Highly accurate dosing of oil for damper systems with Coriolis mass flowmeter.

Measurement made easy

Introduction

In every automobile at each tire a damping system is installed. These dampers are usually hydraulic models and require a certain volume of oil for proper function. The absorber part of the damper has to be filled with a certain volume of oil or a similar medium, providing the same behavior when pressed through narrow holes of the piston.

The challenge

The necessary amount of oil for each piston has to be measured precisely, since too less or too much oil leads to improper function of the damping system. As the used media has no conductivity, the commonly used Electromagnetic Flowmeter can’t be used for this application. Additionally, volume varies with changing temperature and makes any volumetric measuring device less accurate.
Solution

It is ABB’s CoriolisMaster with its outstanding features, who could demonstrate his capability to customer’s fullest satisfaction.

Because of the characteristics of the dosing process in respect of quantity and speed (400 ml per 2.3 to 2.8 sec.) and accuracy requirements (±5 ml per batch) the model FCB150 with Modbus communication has been selected. After installation of a test unit and some optimizations of parameters in the field, the CoriolisMaster worked perfectly for thousands of filling cycles up to now. The customer’s goal was to achieve a repeatability of each batch of mentioned ±5 ml, which could be outperformed by ±3.5 ml, as the final result was a repeatability of ±1.5 ml per batch.

Fig. 1: Damper for automotive application

Fig. 2: CoriolisMaster FCB150 in a highly accurate dosing application

Summary

These very short filling cycles with high precision is only possible through the extended control algorithms within the CoriolisMaster. The advanced hard- and software architecture allows for high end, fast filling applications. The fast frequency output and fast Modbus communication with unique Scan registers helps for easy and high speed system integration.
Fig. 3: Repeatability of ±1.5 ml has been reached

| (A) Measured dose by FCB150 in [ml] | (B) Requested dose in [ml] |

Products used

**Coriolis mass flowmeter CoriolisMaster FCB150**

Nominal diameter: DN 15 (1/2")
Measuring accuracy: ±0.10 % of measured value
Density accuracy: 1 g/l
Process connection: Female thread "G"
Wetted parts material: Stainless steel
Medium temperature: 15 ... 25 °C
Measuring range: 8 ... 8000 kg/h
Output signal: Modbus, 2 digital outputs
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