It provides significant improvements in accuracy even under dynamic temperature conditions.

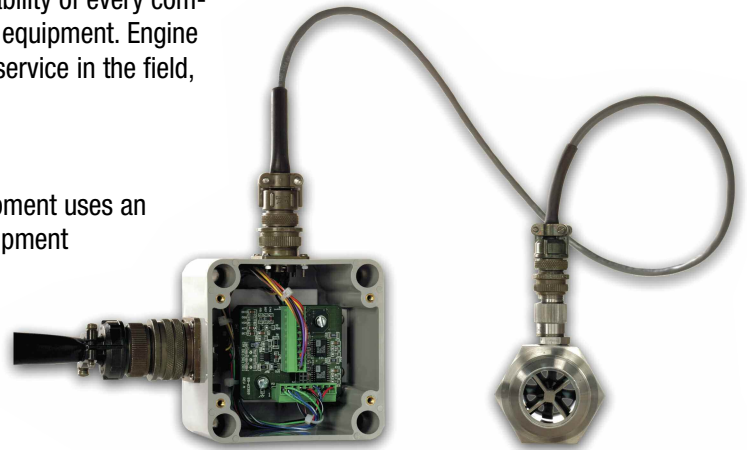
In this application, the LinearLink TCI infers mass by density compensation, essentially bringing the cold and hot fluid volumes to a standard. Regardless of the process temperature, the compensated volume of flow is converted to a weight equivalent—allowing the customer to determine the amount of leakage that has occurred during a test procedure.

System Description

Torque converters are mounted on a test stand fixture that includes an inlet/outlet manifold. The converters are run through various preprogrammed tests to evaluate their overall performance. The system measures various parameters including oil leakage rate.

FT Series turbine flow meters are installed in series on the test fixture, with the inlet meter located downstream of the unit under test and the outlet meter positioned upstream of the device. The system is pressurized with transmission/drive train oil flowing at a rate of 40-50 gallons-per-minute (nominal). The oil can reach temperatures as high as 260° F on the outlet side of the system while backpressure is maintained at 60 psi throughout the testing.

Thanks to precision flow measurement that compensates for changes in fluid temperature, test engineers can determine the oil leakage rate of the torque converter by subtracting the outlet fluid flow rate from the inlet flow rate.



Technical Information

Flow Meter (Model Number):	FT-32C1U2-LEAT1
Electronics (Model Number):	LNT-3-C0-MAB7
Flow Rate:	40 – 50 GPM
Fluid:	Transmission Oil



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