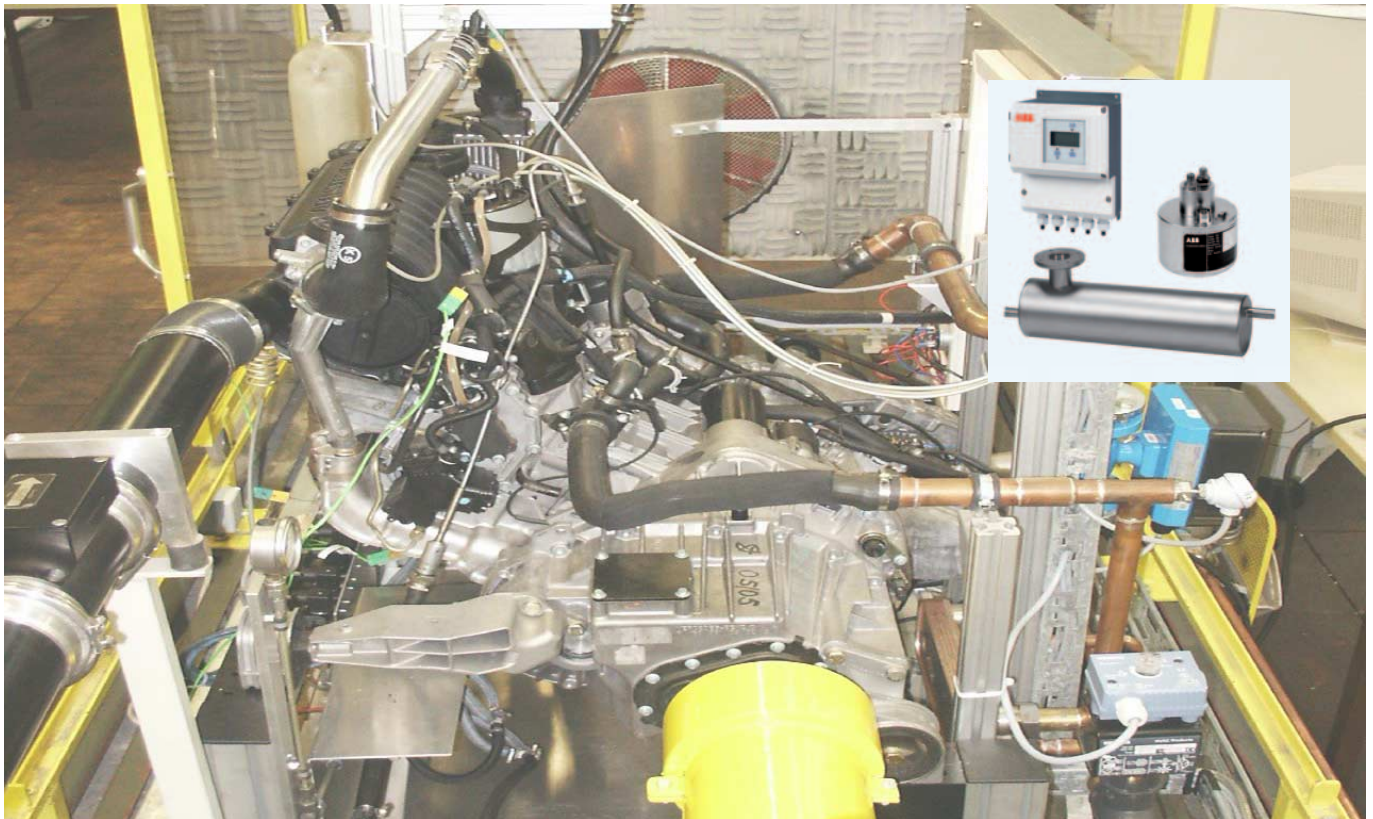


## Instrumentation Solutions



- Extremely wide flow range (1:2000)
- Low wear measurement accuracy – no moving parts
- Most accurate measurements – ideal for internal accounting
- Multivariable measurements – flowrate, density and temperature
- Very high measurement resolution
- Select mass or volume flowrate metering
- Total installation flexibility – symmetrical parallel meter pipe construction
- Low installation costs – compact design

## 1 Introduction

The next generation cars are developed and tested in automobile development centers. All components are subjected to comprehensive testing. The heart of the car – the engine – receives special attention in every new development. This includes not only high, but also very low fuel consumptions.

During the development of the next generation-cars it is equally essential that the latest measurement technologies be employed.

## 2 Problem Solution

The instrument to be used for fuel measurements must have high accuracy, not only at high flowrates, but also at very low flowrates. These varying requirements occur during a single test cycle for which only a single instrument can be utilized.

The ABB Coriolis Mass-Flowmeter FCM2000-MS2 in the meter size DN 6 [1/4"] is the ideal instrument for the requirements specified below with its flow range from 0 ... 1000 kg/h.

<b>Fluid</b>	Various fuels and oils
<b>Flow range</b>	0.5 ... 450 l/h
<b>Signals</b>	Local display 2 current outputs 1 pulse output
<b>Measurement dynamics</b>	Better than 1:2000
<b>Fluid temperature</b>	50 ... 120 °C [122 ... 248 °F]

In addition to totalizing the flow of the oil and fuels used for accounting, calculation and test purposes it is also of special importance to know the quality and composition of the fuel in the test lines. In the past, one has relied on verbal information. The "ABB-Totalizer" now provides for the first time the ability to measure and transmit the quality of the fluid utilizing an „online“ density measurement.


<b>Fluid</b>	Various fuels and oils
<b>Density range</b>	0.7 ... 0.9 kg/l
<b>Accuracy</b>	0.005 kg/l
<b>Reproducibility</b>	0.0001 kg/l

This means that the test stand engineer automatically has information available about the fuel presently being used in the test stand. Differences, for example, between gasoline or diesel fuel as well as the gasoline quality can be recorded and displayed. The density measurement is a "quasi" side benefit of the initial requirement for an exact flowrate measurement.

## 3 Usefulness

The defining advantage of this technology is a maintenance free accuracy. Pure mechanical counters wear with time and lose their accuracy, but the FCM2000, which has no moving parts in the fluid, has no wear. Accuracy and measurement dynamics remain unchanged. Long service life is assured.

## 4 Features of the Components Utilized

Instrumentation	
	<p><b>Coriolis Mass-Flowmeter FCM2000</b></p> <ul style="list-style-type: none"><li>• Meter sizes: DN 1.5 ... DN 150 [1/17" ... 6"]</li><li>• Flow range: 0.03 ... 660,000 kg/h</li><li>• Fluid temperature: -50 ... 180 °C [-58 ... 356 °F]</li><li>• Flowrate accuracy: &lt; 0.15 % of rate</li><li>• Density accuracy: Standard: 0.005 kg/l, Optional: 0.001 kg/l</li><li>• Communication:<ul style="list-style-type: none"><li>2 current outputs</li><li>1 pulse output</li><li>contact in- and output</li><li>HART, PROFIBUS PA, FOUNDATION Fieldbus</li></ul></li><li>• Installation requirements:<ul style="list-style-type: none"><li>no up- or downstream conditioning sections,</li><li>all possible orientations</li></ul></li><li>• Approvals: ATEX, FM, CSA, NEPSI, GOST</li></ul>

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Printed in the Fed. Rep. of Germany (01.2008)

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3KDE010022R3001



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