

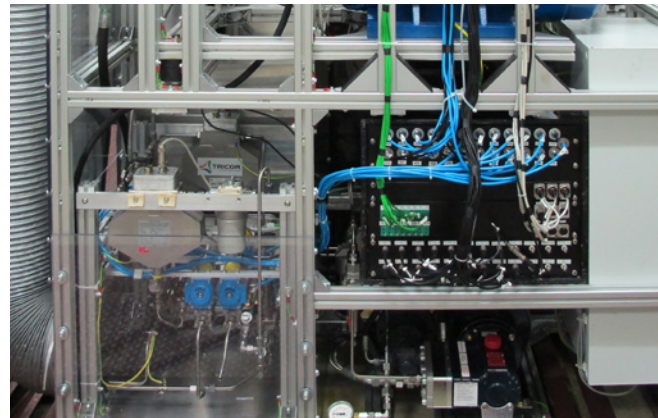
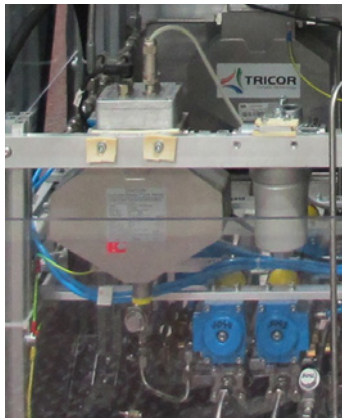
## APPLICATION SPOTLIGHT

Test stand for dimethyl ether alternative fuel





## Test stand for dimethyl ether alternative fuel at the Technical University of Munich (TUM)



### APPLICATION

(Bio-)methyl ethers are being investigated as alternative fuels in bi-fuel diesel combustion processes within the scope of a research project at the Institute of Internal Combustion Engines of the Technical University of Munich. These fuels can be produced from renewable energy sources and a carbon source, such as CO<sub>2</sub> or biomass. They are intended to realize low-soot and therefore clean combustion as fuels in diesel engines. Since the ignitability of dimethyl ether is suitable (cetane numbers in the range of 30 to 80) – old diesel engines can be operated from just 40 cetane – it can be used as a diesel fuel replacement. Only minor modifications to the engine are required. These mainly relate to the injection pump. Installing a pressure tank is also required, similar to the use of liquefied petroleum gas. Dimethyl ether burns without soot formation due to its high oxygen content.

### TECHNICAL DATA

Medium	Dimethyl ether
Temperature	104-212 °F (40-100 °C)
Pressure	Up to 435 psi (55 bar)
Measurement range	3.5-70 l/h (3-60 kg/h)

### PRODUCT

Two TRICOR Coriolis Mass Flow Meters TCM 0325 for liquids and gases, designed for explosion protection zone 2, connection via USB interface.

### CHALLENGE

Measuring the supply and return flow of the fuel on a test stand with a single-cylinder diesel engine. The fuel quantity varies between 3 kg/h and 60 kg/h. Exact determination of the air-dimethyl ether mixture and the efficiency is the goal. The challenge for the measuring components is to realize an especially high measuring accuracy over a very broad measuring span, if possible independently of temperature or viscosity fluctuations.

### SOLUTION

The TRICOR Coriolis Mass Flow Meters that are used deliver extremely precise results over a very broad measuring range with a maximum measured value deviation of 0.1 %, independently of the viscosity and temperature. Thanks to the USB interface, the TCM 0325 can be connected directly and easily to the existing evaluation system, Modbus RTU on MATLAB (MATrixLABoratory).

### RESULT

- Reliable measurement results
- High measuring accuracy
- Straightforward data transmission